IMPROVING THE PRACTICE AND PATTERNS OF EXCLUSIVE BREASTFEEDING IN LAGOS STATE, NIGERIA: AN EVIDENCE SYNTHESIS, QUANTITATIVE SURVEY, AND THEORY-INFORMED QUALITATIVE STUDY

by

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Abstract

Exclusive breastfeeding is critical to support adequate growth and development and reduce infant mortality. Despite interventions to promote exclusive breastfeeding and other recommended infant feeding practices in Nigeria, rates remain suboptimal. This thesis aimed to explore interventions, barriers, and facilitators to exclusive breastfeeding up until 6 months in Lagos state, Nigeria, through three interlinked studies.

The systematic review found that a wide range of interventions to support exclusive breastfeeding in a range of settings in low- and middle-income countries (LMICs) increased rates approximately twofold. Findings from the survey of Health Care Professionals in public health facilities showed critical gaps in knowledge and attitudes, especially managing breastfeeding problems and attitude towards addition of water or formula feeds during the first six months. The qualitative study employed the Capability-Opportunity-Motivation Behaviour (COM-B) model for behaviour change as its underpinning theoretical framework. Facilitators of exclusive breastfeeding identified included knowledge of its benefits, personal determination to exclusively breastfeed, and availability of a strong family/HCP support system: barriers included perceived need to give water, perception of breastmilk insufficiency, need to return to work, and lack of support for exclusive breastfeeding from significant others. These findings indicate the need for commitment from all stakeholders towards the implementation and upscaling of breastfeeding programs in a coordinated manner to increase exclusive breastfeeding in Nigeria.

Dedication

To the Nigerian Child, who in infancy and early childhood is faced with higher odds of death and illness, due in part to sub-optimal levels of simple, inexpensive, and evidence-based interventions such as exclusive breastfeeding.

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Table of Contents

CHAPTER 1: BACKGROUND LITERATURE 1

1.1. Overview of the chapter 2
1.2. Introduction 2
1.3. Historical perspectives 3
1.4. Definition of breastfeeding and other infant feeding terms and their indicators 3
1.4.1. Previous definitions of breastfeeding practices 4
1.4.2. More recent Indicators of breastfeeding and other IYCF practices 5
1.4.3. Recommended infant and young child feeding (IYCF) practices 8
1.4.4. Rationale for the current breastfeeding recommendations 8
1.4.5. Concerns about the current EBF/BF recommendations 10
1.5. Benefits of breastfeeding 11
1.5.1. Benefits to the baby 12
1.5.2. Benefits to the mother 16
1.5.3. Other benefits of breastfeeding 19
1.6. Conceptual framework for determinants of breastfeeding 20
1.7. Global epidemiology of breastfeeding and current trends 23
1.7.1. Sources of data on global epidemiology of breastfeeding practices 23
1.7.2. Global patterns: 'Ever breastfed', and Early initiation of breastfeeding 25
1.7.3. Global patterns of exclusive breastfeeding 25
1.7.4. Global patterns of other breastfeeding practices 26
1.7.5. Inequalities in breastfeeding practices 27
1.8. Regional epidemiology of breastfeeding – sub-Saharan Africa 28
1.8.1. Sub-Saharan Africa 28
1.8.2. Data sources for regional epidemiology description 28
1.8.3. 'Ever breastfed' and early initiation of breastfeeding. 30
1.8.4. Exclusive breastfeeding and predominant breastfeeding under six months 30
1.8.5. Other infant feeding indicators 31
1.9. Situation analysis of breastfeeding in Nigeria 32
1.9.1. Current breastfeeding patterns and recent trends 32
1.9.2. Reasons for low levels of optimum breastfeeding practices within Nigeria 46
1.10. Breastfeeding promotion and support 54

1.10.1. Definitions 54
1.10.2. The Baby Friendly Hospital Initiative 55
1.10.3. Knowledge, attitudes, self-efficacy and breastfeeding-support practices of Health Care Professionals (HCPs) in Nigeria 57
1.10.4. Community support for exclusive breastfeeding 65
1.10.5. Baby-Friendly Community Initiative 65
1.10.6. Effectiveness of interventions to promote breastfeeding. 67
1.10.7. Intervention studies of breastfeeding promotion in Nigeria 71
1.11. Overarching aims and objectives of thesis 77
1.11.1. Over-arching aim 77
1.11.2. Aims of each study 78
CHAPTER 2: METHODOLOGY 79
2.1. OVERVIEW OF THIS CHAPTER 80
2.2. CHOICE OF STUDY METHODS 80
2.2.1. Rationale for choice of methods employed for each of the included studies. 80
2.2.2. Definition and description of mix of methods used in this thesis 82
2.3. Epistemological and philosophical/theoretical perspectives 84
2.3.1. Ontology 85
2.3.2. Epistemology 85
2.3.3. Philosophical/theoretical perspective 86
2.4. CONCLUSION 90
CHAPTER 3: IMPROVING EXCLUSIVE BREASTFEEDING IN LOW- AND MIDDLE-INCOME COUNTRIES: A SYSTEMATIC REVIEW AND META-ANALYSIS 91
3.1. NEED FOR THIS SYSTEMATIC REVIEW 92
3.2. Improving exclusive breastfeeding in low- and middle-income countries: a systematic review and meta-analysis 93
3.3. Additional evidence on interventions to improve EBF rates in Nigeria 120
CHAPTER 4: SURVEY OF BREASTFEEDING KNOWLEDGE, ATTITUDES, AND PROFESSIONAL SELF-EFFICACY AMONG HEALTH CARE PROFESSIONALS 122
4.1 Background 123
4.1.1. Support for breastfeeding 123
4.1.2. Gaps in literature on the knowledge, attitudes, self-efficacy, and breastfeeding-support practices of Health Care Professionals in Nigeria 123
4.2 Aims and objectives. 125

4.2.1. Aim 125
4.2.2. Specific objectives 125
4.3. Study methods 125
4.3.1. Setting 125
4.3.2. Study population 126
4.3.3. Study design 127
4.3.4. Sample size estimation 128
4.3.5. Sampling method 128
4.3.6. Data Collection Technique 130
4.3.7. Data Collection Instrument 131
4.3.8. Data Analysis 139
4.3.9. Ethical considerations 140
4.4. Results 141
4.4.1. Socio-demographic characteristics of respondents 141
4.4.2: Personal breastfeeding experience 144
4.4.3: Perception of personal breastfeeding experience 145
4.4.4. Respondents' knowledge of breastfeeding 145
4.4.5. Attitude towards breastfeeding 150
4.4.6: Respondents' professional self-efficacy 152
4.4.7. Training and practice opportunities for breastfeeding counselling and support 153
4.4.8: Association between knowledge and respondent characteristics 155
4.4.9: Association between attitude and respondents' characteristics 158
4.4.10. Association between professional self-efficacy and respondent characteristics 160
4.5. Discussion 162
4.5.1. Summary of main findings 162
4.5.2. Knowledge of breastfeeding and breastfeeding support 163
4.5.3. Attitudes towards breastfeeding and breastfeeding support 166
4.5.4. Professional breastfeeding self-efficacy 167
4.5.5. Breastfeeding experience, breastfeeding support practices and training opportunities 169
4.5.6. Knowledge and association with characteristics 171
4.5.7. Attitude and relationship with characteristics 174
4.5.8. Professional self-efficacy and HCPs characteristics 175
4.5.9. Strengths and limitations 177
4.5.10. Conclusion 178

CHAPTER 5: A QUALITATIVE STUDY OF INFLUENCES ON EXCLUSIVE BREASTFEEDING IN LAGOS STATE, NIGERIA 180

5.1 Background 181

5.1.1. Introduction 181

5.1.2. Need for a study on behavioural influences of breastfeeding practices 182

5.2 Aim and objectives 183

5.2.1. Aim 183

5.2.2. Study objectives: 183

5.3 Methods 183

5.3.1. Theoretical framework 183

5.3.2. Selection of study communities 186

5.3.3. Background of selected study communities 188

5.3.4. Participant selection 189

5.3.5. Setting of data collection 191

5.3.6. Data collection tools and techniques 192

5.3.7. Data analysis 196

5.4 Results 199

5.4.1 Participants and characteristics 199

5.4.2. Delivery characteristics and breastfeeding practices of recent mothers 201

5.4.3. Characteristics of key informants and FG participants 203

5.4.4. Influences on infant feeding practices. 205

5.4.5. Motivation 208

5.4.6. Capability 219

5.4.7. Opportunity 227

5.5. Discussion 264

5.5.1. Participants and characteristics 264

5.5.2. Exclusive breastfeeding and early breastfeeding initiation 264

5.5.3. Timing and types of complementary feeds, use of infant formula, and total breastfeeding duration. 274

5.5.4. Strengths and limitations 277

5.5.5. Conclusion 283

CHAPTER 6: OVERARCHING DISCUSSION, CONCLUSIONS, FUTURE RESEARCH PRIORITIES AND IMPLICATIONS FOR PRACTICE 285

6.1. OVERVIEW OF THIS CHAPTER 286

6.2. Key findings from the thesis and contextualization in the body of literature 286
6.2.1. Aim 1: 286
To determine the effect of 286
6.2.2. Aim 2: 288
6.2.3. Aim 3: 290
6.3. New overlapping research findings since my Ph.D. research began. 290
6.3.1. Recent evidence on interventions to improve EBF rates in Nigeria..... 291
6.3.2. Recent findings of HCP BF knowledge, attitudes, and practices in Nigeria 294
6.3.3. Recent findings on EBF barriers and facilitators among women, family, and community members 296
6.4. Use of the COM-B model to consider potential candidate intervention components for the promotion of exclusive breastfeeding. 298
6.5. Strengths of the thesis 307
6.6. Limitations of the thesis 308
6.7. Implications of research findings for policy and practice 310
6.8. Opportunities for future research..... 313
6.9. Overarching conclusions 314
LIST OF REFERENCES.....317
APPENDICES.....332

List of figures

Fig 1.1: Conceptual model of the factors affecting breastfeeding 21

Fig 1.2: Trends in key breastfeeding practices in Nigeria, 1999–2013 40

Fig 5.1: COM-B Model 185

Fig 6.1: Conceptual model of the components of an enabling environment for breastfeeding and interventions likely to be effective 298

Fig 6.2: The Behaviour Change Wheel 299

List of boxes

Box 1.1: Definitions of optimal feeding practices 8

Box 1.2: WHO/UNICEF Ten Steps to successful breastfeeding 55

List of tables

Table 1.1. A description of IGAB classification of breastfeeding practices 5

Table 1.2. Summary of indicators for measuring/assessing optimum breastfeeding practices.....7

Table 1.3. Trends in recommended infant feeding practices in Nigeria, 1999 – 2018 and comparison of selected IYCF indicators from NDHS 2018 and MICS 2017 36

Table 1.4. EIBF and EBF rates by selected socio-demographic characteristics 37

Table 1.5. Summary of systematic reviews on EBF facilitators and barriers 48

Table 1.6. Summary of reviewed empirical studies on EBF facilitators and barriers.....49

TABLE 1.7: Summary of studies on HCP knowledge, attitudes, self-efficacy, and breastfeeding support 59

TABLE 1.8: Breastfeeding promotion intervention studies from Nigeria 73

Table 4.1: Socio-demographic characteristics of participants 142

Table 4.2. HCP personal breastfeeding experience 145

TABLE 4.3. Knowledge of breastfeeding – True/False option questions 146

Table 4.4. Knowledge of breastfeeding – one best answer type questions 147

Table 4.5. Knowledge of breastfeeding – patient management problem with multiple response 148

Table 4.6 – Graded composite knowledge score 150

Table 4.7. Attitude of respondents towards breastfeeding and breastfeeding practices 151

Table 4.8. Graded attitude score.....152

Table 4.9: Graded professional self-efficacy scores 153

Table 4.10: Practice of breastfeeding counselling 153

Table 4.11. Respondents' training opportunities.....154

Table 4.12: Mean composite knowledge score and association with respondents' characteristics.....157

Table 4.13: Mean attitude score and association with respondents' characteristics ..159

Table 4.14: Mean professional self-efficacy score and association with respondents' characteristics.....161

Table 5.1: COM-B domains with examples 185

Table 5.2: Summary of characteristics of breastfeeding studies using the COM-B model 187

Table 5.3: Overview of participants in qualitative study.....199

Table 5.4: Characteristics of women interview participants.....200

Table 5.5: Delivery characteristics and breastfeeding practices of recent mothers 202

Table 5.6: Characteristics of key informants and focus group participants.....203

Table 5.7: Study themes and subthemes 206

TABLE 5.8 Common local staples used for complementary feeding in Lagos State, Nigeria.....215

Table 6.1: Components of potential candidate intervention.....301

List of Acronyms and Abbreviations

A&T	Alive & Thrive
ANC	antenatal clinic
AOR	adjusted odds ratio
BCW	Behaviour Change Wheel
BF	Breastfeeding
BFCI	Baby-friendly Community Initiative
BFHI	Baby-friendly Hospital Initiative
BFI	Baby-friendly Initiative
CDA	Community Development Association
CDC	Community Development Committee
CF	complementary feeding
CG	control group
CHEW	Community health extension worker
CHO	Community health officer
CHW	Community health worker
CI	confidence interval
COM-B	Capability-Opportunity-Motivation Behaviour
COVID-19	Coronavirus Disease 2019
c-RCT	cluster-randomized controlled trial
DHS	Demographic and Health Survey
EBF	exclusive breastfeeding
EIBF	early initiation of breastfeeding
FGD	focus group discussion
GPZ	Geopolitical zone
HCP	Health care professional
HIC	high income country

IEC	information, education, and communication
IG	Intervention group
IGAB	Interagency Group for Action on Breastfeeding
IQ	Intelligence quotient
IYCF	infant and young child feeding
JICA	Japan International Cooperation Agency
KII	key informant interview
LGA	local government area
LMICs	low- and middle-income countries
MCH	maternal and child health
MD	mean difference
MDGs	Millennium Development Goals
MICS	Multiple Indicator Cluster Survey
NHDS	Nigeria Demographic and Health Survey
PHC	primary health care
RCT	randomized controlled trial
SD	standard deviation
SDGs	Sustainable Development Goals
SOWC	State of the World's Children
SSA	sub-Saharan Africa
TBA	traditional birth attendant
UK	United Kingdom
UNICEF	United Nations Children's Fund
US	United States
US CDC	United States Centers for Disease Control and Prevention
WDC	Ward Development Committee
WHC	Ward Health Committee
WHO	World Health Organization

CHAPTER 1: BACKGROUND LITERATURE

1.1. Overview of the chapter

This chapter provides background information on exclusive breastfeeding and other recommended infant feeding practices. It discusses the recommended feeding practices and their importance, current patterns and past trends of exclusive breastfeeding globally and within Nigeria, the determinants of breastfeeding, and interventions to improve rates of exclusive breastfeeding and other recommended infant feeding practices. It demonstrates the gaps in the existing research landscape, especially locally in Nigeria, thus providing justification for the research carried out in the ensuing chapters.

1.2. Introduction

Optimal feeding of an infant is important to support adequate growth and development, especially in the most critical period of the first 1,000 days of development, which corresponds to the period of intrauterine growth, and the first two years of life.[1–4] This period marks a time of rapid growth and development, high susceptibility to infections, and complete dependence on others for nutritional requirements and other basic needs; more recent research has shown that it is also a period of sensitive adaptational development and epigenetic modulation.[2,3,5] Breastmilk has been found to be the most suitable nutrition for infants and young children.[2,6–9]

1.3. Historical perspectives

A short section on historical perspectives has been included in this thesis to provide the context for events that led to the development of modern breastfeeding promotion programs.

Breastfeeding was common in ancient times, but in the 20th century breastfeeding rates among women in high-income countries (HICs) began to decline; rates were also lower amongst women who were more educated, wealthier, or resided in urban areas from low- and middle-income countries (LMICs). This was fuelled in part by the emergence of many breastmilk substitutes, and the rise of the women's liberation movement.[10,11]

The Innocenti Declaration of 1990 took the discourse on breastfeeding protection, promotion, and support to centre stage globally.[12–14] Following this, the Baby Friendly Hospital Initiative (BFHI) was launched in 1991, and the Ten Steps for successful breastfeeding elucidated to provide a framework for its implementation.[14–16] In its many years of existence, this Initiative has impacted positively on breastfeeding practices, but has also faced varying challenges across the globe; it was revised in 2006 and 2017 for greater impact.[16] This initiative is described in some more detail in a subsequent section.

1.4. Definition of breastfeeding and other infant feeding terms and their indicators

In this section, I provide an overview of breastfeeding and other infant feeding terms used in this thesis, their indicators, and the rationale for the selection of recommended

infant feeding practices. This is to provide clarity on the different measures used throughout the thesis, and on the reasons why certain practices are recommended and/or used as indicators for infant feeding practices.

The World Health Organization (WHO), United Nations Children's Fund (UNICEF), and other reputable stakeholders in the infant health and nutrition sectors have identified optimal feeding practices for infants and young children based on research evidence.[5,17] It is important at this point to define the optimal and sub-optimal breastfeeding practices that will be used in the breastfeeding indicators, and in the ensuing chapters.

The mode by which infants under six months are fed can be categorised as follows:[18]

- exclusively breastfed
- breastfed with added plain water only
- breastfed with added non-milk liquids (no solid or semi-solid foods; no animal milk-based liquids or infant formula)
- breastfed with added animal milk or formula (no solid or semi-solid foods)
- breastfed and solid or semi-solid foods; or
- not breastfed

1.4.1. Previous definitions of breastfeeding practices

The various modes of breastfeeding were classified by the Interagency Group for Action on Breastfeeding (IGAB) in 1990[19,20] to provide some consistency in breastfeeding definitions at the time, as contained in Table 1.1:

Table 1.1. A description of IGAB classification of breastfeeding practices*

Breastfeeding category	Sub-category	Description (what infant receives)
Full breastfeeding	Exclusive	Breastmilk only, without the addition of any other liquids, solids, or water; except for vitamins and other medications, where indicated
	Predominant (previously known as "almost exclusive")	Breastmilk is the predominant source of nutrition, but water, juices, and other culturally appropriate fluids are added
Partial breastfeeding	High	Breastmilk forms more than 80% of baby's nutrition
	Medium	20 – 80%
	Low	Less than 20%
Token breastfeeding		Occasional breastfeeds, contributing little or no nutritive value to the infant

Most of these definitions have been revised, or replaced by more recent ones; however, some of the studies referenced in this thesis have used one or more of these terms, and they are therefore defined here for clarity.

1.4.2. More recent Indicators of breastfeeding and other IYCF practices

A set of population-level indicators were derived by the WHO for ease of in-country assessments, and to facilitate comparison of breastfeeding practices across countries, regions, and continents. The 24-hour dietary recall method, which is employed in the calculation of these indicators, is widely used in population-based surveys.[17,18] The WHO

* Table adapted from Noel-Weiss, J., Boersma, S. & Kujawa-Myles, S. Questioning current definitions for breastfeeding research. *Int Breastfeed J* 2012: **7**, 1-4. [20] https://doi.org/10.1186/1746-4358-7-9

however note that additional indicators may be required by smaller programs and projects, which are not included in this list, but are more specific to their programs.

The 2008 list of indicators comprised eight core and seven optional IYCF indicators;[17] in 2021, the list of indicators was revised. Some were added, others removed, and some existing ones were modified; the optional indicators from 2008 were either added to the core list or deleted. The 2021 list comprises 17 indicators of recommended IYCF practices.[18]

In this thesis, one additional indicator was utilised. Since the focus of this thesis was on modalities for improving the practice and duration of exclusive breastfeeding, it was important to have an indicator to assess EBF point prevalence at six months; this has been used in several other smaller studies, and less commonly in population-based surveys. In the systematic review (Chapter 3), the main outcome indicator was the point prevalence of exclusive breastfeeding at six months, i.e., the proportion of those who exclusively breastfed their infant for the recommended duration of (up until) six months. Table 1.2. summarises the breastfeeding and other IYCF indicators utilised in the background chapter.

Table 1.2. Summary of indicators for measuring/assessing optimum breastfeeding practices[2]

Indicator	Type	Reference age group	Definition of indicator	Included in:	
				2008	2021
Ever breastfed	BF	Children born in the last 24 months	Percentage of children born in the last 24 months who were ever breastfed.	√	√
Early initiation of breastfeeding	BF	Children born in the last 24 months	Percentage of children born in the last 24 months who were put to the breast within one hour of birth.	√	√
Exclusively breastfed for the first two days after birth	BF	Children born in the last 24 months	Percentage of children born in the last 24 months who were fed exclusively with breast milk for the first two days after birth	x	√
Exclusive breastfeeding under six months	BF	Infants 0–5 months of age	Percentage of infants 0–5 months of age who were fed exclusively with breast milk during the previous day.	√	√
Predominant breastfeeding under 6 months	BF	Infants 0–5 months of age	Proportion of infants 0–5 months of age who are predominantly breastfed	√	x
Exclusive breastfeeding up until 6 months[3]	BF	Infants	Proportion of infants who were exclusively breastfed from birth up until six months of age (180 days)	x	x
Mixed milk feeding under six months	BF	Infants 0–5 months of age	Percentage of infants 0–5 months of age who were fed formula and/or animal milk in addition to breast milk during the previous day	x	√
Introduction of solid, semi-solid, or soft foods 6–8 months	CF	Infants 6–8 months of age	Percentage of infants 6–8 months of age who consumed solid, semi-solid or soft foods during the previous day	√	√
Continued breastfeeding 12-23 months	BF	Children 12–23 months of age	Percentage of children 12–23 months of age who were fed breast milk during the previous day.	x	√
Median duration of breastfeeding	BF	All children less than 36 months of age	The age in months when 50% of children 0–35 months did not receive breast milk during the previous day	√	X
Bottle feeding 0–23 months	Other	Children 12–23 months of age	Percentage of children 0–23 months of age who were fed from a bottle with a nipple during the previous day	√	√

[2] Adapted from: Indicators for assessing infant and young child feeding practices: definitions and measurement methods. Geneva: World Health Organization and UNICEF, 2021.[18] (Licence: CC BYNC-SA 3.0 IGO; https://creativecommons.org/licenses/by-nc-sa/3.0/igo), and World Health Organization. Indicators for assessing infant and young child feeding practices: Part I. Geneva: WHO. 2008.[17] [3] Not included in list of indicators for assessing infant feeding practices. BF = BF indicator, CF = complementary feeding indicator

1.4.3. Recommended infant and young child feeding (IYCF) practices.

Optimum infant feeding practices recommended by the WHO and other leading international health authorities[5,6,17,18,21] are described in Box 1.1:

Box 1.1: Definitions of optimal feeding practices

Early initiation of breastfeeding (EIBF): refers to putting a baby to the mothers' breast within the first thirty minutes to one hour after delivery. *Exclusive breastfeeding (EBF) under six months*: defined as an infant receiving only breastmilk, without the addition of any other liquids, solids, or water; except for oral rehydration solution, vitamin and mineral solutions, and other medications where indicated. *Appropriate and timely complementary feeding*: refers to the introduction of other fluids and solids, apart from breastmilk, beginning from six months of age. *Continued breastfeeding* up until at least two years of age.

1.4.4. Rationale for the current breastfeeding recommendations

Initiation of breastfeeding within one hour of delivery has been recommended for a number of reasons: the putting of a baby to breast immediately after birth initiates the let-down reflex and facilitates breastfeeding, which in turn reduces the likelihood of giving pre-lacteal feeds to nourish the neonate; also, the ideal time for putting the baby to breast is shortly after delivery, when the physiologic mechanisms for breastfeeding are primed and ready for deployment.[22,23] Studies have shown that the odds of neonatal mortality are reduced in infants who initiate breastfeeding within one hour of birth.[22,24] A trial in Ghana

showed that the effect of delayed initiation on neonatal mortality was dose dependent; it also demonstrated that the odds of neonatal mortality were higher for predominantly and partially breastfed infants when compared with those exclusively breastfed.[24] A systematic review of studies on early initiation of breastfeeding and exclusivity in the first month[22] showed that up to 20% of all neonatal deaths could be averted by scaling up early initiation to full coverage. Delaying initiation of breastfeeding beyond one hour of birth doubled the odds of neonatal mortality compared with early initiation (pooled OR=2.02,95%CI 1.42, 2.11); odds of neonatal mortality were also higher when breastfeeding was initiated after 24 hours compared to within the first hour of birth (pooled OR=1.73; 95%CI 1.42, 22.11). The review also investigated the effect of exclusive breastfeeding for one month compared to partial breastfeeding; the odds for mortality were higher in the partially breastfed group (pooled OR=3.67, 95%CI 2.04, 6.61). and similar estimates were observed for infection-related mortality, and mortality resulting from sepsis and other infections.[22]

In 2001, the WHO revised the recommended duration of exclusive breastfeeding from between four and six months to up until six months following the evidence emanating from systematic reviews at the time, and further studies have supported this recommendation.[25–27] The systematic review on which this recommendation was first based compared child health, growth and development, and maternal health outcomes when exclusively breastfed for 6 months versus 4-6 months, and found several advantages of EBF for 6 months including reduced morbidity and mortality from gastrointestinal and respiratory infections, prolonged amenorrhoea and more rapid weight loss in the mother. They also found no differences in the growth and development of the infant, and no effect

on allergies or atopy; a reduced level of iron was observed among exclusively breastfed infants from developing country settings.[25]

From the age of six months breastmilk is no longer adequate to meet the nutritional requirements of an infant, and needs be complemented by additional foods to prevent the infant's weight from faltering.[21,28] It, however, continues to provide much-needed nutrition and other factors important for growth and development; breastmilk provides about half of the infant's energy requirements at one year, and about one-third within the second year of life. The recommendations for appropriate (timely, adequate, safe, and properly fed) complementary feeding at six months, and continued breastfeeding until at least two years of age, are based on this evidence.[28]

1.4.5. Concerns about the current EBF/BF recommendations

Some groups of researchers and clinicians alike have called for a review of the EBF recommendations, especially with the availability of breastmilk substitutes that are closer to the composition of human milk. Apart from requiring support for it to be successful, evidence has been cited of some negative effects of breastfeeding exclusively for six months, and of continued breastfeeding up to two years and beyond.[27]

In the infant, these issues include the possibility of iron deficiency anaemia at six months, the higher risk of dental caries in infants breastfed for longer periods, and some recommendations to introduce certain foods earlier than six months in infants with a family

history of severe allergies.[27,29] Also, evidence from a systematic review showed no differences in the weight or length of breastfed and non-breastfed infants.[30] For the mother, there is some evidence that prolonged duration of breastfeeding may result in a higher (up to a two-fold) risk of post-menopausal vertebral fractures.[31] Self-reported breastmilk insufficiency and poor maternal nutrition are often given as reasons for discontinuing exclusive or prolonged breastfeeding.[27]

Nonetheless, experts have assessed that the benefits of the recommended breastfeeding practices far outweigh the small number of negative effects that have been identified, and have proffered ways of mitigating these effects while continuing with the current recommendations.[27,29,31]

1.5. Benefits of breastfeeding

This section of the chapter has been included to provide evidence of the many ways in which breastfeeding is beneficial, and to justify the rationale for the recommended infant feeding practices discussed in Section 1.4.

Breastmilk is commonly referred to as *'the best food for babies'*, because of its immense benefits to the baby, the mother, and society at large.[6,10,29,32] The importance of breastmilk cannot be overemphasized, and evidence abounds as to how critical it is for both mother and child, irrespective of their socio-economic status, or where they live across the globe.[6,10] Economic evaluations have determined that more than 800,000 child deaths from

75 LMICs with high mortality burdens could be averted annually if the practice of breastfeeding improved to near recommended levels of 90%,[33] which translated to approximately 13% of all deaths in children below two years of age in the 75 Countdown countries in 2015.[6] In addition, approximately 20,000 deaths of mothers could be averted annually from various causes by the scaling up of breastfeeding rates worldwide.[6]

Breastfeeding benefits can be categorised under three main headings: benefits to baby, benefits to the mother, and benefits to the rest of the family, society, and economy.

1.5.1. Benefits to the baby

Breastfeeding is a well-suited, highly economical, and balanced nutrition for the newborn, meeting all of baby's needs up until the age of six months and providing substantial proportions of their caloric and micronutrient needs up till at least two years of age.[6,7,32,34]

It is not only nutritionally superior to other sources of nourishment, but also provides beneficial elements of maternal immunity, promotes the growth of healthy gut bacteria through the presence of prebiotics, and helps to modulate genetic expression.[6,34]

The breastfed infant enjoys short-term and long-term benefits, most of which are more pronounced in those that are exclusively breastfed.[6,10,35]

1.5.1.1. Short-term benefits: morbidity and mortality

A series on the impact of breastfeeding on maternal and child health in a supplemental issue of *Acta Paediatrica* in 2015 included evidence from a series of systematic reviews.[29] One of these reviews estimated the effect of suboptimal breastfeeding practices on all-cause mortality and infection-related mortality compared to exclusive breastfeeding between 0-5 months, and of exclusive breastfeeding compared to non-breastfeeding between six months and two years.[35] It included 13 articles from LMICs – nine prospective cohort studies, two case-control studies, and two RCTs.

The review found that the risk of all-cause mortality was significantly higher in infants who were predominantly (RR=1.48, 95% confidence intervals (CI) 1.14, 1.92; 3 studies), partially (RR=2.84, 95%CI 1.63, 4.97; 3 studies), or never breastfed (RR=14.4, 95%CI 6.13, 33.9; 2 studies), when compared with exclusively breastfed infants between 0-5 months of age.[35] Infection-related mortality (i.e. mortality from diarrhoea, pneumonia, and other infective causes such as neonatal sepsis, malaria) was also significantly higher when compared with infants exclusively breastfed between 0-5 months of age, viz: predominant breastfeeding 70% higher risk (RR=1.7, 95%CI 1.18, 2.45; 3 studies), partially breastfed 4.6 times higher (RR=4.56, 95%CI 2.93, 7.11; 3 studies), and never breastfed infants 8.7 times higher risk (RR=8.66, 95%CI 3.19, 23.5; 2 studies).[35] These effects were dose-dependent, as the higher the exposure to breastfeeding the greater the protection. The authors of this review however adjudged the quality of the evidence included in this review as very low to low and cited the serious risk of bias, and paucity of RCTs and other high-quality studies as the basis for this assessment.

Another systematic review within the *Acta Paediatrica* supplement looked at the effect of breastfeeding practices on acute otitis media in infancy and childhood;[36] a total of 24 studies - 18 cohort studies and 6 cross-sectional studies – were included, all from HICs. A meta- analysis of the effect of EBF versus non-EBF for the first six months of life and the risk of acute otitis media up until two years included five cohort studies which were assessed as being of satisfactory or good quality; it showed a 43% less risk of acute otitis media amongst those exclusively breastfed compared with non-EBF infants (OR 0.57, 95%CI 0.44, 0.75).[36] The review found insufficient evidence on the effects of breastfeeding and the risk of otitis media beyond two years of age.

1.5.1.2. Long-term benefits to the infant

Some of the long-term effects of breastfeeding in childhood include a lower risk of obesity,[37] a higher performance in intelligence tests,[38] and a lower risk of asthma.[39] A meta-analysis of 18 estimates from 17 studies[38] showed a positive effect of breastfeeding on intelligence quotient (IQ), with a higher performance in intelligence tests (mean difference (MD): 3.44 points; 95%CI 2.30, 4.58). This study was further controlled for residual confounding by maternal IQ, publication bias, and misclassification, in a subgroup analysis of four of the included studies with a large sample size and judged to be at low risk of bias; these high-quality studies showed an improvement in IQ that was, however, not statistically significant (mean difference 1.76 points; 95%CI 0.25; 3.26).[38] Findings from a Brazilian birth cohort[40] found a positive, statistically-significant association between exclusive or predominant breastfeeding of 12 months duration or more and higher IQ scores, higher educational attainment and higher income by the age of 30 years, when

compared with exclusive or predominant breastfeeding of less than one month duration; the association was found to be dose-dependent. Another birth cohort in Denmark[41] which adjusted for potential confounders, found that breastfeeding of one month or less was associated with a three-point lower IQ at five years of age than those with longer breastfeeding durations, but the relationship was not found to be dose-dependent; in this study breastfeeding was not disaggregated into exclusive or non-exclusive categories.

The long-term effects of breastfeeding on the development of some non-communicable diseases in later life was assessed by Horta et al in a systematic review.[37] Breastfeeding was negatively associated with overweight/obesity (pooled OR=0.74; 95%CI 0.70, 0.78, 113 estimates), with the association being slightly stronger amongst those exclusively breastfed; the effect was smaller but still significant amongst higher quality studies (OR=0.87; 95%CI 0.76, 0.99, 11 estimates).[37] The review also found a lower odds of Type 2 diabetes in later life amongst those who were breastfed (pooled OR=0.65; 95%CI 0.49, 0.86, 11 estimates); this association was however not significant when high-quality studies only were included (pooled OR=0.76; 95%CI 0.40, 1.47, 3 estimates), and the authors attributed the non-significance to the small number of studies included in the analysis. Although the pooled odds ratio showed an inverse relationship between breastfeeding and systolic blood pressure, this was not significant in estimates with high-quality studies only (pooled OR= -0.48; 95%CI –1.21, 0.26, 7 estimates). No association was found between breastfeeding and diastolic blood pressure, or total cholesterol. When compared with the evidence from the earlier reviews, the authors concluded that breastfeeding lowered the odds of overweight/obesity, the data suggested a reduction in the odds of developing Type

2 diabetes although more evidence was needed, and no relationship was established between breastfeeding and blood pressure, or with total cholesterol.[37]

A systematic review by Lodge et al investigating the effects of breastfeeding on asthma and allergic diseases[39] found weak evidence that breastfeeding conferred some protection for allergic disease, although stronger for estimates from LMICs. Yet another review found that breastfeeding reduced the risk of various types of malocclusions by about 70%.[42]

1.5.2. Benefits to the mother

1.5.2.1. Breastfeeding duration and female cancers

Existing research has shown that a longer duration of breastfeeding is protective against breast and ovarian cancers. A systematic review (163 papers) by Chowdhury et al examined the association between breastfeeding and maternal health outcomes.[43] Mothers who ever breastfed had a 22% reduction in the risk of breast cancer (OR=0.78; 95%CI 0.74, 0.82) compared with those who never breastfed. This positive association was consistent in the subgroup analyses, where the results were thoroughly controlled for confounding, stratified by study size, study quality, country classification, and when adjusted for parity. The effect of exclusive breastfeeding was not investigated in the analysis. Although previous reviews had found a positive effect of longer breastfeeding duration, this review found higher levels of protection from a similar exposure of longer breastfeeding duration.[43]

The association between breastfeeding duration and ovarian cancer was similar to that for breast cancer, with a 30% risk reduction in those who ever breastfed (OR=0.70, 95%CI 0.64, 0.77; 41 estimates), and a 37% risk reduction among those who breastfed for more than 12 months (OR=0.63, 95%CI 0.56, 0.71), when compared with those who never breastfed; this analysis did not investigate exclusive breastfeeding as an exposure.[43] The positive association was consistent across a range of sub-group analyses.

1.5.2.2. Bone effects/osteoporosis

Some individual studies previously found that a longer duration of breastfeeding had negative effects on bone density, resulting in post-menopausal osteoporotic fractures.[44] However, the meta-analysis by Chowdhury et al[43] found insufficient evidence to conclude on the relationship between breastfeeding duration and risk of osteoporosis; the study did not estimate the effect of exclusive breastfeeding on the risk of osteoporosis.

1.5.2.3. Type II Diabetes Mellitus

A systematic review and meta-analysis by Aune et al[45] included six studies from four continents; these were prospective studies with large sample size. None of the studies were from an LMIC or from Africa. It found an inverse relationship between breastfeeding duration and type 2 diabetes mellitus in the mother, with a 32% risk reduction from longest duration of breastfeeding when compared with the shortest duration (OR=0.68, 95%CI 0.57, 0.82); this inverse relationship persisted after adjustments for confounding factors in subgroup analysis, such as BMI, parity, physical activity, and family history of diabetes

mellitus. It also concluded that there was a 9% risk reduction for every 12-month increase in lifetime duration of breastfeeding.

1.5.2.4. Maternal cardiovascular risk

A recent systematic review included nearly 1.2 million parous women, of which more than 80% had ever breastfed.[46] A random effects meta-analysis was conducted and the evidence weighed in favour of an association between a longer breastfeeding and a lower risk of cardiovascular outcomes when compared with no breastfeeding; the strength of association was not affected by the sub-group analysis.[46]

1.5.2.5. Short term maternal health outcomes

Lactational amenorrhoea:

The likelihood of lactation amenorrhoea at six months postpartum was found to be higher for EBF or predominant BF than for no breastfeeding (RR=1.23, 95%CI 1.07, 1.41) or partial breastfeeding (RR=1.21, 95%CI 1.01, 1.25).[43] This is important because lactational amenorrhoea serves as a form of contraceptive, reducing the risk of short-interval pregnancies which are associated with higher levels of obstetric complications, neonatal and infant morbidity and mortality.[47,48]

Postpartum depression:

The systematic review on breastfeeding and maternal health outcomes[43] did not find any new studies to add to a previous review which concluded that depression during pregnancy

or in the postpartum period is associated with a shorter breastfeeding duration.[49] It also found negative breastfeeding attitudes, pain or difficulties emanating from breastfeeding, and a lower breastfeeding self-efficacy to be predictors of postpartum depression.[49]

Postpartum weight change:

Chowdhury et al[43] updated an earlier systematic review that focused on postpartum weight change.[50] Varying breastfeeding practices were assessed in the contributing papers, including breastfeeding duration, and EBF versus non-EBF. Although some of the included studies demonstrated an inverse relationship between breastfeeding and postpartum weight change, the evidence was not conclusive.

1.5.3. Other benefits of breastfeeding

1.5.3.1. Economic benefits

The economic value of optimal breastfeeding practices to any society are estimated as being enormous, in terms of saved lives and improved health of infants and mothers who breastfeed; reduced treatment costs from the protective effects of breastfeeding; family savings from not purchasing infant formula, and the impact of better intelligence on the economic outlook of infants as they grow up.[10,29] Meta-analysis of study data showed a positive, dose-dependent relationship between IQ scores and hourly wages; this was true for both HICs and LMICs.[10] Through modelling of the data, it was also estimated that an increase in exclusive breastfeeding by ten percentage points, or in continued breastfeeding up to one year or two years, would significantly reduce treatment costs in infants; implying

a healthier population of children requiring less hospitalization/hospital visits.[10] The global average estimated loss of gross national income attributed to cognitive defects from infant feeding practices when compared with every infant breastfeeding until at least six months of age was 0.49% in 2012; this cost burden was higher in proportion for HICs (0.53%) than LMICs (0.39%).[10,51] Protecting, promoting and supporting breastfeeding helps address inequalities that militate against sustainable development.[6]

1.5.3.2. Environmental sustainability

Breastfeeding is one of several sustainable solutions to planet health, and a good example of the deep connections between human health and the ecosystem.[10] It is being increasingly recognized as an environmentally-friendly food, as it does not require any artificial fuels or water for its preparation and use. Breastmilk produces less waste and saves resources otherwise used for the production, storage and transportation of infant formula and its packaging, and studies have estimated that the production of one kilogram of breastmilk substitute may require up to 4000 litres of water.[10] Scaling up breastfeeding practices to optimal levels has been identified as key to achieving the Sustainable Development Goals (SDGs) by 2030. [10,52]

1.6. Conceptual framework for determinants of breastfeeding

In this section, I briefly explain the framework that underpins the conceptualization and focus of the research conducted as part of this thesis, and which informs the topics for review in this background chapter.

The practice and patterns of breastfeeding are influenced by multiple factors at different strata of society. A conceptual framework of the multifactorial determinants of breastfeeding by Hector et al[53] shows the various levels of determinants, and factors that have been identified at each of these levels from previous studies to influence breastfeeding practices and patterns. The authors drew on previous research and built the framework on an adaptation of the human ecological model.[54] This framework, and further adaptations of it such as that proposed by Rollins et al,[10] have been widely applied in different contexts including LMICs. In this thesis, the understanding of the multilevel determinants of breastfeeding provided a basis for selecting the different components of included research. The conceptual framework is found below in Figure_1.1:

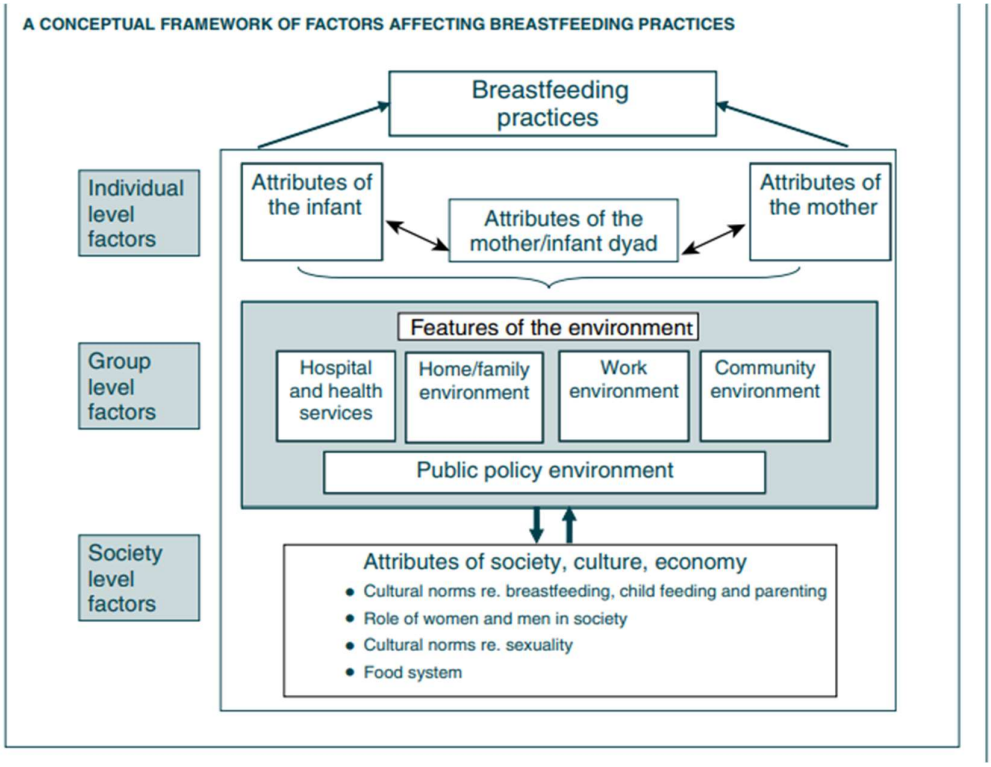


Fig 1.1: Conceptual model of the factors affecting breastfeeding.
(Figure reproduced from: Hector D, King L, Webb K, Heywood P. Factors affecting breastfeeding practices. Applying a conceptual framework. New South Wales Public Health Bulletin. 2005;16(4):52-5. https://doi.org/10.1071/NB05013. Reproduced by permission, NSW Health © 2023)[53]

The model above shows that breastfeeding practices and patterns are/can be influenced by factors at the individual, group, and society levels.[53] Factors at the individual level include unique attributes of mother and infant, and the relationship between mother and infant. The various settings at group level have important influences on breastfeeding. The health care providers (HCPs) are key players in the provision of health systems and services, which are in turn impacted upon by various factors such as legislation, policy, financing, training, monitoring and supervision. Within the family and community setting, breastfeeding support from family and community members, as well as lay support, play an important role. Previous studies have shown that the workplace and employment status are important breastfeeding determinants. At the societal level, the sociocultural context, food system, and market forces are important considerations.[53] The factors interact in various ways within and across the levels to affect breastfeeding practices positively or negatively.

Using this framework alongside a review of available literature, areas of importance which are yet poorly researched in LMICs, and in Nigeria in particular, have been identified for further study in this thesis. It is however important to first establish the global and local patterns of breastfeeding, to provide an understanding of the magnitude of suboptimal breastfeeding practices, and this will be done in the following section.

1.7. Global epidemiology of breastfeeding and current trends

This thesis examines breastfeeding practices in LMICs, with a focus on Nigeria. However, this section reviews the global epidemiology of breastfeeding, for the purpose of providing information for context, comparison, and for a better understanding of breastfeeding patterns and factors affecting them.

The prevalence of breastfeeding varies across the world by country, continent, region, and country income level.[6] However, wide disparities exist between HICs and LMICs; most HICs have a low prevalence of continued breastfeeding at 12 months of below 20%, albeit with wide variations.[6] Several authorities report the paucity of data from HICs on most breastfeeding indicators including exclusive breastfeeding, thus making comparison across all country income groups difficult. However, nearly all countries of the world have a high rate of women who 'ever breastfed'.[6]

1.7.1. Sources of data on global epidemiology of breastfeeding practices

Three main sources of data have been drawn upon to describe the global epidemiology of breastfeeding, and are described briefly forthwith: UNICEF's State of the World's Children (SOWC) 2021 report,[55] one of the Lancet Breastfeeding Series papers in 2016 on epidemiology, mechanisms, and lifelong effect,[6] and a 2021 review of global prevalence of infant feeding practices that focused on LMICs.[56] The lack of uniformity in reporting and use of indicators across countries, regions, and income groups makes comparisons across data sources, between regions and over time periods challenging.[6,55,56]

The State of the World's Children is an annual UNICEF publication that focuses on a particular theme, but also presents data on various health indicators for most countries of the world. It derives data from nationally-representative surveys such as the Demographic and Health Surveys, the Mixed Indicator Cluster Surveys, other United Nations and administrative sources.[55] Regional and global data were generated as population-weighted averages for indicators with a population-level data coverage of at least 50%. Eight indicators are presented for IYCF, including early initiation of breastfeeding, and exclusive breastfeeding under six months.[55]

One of the papers in the Lancet Breastfeeding Series[6] described the global epidemiology of breastfeeding, obtaining data from several data sources such as national surveys including the Demographic and Health Surveys for LMICs; systematic reviews of published and grey literature were conducted to generate data for HICs when other sources were not available, due to their poor reporting of most WHO breastfeeding indicators. The review reported standard WHO indicators for IYCF, and additional indicators to enable the comparison of data across regions and income levels, due the disparities in breastfeeding reporting and available data. Despite these efforts, there were still several gaps in data from HICs.[6]

Zong et al [56] published a paper in 2021 on the current prevalence of selected breastfeeding and complementary feeding indicators from the Demographic and Health Surveys (DHS) of 57 LMICs for the years 2010 to 2018. They went further to analyse time trends for a subset of 44 of these countries having survey data from 2000 to 2009.[56] The DHSs are nationally-representative cross sectional surveys conducted in many countries across the world,

usually at five-year intervals, and data collection was done in a standardised way across surveys using a structured, interviewer-administered questionnaire. The survey selected five breastfeeding indicators and two complementary feeding indicators for analysis. Countries were classified according to the WHO region and World Bank income group. Weighted prevalence estimates and 95%CIs were calculated for each selected indicator. Nonetheless, the African region had data from far more countries than any other region, thus the information from this survey may not be wholly representative of the epidemiology of breastfeeding in the represented regions.[56]

1.7.2. Global patterns: 'Ever breastfed', and Early initiation of breastfeeding

Globally, early initiation of breastfeeding was estimated at 48% in the UNICEF report, with Eastern Europe and Central Asia having 70% of all newborns put to breast within one hour of birth, whilst the Middle East and North Africa ranked lowest at 34%.[55] In their review, Zong et al estimated early initiation among LMIC countries at 51.9%, with the European region having the highest prevalence of 67%, while the Eastern Mediterranean region was lowest at 42.6%.[56]

1.7.3. Global patterns of exclusive breastfeeding

The SOWC report estimated the prevalence of EBF <6 months globally at 44%, with South Asia, Eastern/Southern African regions, and least developed countries having higher rates at 57%, 55% and 53% respectively. North America had the lowest rates at 26%; however, data were not available from Western Europe for any of the breastfeeding indicators.[55] The

review of LMICs found a similar rate for EBF <6m which was estimated overall to be 45.7%, with South-East Asia/West Pacific having the highest prevalence by region at 55.2%; the Eastern Mediterranean had the lowest prevalence at 34.5%.[56] The review by Victora et al estimated EBF <6m at 37% across LMICs, as at the time of each country's last national survey.[6] The SOWC report, Lancet paper, and LMICs prevalence study, all drew on nationally representative surveys such as the DHS and the Multiple Indicator Cluster Survey for their data; however the SOWC report was for 2021, the prevalence study covered the period 2010 to 2018, while the Lancet paper focused on data up until 2013, which may in part explain the disparity between the estimates of the Lancet paper and the other two sources. The data suggests a modest global increase in exclusive breastfeeding under 6 months globally, driven mainly by LMICs.

1.7.4. Global patterns of other breastfeeding practices

The UNICEF report used the modified indicator of continued breastfeeding (12-23 months), which was not comparable across the other data sources; globally, 65% of infants between 12–23 months of age were still receiving breastmilk as part of their diet, ranging from a high of 78% and 75% respectively in South Asia and least developed countries, to just 12% in North America.[55] In the LMICs prevalence study, breastfeeding at 12 months was estimated at 83.1% across the included countries, with the African region leading at 87.2%, and closely followed by the SE Asia/W. Pacific at 84.8%. When assessed by income group, low-income countries had the highest prevalence at 87.8% followed by lower middle-income countries at 82.7%.[56] These findings are in tandem with data from The Lancet

Breastfeeding Review, which found that breastfeeding at 12 months was common in low- and low-middle income countries, but decreased with increasing national wealth; continued breastfeeding at 12 months was estimated globally at 73.3% in 2013, dropping slightly from 76.0% in 1993.[6]

1.7.5. Inequalities in breastfeeding practices

Inequalities in breastfeeding patterns, both between and within country, have been observed from data; these are more marked in continued breastfeeding rates than for exclusive breastfeeding. Globally and in most regions, the poorest 20% were found to have higher rates of continued breastfeeding (12–23 months) than the wealthiest 20%, when disaggregated by wealth quintile, viz: globally, 75% vs 56%; sub-Saharan Africa, 76% vs 53%; West and Central Africa, 79% vs 43%; this difference is more pronounced in LMICs.[6,55] A similar pattern was observed for exclusive breastfeeding, with low-income countries having a higher proportion of exclusively breastfed infants under six months at 47%, when compared with lower-middle-income and upper-middle-income countries at 39% and 37% respectively.[6]

In HICs where rates of continued breastfeeding are quite low and exclusive breastfeeding rates are even lower, a different pattern is seen. Any breastfeeding is more common among well-educated, high-income earning women than their less-educated, lower-income earning counterparts; this pattern has prompted breastfeeding promotion programs targeted to some low-income groups and minorities in some HICs.[6] It is posited that the

protection, promotion and support of breastfeeding will help to address some of these inequalities that militate against sustainable development.[10]

1.8. Regional epidemiology of breastfeeding – sub-Saharan Africa

This section of the chapter provides regional data on breastfeeding practices and patterns, which provide context, data for comparison with local data, and an understanding of the factors affecting the breastfeeding practices and patterns.

1.8.1. Sub-Saharan Africa

Sub-Saharan Africa consists of all countries south of the Sahara desert, with an estimated population of nearly one billion in 2016; a large proportion of countries in this region fall into the low- and middle-income country category.[5] North Africa, on the other hand, refers to the countries in the North of Africa and the Sahara such as Egypt, Algeria and Tunisia.[55] Sub-Saharan Africa (SSA) can further be divided into West and Central Africa, and Eastern and Southern Africa. Most regional analyses utilize these subdivisions for comparison.[5]

1.8.2. Data sources for regional epidemiology description

In addition to regional data from the SOWC 2021 report,[55] data for this section was obtained from a cross sectional study of core and optional IYCF indicators in 32 SSA countries,[5] a meta-analysis of DHS of 29 SSA countries,[57] and an analysis of exclusive

breastfeeding rates in 13 West African countries,[58] all of which were derived from DHS data.

The cross-sectional study of secondary data included the most recent DHS survey for the included countries conducted between 2010 and 2016; a total of just over 150,000 children from 32 SSA countries were included.[5] It captured data of children born in the last 24 months preceding each survey, both living and deceased, and was analysed using a weighted data analysis approach. Eight core and six optional IYCF indicators were generated. The standardization of the DHS surveys facilitated comparability across countries and sub-regions.

Another study of breastfeeding indicators in SSA also used the DHS as secondary data, but conducted a meta-analysis of data from 29 countries for four key breastfeeding indicators.[57] Their study had similar strengths to the previous one, as the DHS makes comparisons easy due to the standardization of the DHS surveys. They however acknowledged some limitations. Only two countries from Southern Africa were included in the study, which makes the data set not generalizable to that sub-region. Also, as in other studies, some biases from recall may have occurred, and estimation of EBF rates from 24 hour recall implies that those who fed infants other fluids occasionally may have been missed, thereby overestimating EBF rates.[57] This applies to most research that have used DHS surveys as secondary data.

The study that assessed EBF rates for 13 West African countries had a weighted sample of nearly 20,000 infants from DHS survey data covering the period between 2010 and 2018; it also determined factors associated with EBF.[58]

1.8.3. 'Ever breastfed' and early initiation of breastfeeding.

All countries in SSA except Gabon had rates of 'ever breastfed' above 90%, indicating that breastfeeding is commonly practiced across the region.[5] Estimates of early initiation of breastfeeding (EIBF) in SSA ranged between 50.5% and 54%.[5,55,57] Central Africa had the lowest rates at 37.8%, whilst Southern Africa had the highest rate at 69.7%. One author, Gebremedhin, observed wide variations between the EIBF rates of living and deceased cohorts; in this estimate 99% of living children were ever breastfed compared with 77.1% of deceased children, a difference of more than 20%.[5] Previous evidence has shown that EIBF helps to mitigate against neonatal and infant mortality.[24] The author suggests that ever breastfed and EIBF rates may be overestimated in datasets that exclude deceased children.[5]

1.8.4. Exclusive breastfeeding and predominant breastfeeding under six months

As defined in Section 1.4., exclusive breastfeeding under six months is calculated as the percentage of infants 0–5 months of age who were fed exclusively with breast milk during the previous day.[18] Estimates for exclusive breastfeeding under six months in SSA ranged between 41% and 45% of infants under six months of age.[5,55,57] There was wide regional

variation; Central Africa had the lowest prevalence of 23.7%, with Western Africa almost 10 percentage points higher at 32.6%.[58] Southern and Eastern Africa had higher EBF rates, at 56.6% and 53.5% respectively.[57] Rates of exclusive breastfeeding declined with infant age, as rates for SSA at 0-1, 2-3 and 4-5 months were 59.5%, 43.1%, and 23.9% respectively.[5] The study of West African countries estimated the rate of EBF <6months at 31.0%; only three of the 13 included countries had rates above 50%.[58]

Predominant breastfeeding, as defined in Section 1.4., captures infants aged 0-5 months who received breastmilk as their predominant source of nutrition and is commonly used in studies describing breastfeeding patterns within SSA. It is one of the indicators recently taken off the list by WHO though still widely used. A wide disparity was observed between data sources for the predominant breastfeeding rate, which was estimated at 72.3% by Gebremedhin,[5] but much lower by Issaka et al at 31.3%.[57]

1.8.5. Other infant feeding indicators

Nearly seven of every ten infants in SSA (69.3%) are introduced to complementary foods in a timely manner at around six months.[5] Continued breastfeeding in SSA at one year (12-15 months) and at 2 years (20 – 23 months) was estimated at 89.5% and 53.7% respectively.[5] Continuous breastfeeding (12 – 23 months) rates were 68% for SSA; 70% and 66% respectively for Eastern and Southern Africa, and West and Central Africa, respectively, showing less disparity between these two major sub-regions than with the other breastfeeding indicators.[55]

About 15% of children between 6 – 23 months of age were not breastfed and often exposed to sub-optimal feeding practices, which predisposed them to malnutrition.[5]

1.9. Situation analysis of breastfeeding in Nigeria

The breastfeeding situation analysis in Nigeria is important and provides a detailed review of current and historical trends in breastfeeding practices and their patterns. It provides information on the problems and gaps in the Nigerian breastfeeding context and is vital for developing interventions.

1.9.1. Current breastfeeding patterns and recent trends

The prevalence of breastfeeding in Nigeria is high, a pattern similar to that of most other LMICs. In 2018, 97% of children born in Nigeria were categorised as having ever been breastfed[59]. In Nigeria, the sub-optimal level of exclusive breastfeeding is one of the main challenges with breastfeeding practices; despite the institution of some breastfeeding promotion activities, rates have not improved as projected over the past few decades in achieving important targets such as the Millennium Development Goals in 2015, and towards the SDGs by 2030.[6,60]

1.9.1.1. Large, nationally representative surveys

The Nigeria Demographic and Health Survey 2018 (NDHS 2018)[59] is the most recent national demographic and health survey in Nigeria, conducted by the National Population Commission in conjunction with a number of funding partners to provide accurate and up-

to-date data on relevant population and health indices. A stratified, two-stage cluster sampling method was used to select a nationally representative sample of approximately 42,000 households, using census enumeration areas as the sampling frame. High standards were maintained throughout the survey to ensure high quality data, with survey completion in all but 11 of the 1,400 clusters selected, and a 99% household response rate recorded. Four questionnaires, adapted to the Nigerian context from the Demographic and Health Survey questionnaires were used to collect data.[59]

The NDHS 2018 assessed several IYCF practice indicators including early initiation of breastfeeding, exclusive breastfeeding under 6 months, introduction of complementary foods at 6 months, and continued breastfeeding at 2 years. It provides disaggregated data by geopolitical zone and state for EIBF, but not for EBF <6months, which is a major drawback of the 2018 NDHS data.[59]

The Nigeria Mixed Indicator Cluster Survey (MICS) 2016-2017 report is another source of nationally-representative data on a wide range of maternal and child indicators, and spearheaded by UNICEF in collaboration with other relevant agencies to provide countrywide household surveys that facilitate data comparisons across the globe.[61] The fifth round of surveys, conducted between 2016 and 2017 in Nigeria, included a sample of 37,440 households with a response rate of 98.8%, and an eligible population of children under five of more than 28,000. A two-stage sampling method was employed, and sample weights were applied in the reporting of the results. Two-thirds of those sampled resided in rural areas.[61]

1.9.1.2. Ever breastfed and early initiation of breastfeeding from nationally representative surveys

The proportion of infants ever breastfed in Nigeria is high and varies minimally by socio-demographic factors. Estimates range between 95%[61] and 97%.[59] Although almost all last-born children given birth to in the two years preceding the 2018 survey had been breastfed at some point, data on EIBF however showed sub-optimal rates. From the 2018 survey, about four in every ten infants (42%) were put to breast within one hour after delivery;[59] this is higher than the estimate from the 2017 MICS of 32.8%.[61] Earlier NDHS data show that current rates of EIBF are an improvement on rates between 1999 and 2013, which ranged between 31% and 38%.[62] These rates of early initiation are however still low, especially in the light of mounting scientific evidence that the risk of neonatal mortality can be significantly reduced by the early initiation of breastfeeding.[22,24] This is very important for Nigeria which is classified as a high-burden country for neonatal mortality, having the third highest number of neonatal deaths globally, after India and Pakistan.[63]

Several studies of primary and secondary data provide data on factors affecting EIBF in Nigeria. From NDHS 2018 data, EIBF was more likely to occur with infants delivered by health workers (50%) than those assisted by traditional birth attendants (TBAs), other people, or no one (33%, 37%, and 33% respectively); those in urban compared with rural areas (49% vs 38%), born to mothers with education above secondary level compared with

no education (52% vs 34%), and increased with increasing wealth quintile (from 31% in the lowest to 54% in the highest wealth quintile).[59]

It also provided zonal estimates, with EIBF highest in the South-West and North-Central zones (63.3% and 60.3% respectively), and lowest in the North-East and North-West Zones (27.4% and 32.4% respectively). Rates of below 20% were estimated for Adamawa, Gombe, Bauchi and Taraba states in the North-East (19.5%, 18.0%, 14.7%, and 10.4% respectively), Sokoto and Jigawa states in the North-West (11.9% and 10.1% respectively). Two states had EIBF rates above 80%: Bayelsa, South-South GPZ (94.9%) and Ogun, South-West GPZ (83.4%). Lagos state was estimated to have an EIBF rate of 58.6%.[59] State-level data for EBF was not commonly reported due to small samples, but MICS 2017 reported that 51.8% of surveyed infants in Lagos State had been exclusively breastfed the previous day, compared with the national prevalence of 23.6%.[61]

Estimates from the NDHS however do not tally with the MICS 2017 data, which mostly had lower prevalence rates (see Table 1.3), and a different pattern of EIBF across the zones, (see Table 1.4). These disparities are quite concerning, seeing that these are two major sources of nationally representative data carried out at about the same time, and heavily relied upon for decision-making by internal and external bodies. The sampling procedures are well laid out in both documents, and do not appear to differ much from each other.

Table 1.3. Trends in recommended infant feeding practices in Nigeria, 1999 – 2018 and comparison of selected IYCF indicators from NDHS 2018 and MICS 2017[§]

	National Demographic Health Survey					Multiple Indicator Cluster Survey
Year of survey	1999	2003	2008	2013	2018	2017
Selected IYCF practices (indicators)[**]						
Ever breastfed	NA[††]	NA	97.0	NA	97.0	95.0
Early initiation of breastfeeding	38.0	31.0	38.0	34.0	42.0	32.8
Exclusive breastfeeding under six months	16.0	16.0	13.0	17.0	28.7	23.7
Predominant breastfeeding under six months	39.0	52.0	48.0	52.0	39.0	54.0
Had pre-lacteal feed	NA	NA	56.0	NA	49.0	NA
Continued BF at 2 years (20–23 months)	NA	NA	NA	NA	27.8	37.1
Bottle feeding (0-23 months)	18.0	21.0	15.0	16.0	12.3	NA
Mean duration of exclusive breastfeeding (months)	NA	NA	NA	1.8	2.8	NA
Median duration of any breastfeeding (months)	NA	18.0	17.0	18.3	18.5	19.9

[§] Data sources: National Population Commission [Nigeria] and ICF. 2018 Nigeria DHS Key Findings. Abuja, Nigeria and Rockville, Maryland, USA; 2019.[59] National Bureau of Statistics (NBS) and United Nations Children's Fund (UNICEF). 2017 Multiple Indicator Cluster Survey 2016-17, Survey Findings Report. Abuja, Nigeria: NBS and UNICEF.[61]

[**] Numbers in boxes are percentages.

[††] Data not available

Table 1.4. EIBF and EBF rates by selected socio-demographic characteristics
‡‡

	EIBF (%)		EBF (%)	
Socio-demographic characteristic	**NDHS 2018**	**MICS 2017**	**NDHS 2018**	**MICS 2017**
Overall	42.1	32.8	28.7	23.7
Zone				
North-Central	60.3	37.0		24.9
North-East	27.4	32.1		21.3
North-West	32.4	31.8		18.5
South-East	39.4	34.5		25.3
South-West	63.3	24.9		43.9
South-South	55.4	41.8		27.2
Residence				
Rural	37.6	32.4		20.7
Urban	49.4	33.9		31.7
Mother education				
None	34.2	31.0		19.6
Non-formal	N/A	32.2		16.9
Primary	44.4	36.3		20.8
Secondary	49.6	32.9		30.6
Higher	51.5	34.3		41.0

‡‡ Data Sources: Data sources: National Population Commission [Nigeria] and ICF. 2018 Nigeria DHS Key Findings. Abuja, Nigeria and Rockville, Maryland, USA; 2019.[59] National Bureau of Statistics (NBS) and United Nations Children's Fund (UNICEF). 2017 Multiple Indicator Cluster Survey 2016-17, Survey Findings Report. Abuja, Nigeria: NBS and UNICEF.[61]

Wealth quintile				
Lowest/poorest	30.5	28.1		16.4
Second	36.6	31.3		20.0
Middle	43.7	36.0		23.7
Fourth	50.4	36.1		27.1
Highest/richest	53.7	33.8		35.8
Ethnicity of household head				
Hausa		31.7		18.7
Igbo		33.9		31.9
Yoruba		28.5		42.8
Other		36.7		26.6
Child's sex				
Male	42.3			23.5
Female	42.0			24.0

A multivariate analysis of the NDHS 2013 data explored characteristics associated with early breastfeeding initiation.[64] Determinants identified included place of delivery, with women who gave birth in a health facility more likely to initiate BF early compared to women who gave birth at home (adjusted odds ratio (AOR) 1.40, 95%CI 1.22-1.60); mode of delivery (vaginal vs caesarean section; AOR=3.08, 95%CI 2.14-4.46); perceived size of child at birth (perceived as large vs small sized; AOR=1.19, 95%CI 1.03-1.39); and birth order (2^{nd}-3^{rd} birth: AOR=1.25, 95%CI 1.06-1.46; ≥4^{th} birth vs 1^{st} birth: AOR=1.26, 95%CI 1.05-1.51). Other determinants were place of residence (urban vs rural; AOR=1.46, 95%CI 1.23-1.75); and zone of residence (North-East: AOR=1.69, 95%CI 1.38-2.07; North-Central: AOR=1.93, 95%CI 1.56-2.39; South-South: AOR=1.42, 95%CI 1.12-1.81; vs North-West).[64]

1.9.1.3. Exclusive breastfeeding patterns from nationally representative surveys

The 2018 NDHS report indicates that considerable gains have been made in exclusive breastfeeding rates when compared to previous NDHS reports – 28.7% of infants between 0-5 months of age were exclusively breastfed, as compared with 17% in 2013[59,65] This is however still below the WHO target to increase the rate of exclusive breastfeeding in the first six months to at least 50% by the year 2025. [32,66] When disaggregated by age group, the exclusive breastfeeding rate amongst infants aged 0-1, 2-3, and 4-5 months translated to 39%, 29% and 18% respectively in 2018, with an average duration of exclusive breastfeeding of 2.8 months.[59]

Prior to the 2018 survey, trends in exclusive breastfeeding rates of infants between 0-5 months hovered below 20% between 1999 and 2013.[62] (see Table 1.3, Fig 1.1) The NDHS

2013 recorded a rate of 17% exclusivity below six months; when disaggregated by age of infant, EBF rates for 0-1, 2-3, and 4-5 months were 26.1%, 18.9% and 10.0% respectively.[65] A systematic review on breastfeeding in Nigeria was published in 2016 with 24 cross-sectional studies spanning from 1979 to 2014 meeting its inclusion criteria; the prevalence of exclusive breastfeeding did not show much improvement during this period.[67]

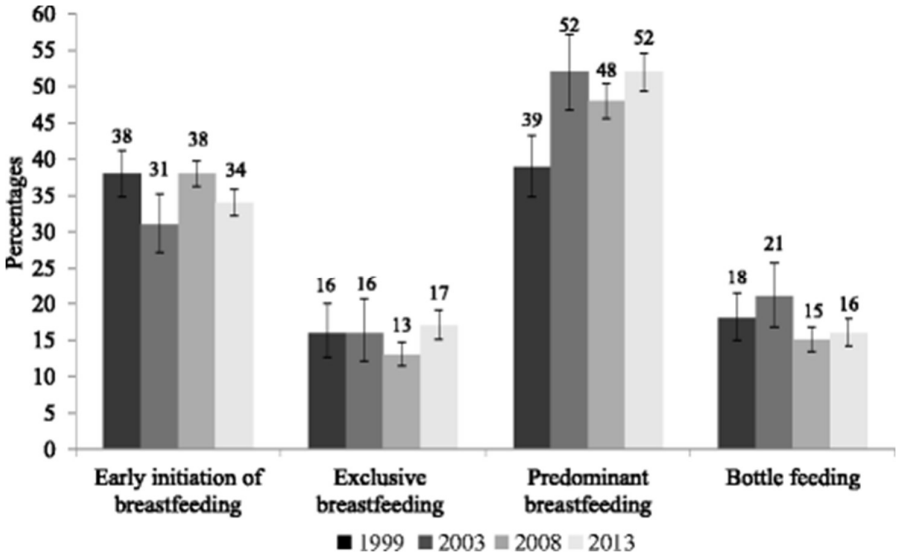


Fig 1.2: Trends in key breastfeeding practices in Nigeria, 1999–2013[§§]

[§§]Figure reproduced from: Ogbo FA, Page A, Idoko J, Claudio F, Agho KE. Have policy responses in Nigeria resulted in improvements in infant and young child feeding practices in Nigeria? *Int Breastfeed J* 2016;**12**, 9. https://doi.org/10.1186/s13006-017-0101-5 [62] under the terms of the Creative Commons Attribution 4.0 International License (http://creativecommons.org/licenses/by/4.0/) Copyright © The Author(s). 2017

The MICS 2017 estimated exclusive breastfeeding under 6 months at 23.7% with regional variations (see Table 1.4). EBF rates were generally higher in the Southern zones of Nigeria than in the North; the highest rate was from the South-West Zone at 43.9%, whilst the North-West zone had the lowest rates at 18.5%.[61]

1.9.1.4. Exclusive breastfeeding estimates from other studies

Estimates of EBF rates at 6 months from smaller, community-based studies ranged from as low as 16% in Ibadan, South-West Nigeria, to 74% in a study across four southwestern states.[68,69] A recent community survey conducted in Lagos, South-West Nigeria in 2014 estimated EBF rates at any age and at 6 months to be 82.0% and 43.3% respectively.[70] Similar variations were found between studies conducted in other zones of the country: a multicentre study in 2014 estimated EBF rates in Abakiliki, South-East Zone at 10%, and from Zaria, North-West Zone at 2%.[68] A greater proportion of the published research however is facility-based, among women attending health facilities for maternal and child health services, and estimates of EBF at 6 months varied widely.

Some issues arise with the assessment of EBF rates in smaller studies, and especially with comparison of rates between studies. Firstly, indicators used across studies were not consistent and therefore not easy to compare. Also, criteria for the assessment of EBF rates varied between studies, such as different recall periods of breastfeeding history, have made comparison across these studies challenging. A few of such issues are highlighted forthwith.

A multi-centre, descriptive cross-sectional study published in 2014[68] and included in a number of systematic reviews was conducted among mothers of infants aged six months to two years in three Nigerian cities, with a total sample size of 433. They estimated EBF rates at five months viz: 54%, 61% and 45% in Ibadan (South-West zone), Abakaliki (South-East zone), and Zaria (North-West zone) respectively; rates for EBF at 6 months were 16% (Ibadan), 10% (Abakaliki), and 2% (Zaria).[68] Although the authors attempted to define what they meant by 'exclusive breastfeeding at six months', it was not clear what the numerator and denominators were, and they admitted that many mothers misunderstood what was asked as the duration of EBF in their study. Also, breastfeeding practices were determined retrospectively, but details were not provided as to the recall duration used; furthermore, mothers with infants of up to two years were included in this study which could have increased the possibility of recall bias.[68]

A community-based, cross-sectional descriptive survey of 600 women selected by multistage sampling from two LGAs of Lagos state, Nigeria, published in 2014, was conducted to determine breastfeeding initiation and exclusivity rates.[70] The authors estimated exclusive breastfeeding at any age at 82%; the reporting of EBF at six months as 52.9% may have been misleading, as a closer look at the data shows that the EBF rate was actually 52.9% of those who practiced EBF at all, which was 260 respondents or 43.3%. Also, the raw data, which would have provided the much-needed data for further clarity of the results, were not presented as tables in the results section.

For the reasons proffered above, in this situation analysis attention has been focused mainly on the larger, nationally representative studies, which for the most part have utilised the well-defined WHO indicators that enable comparison of data across studies. Also, a large proportion of the smaller studies had some methodological issues; the use of non-probability sampling in many, most recruitment being-facility-based, and some having small sample sizes which could result in publication bias. Some studies were poorly reported, and thus it is unclear what was actually done.

1.9.1.5. Factors associated with exclusive breastfeeding practice

Research findings indicate that rates of exclusive breastfeeding in the first six months of life among Nigerian infants vary substantially by region and other socio-demographic characteristics. The MICS 2017 provides data on current patterns and factors associated with exclusivity. EBF rates were found to increase with higher maternal education and wealth quintile, but gender proportions were about the same. EBF rates were also higher in urban than rural areas (31.7% vs 20.7%).[61]

A secondary analysis of data from the 2008 Demographic Health Survey[60] found predictors of exclusive breastfeeding to be mothers' education to secondary level or higher compared to no education (AOR=1.87; 95%CI 1.24–2.82); middle (AOR=1.62, 95%CI 1.14-2.31) or high (AOR=1.64, 95%CI 1.04-2.60) household wealth compared to poor, and mothers' age between 25-34 years, relative to 15-24 years (AOR=1.50, 95%CI 1.12-2.01). The odds of exclusive breastfeeding were lowest for the North-East geopolitical zone (GPZ) (AOR=0.23, 95%CI 0.12-0.34) when compared to the North-Central zone.[60] These findings are akin to

those obtained from a secondary analysis of the 2003 Nigeria Demographic Survey, which in addition found female infants to have higher odds of being exclusively breastfed than male infants (AOR = 2.13, 95%CI 1.03-4.39).[71]

A group of researchers conducted a secondary analysis of data from the 1999, 2003, 2008, and 2013 Nigeria DHS and calculated the population attributable fraction of some modifiable risk factors for non-exclusive breastfeeding.[72] The sample consisted of responses of nearly 35,000 mothers of infants under six months, more than three-quarters of which were not exclusively breastfed. About a quarter (24.7%; 95%CI 9.5-39.5%) of all cases of non-EBF were attributed to middle or poor household wealth, and more than one in five (22.8%; 95%CI 9.2-37.0%) to low level of maternal education (primary or no education). Other modifiable risk factors estimated include home delivery (18.8%), non-skilled or untrained birth attendant at delivery (16.6%), and less than four or no antenatal care visits (9.7%). A slightly higher proportion of non-exclusive breastfeeding was attributable to the socio-economic factors (maternal education and household wealth; 41.9%) than the health service delivery factors (38.9%). Overall, approximately 65% of all cases of non-exclusive breastfeeding were attributable to the five modifiable risk factors assessed in the study.[72]

1.9.1.6. Current patterns and recent trends of other infant feeding practices

A prelacteal feed is any food other than breastmilk that is given before the initiation of breastfeeding, usually during the first three days of life.[73,74] Nearly half of all babies from the NDHS 2018 survey (49%) were given a prelacteal feed.[59] This is lower than rates from

DHS data of 2008 and 2013, in which 56% and 60% of newborns respectively were given pre-lacteal feeds, water being the most common.[65]

Three-quarters (74.4%) of all infants had complementary foods introduced between 6 to 8 months of age.[59] Data from national surveys conducted between 1999 and 2013 show that about a quarter (23%) of infants below six months received complementary feeds prematurely.[65]

Continued breastfeeding at two years was 28%; the median duration of any breastfeeding was reported as 18.5 months by NDHS 2018.[59] The MICs 2017 estimated continued breastfeeding at one and two years of age at 85.9% and 37.1% respectively.[61] Patterns of continued breastfeeding at one year, and even more so at two years, decreased with increasing maternal education and wealth quintile,[61] consistent with patterns from the NDHS 2018.[59] Continued breastfeeding at one year had the lowest rates in households where the head was of Igbo extraction; on the other hand, higher rates of continuous breastfeeding at two years were from households with a Hausa indigene as head.[61]

In summary, the existing data shows that optimal breastfeeding practices generally remained about the same between 1999 and 2013, with some modest improvements in most indicators, including EBF, in the 2017 and 2018 surveys. Although median duration of any breastfeeding was fairly high at 18.5 months, the prevalence of EBF though improved was still unacceptably low at 42% in a country with high levels of infectious disease that would benefit maximally from high exclusive breastfeeding rates.[6,62] The mean duration of

EBF has increased to 2.8 months, which shows that most do not continue exclusivity till the recommended age of six months.

1.9.2. Reasons for low levels of optimum breastfeeding practices within Nigeria

In Nigeria, many studies have been conducted around the breastfeeding knowledge, attitude, and practices of pregnant women and recent mothers. Previous research suggests that although breastfeeding is a well-accepted practice in Nigeria, exclusive breastfeeding is considered as foreign or unacceptable in some cultures, as it conflicts with indigenous beliefs and cultural practices.[68,75]

A review of the literature on breastfeeding barriers and facilitators in the Nigerian context provides some insight on why exclusive breastfeeding and other recommended infant feeding practices are at suboptimal levels. Researchers have employed various study designs, including descriptive cross-sectional, longitudinal observational, qualitative, and mixed methods (quantitative and qualitative) designs. A handful of systematic reviews on EBF/BF influences, each with a slightly different geographic focus and varying inclusion criteria, have also contributed to this body of knowledge.[76–78] Characteristics of systematic reviews and primary studies included in this section are summarised in Tables 1.5 and 1.6, respectively.

Each systematic review included a number of studies from Nigeria; only one study[79] was included in more than one of the reviews. Identified EBF barriers common to all three reviews were maternal employment, perception of breastmilk insufficiency, and maternal health issues/lactation problems.[76–78]

A mixed methods quantitative and qualitative study published in 1997 provided a thick description of sociocultural factors affecting EBF and other infant feeding practices in a rural Yoruba community.[75] More recent studies have identified infant feeding influences among women from various ethnic groups, and residing in different parts of Nigeria.[68,70,80–84] A mixed methods quantitative and qualitative study amongst breastfeeding mothers receiving postnatal care at a comprehensive health centre in Ile-Ife, southwest Nigeria,[80] included nurses and grandmothers in the qualitative strand. Perceptions of the baby not being satisfied with or becoming dependent on breastmilk, health or lactation problems in the mother, pressure from significant others to discontinue or lack of spousal support, and return to work, were some of the identified barriers to EBF; breast image concerns also constituted a barrier.[80]

Table 1.5. Summary of systematic reviews on EBF facilitators and barriers

AUTHOR, DATE, LOCATION	TOPIC/ MAIN IDEA	INCLUSION/ EXCLUSION CRITERIA (INCLUDED STUDIES)	IDENTIFIED EBF/BF INFLUENCES - facilitators	IDENTIFIED EBF/BF INFLUENCES - barriers	LIMITATIONS
Balogun 2015,[76] Developing countries	EBF facilitators and barriers in developed countries	Included: studies in English between 2001 and 2014, primary studies on EBF and full breastfeeding between 0-6 months from developing countries. Excluded: research focused on HIV populations; unpublished research. (25)	EIBF & colostrum use; perceived benefits and knowledge of EBF, support system from family, friends, or workplace	Return to maternal employment, perception of BM insufficiency, maternal health issues & lactation problems	Wide variation of included study methods. LMICs more commonly used terminology for comparison
Kavle 2017,[77] LMICs	Barriers to EBF in LMICs	Included: Studies published from 1st Jan 2000, healthy infants, in Spanish, English or French; primary studies including dissertations and grey literature, from the United States Aid for International Development (USAID) 'ending preventable child and maternal deaths' priority countries. Excluded: EBF not reported (48)	EIBF	Maternal employment, delivery by C/S or outside a HF, poor maternal knowledge of BF, lactation problems, perception of BM insufficiency, lack of family/community support	A large proportion of studies were observational and could not determine relationship between identified barriers and EBF. Wide variability in study methods and definitions
Ejie 2021,[78] SSA	EBF Barriers & facilitators in SSA	Included: Qualitative study design/mixed methods, or qualitative methods of data collection, from 1999 to 2019, published in English, focused on EBF, among mothers of breastfed infants 0-12 months, from SSA. Excluded: Studies with quantitative study design or data collection method, studies with low quality score (20)	Knowledge of EBF, benefits, & self-efficacy, adequate family/community/work place support, information and support from HW	Maternal employment, perceived BM insufficiency, social disapproval and concerns about appearance, lack of family/community support, cultural influences, lactation issues	Few databases (MEDLINE via PubMed and Google Scholar) as well as forward citation searched; no Grey literature or unpublished thesis included. Included studies focused on HIV-infected women

Table 1.6. Summary of reviewed empirical studies on EBF facilitators and barriers

AUTHOR, DATE	TOPIC/ MAIN IDEA	STUDY DESIGN	STUDY POPULATION/ LOCATION/SETTING	IDENTIFIED EBF/BF INFLUENCES - facilitators	IDENTIFIED EBF/BF INFLUENCES - barriers	LIMITATIONS
Davies-Adetugbo, 1997[75]	Sociocultural factors promoting EBF in rural Osun	Mixed methods - questionnaire survey & FGD	FGD - pregnant women/recent mothers, grandmothers, husbands, CHWs in rural Osun. Ques - 3rd trimester women recruited by convenience from PHCs	Demand feeding widely accepted. Feed BM for long durations, up to 2 yrs. BM preferred over formula by majority. BF mothers should eat well to aid lactation	Bathing of infant and mother, washing of breasts, rest, certain rituals - delay initiation. Separation after delivery for some. Colostrum discarded - dirty, harmful. Most believe mother does not lactate immediately. Prelacteal feeds given while awaiting white milk. Not possible to breastfeed without water. Expressed BM culturally unacceptable. Early intro of complementary foods due to thought that BM alone cannot satisfy. Taboo for pregnant women to BF. Lactating mothers should abstain from intercourse.	Convenience sample - for quant survey
Ukegbu 2011[79]	Determinants of BF patterns in Anambra state	Mixed methods. Quantitative - prospective cohort; Qualitative - FGDs	BF mothers recruited by systematic sampling at follow-up clinic visits	Positive family attitude towards EBF, delivery at Govt HF, good BF knowledge	Operative (instrumental) delivery	Facility-based
Agunbiade 2012[80]	Constraints to EBF practice in SW Nig - BF experiences & practices of mothers	Concurrent mixed methods approach - quantitative	BF mothers, grandmothers, nurses recruited from a PHC in Ile-Ife, Osun. Ques survey - convenience sample of BF mothers from PHC.	BF normal expectation of a mother for majority, widely supported. Long breastfeeding encouraged & applauded. Mother's encouragement, social	Quant: Perceived milk insufficiency. Baby hungry after feeding (29%), maternal health problems (27%), fear of infant addiction to breast milk (26%), breast pains (25%), pressure from mother-in-law (25%), return to work/business (24%).	Convenience sample; facility-based recruitment for quantitative

				pressure, personal determination.		
Agunbiade 2012[80]	Constraints to EBF practice in SW Nig - BF experiences & practices of mothers	Concurrent mixed methods approach - qualitative	BF mothers, grandmothers, nurses recruited from a PHC in Ile-Ife, Osun. Interviews with mothers and nurses; FGD with grandmothers.	BF normal expectation of a mother for majority, widely supported. Long breastfeeding encouraged & applauded. Mother's encouragement, social pressure, personal determination.	Qual: Health-related problems, refusal of BM by infant, poor maternal nutrition, lactation problems, inadequate support from husband and conflicting opinions on infant feeding practices from the significant other, breast image concerns	
Okafor IP 2014[70]	Factors associated with EBF practice	Community-based, cross-sectional	Recent mothers residing in 2 LGAs of Lagos state		Lack of formal ANC attendance, lack of institutional delivery	
Olayemi 2014[68]	Factors associated with low EBF rates in 3 GPZ/ethnic groups in Nigeria	Mixed methods - questionnaire survey, KII & FGD	Recent mothers - quantitative survey; KII & FGD amongst mothers, significant others, & health workers from study sites - rural & urban.	Increasing maternal age and education	Perceived milk insufficiency, breastmilk not enough	Facility-based. Poor reporting of sample selection and results
Balogun 2016[82]	Factors influencing EBF in North Central Nig	Longitudinal observational study	Pregnant women from ANC clinics in Abuja	Prenatal EBF intention	Administration of prelacteal feeds	Facility-based
Schnefke 2017[84] (Alive & Thrive Nigeria)	Social norms & perception of IYCF practices	Qualitative	Communities in Lagos and Kaduna states. In-depth interviews - stakeholders, FGDs - mothers, fathers, grandmas,	Knowledge of EBF benefits, good health/nutritional status of mother, family support	Percieved BM insufficiency, maternal health issues, maternal employment, beliefs about need to give water, other cultural beliefs, concern about breast image, personal decision.	

Okafor AE 2018[81]	Factors associated with EBF practice	Qualitative	FGDs among recent mothers in 3 LGAs of Enugu state	Knowledge of EBF benefits	Pressure from support system/significant others, perception of baby needing water, influence of other cultural practices/ beliefs, need to return to work, stressful nature of EBF	
Joseph 2019[83]	Socio-cultural determinants of EBF practices in rural NW Nigeria	Qualitative	Semi-structured interviews of recent mothers (last 5 years) in 2 LGAs of rural Katsina		Negative cultural practices: bathing of mother/baby, breast washing, other rituals. Use of prelacteal feeds, perceived BM insufficiency, perceived need to give water, influence of significant others/inadequate family support,	

Another mixed methods study triangulating quantitative and qualitative data from study sites in three states – Oyo, Ebonyi, and Kaduna – was conducted to investigate factors affecting exclusive breastfeeding.[68] Four interviews and two focus group discussions were held with recent mothers having varying breastfeeding practices, and HCPs from delivery and postnatal wards. The quantitative survey obtained information on breastfeeding practices from mothers of infants aged 6 months to two years living within the study areas. The major barrier to exclusive breastfeeding identified from this study was the baby not being satisfied with breastmilk.[68]

A qualitative study was conducted among recent breastfeeding mothers drawn from three rural communities of Enugu State, Nigeria.[81] Cultural and family support systems were found to influence the perception and practice of exclusive breastfeeding among most respondents. The perception that baby needed water, return to work, and the stress associated with EBF, were major barriers to EBF.[81] A longitudinal observational study of factors influencing exclusive breastfeeding among pregnant women in Abuja, North-Central Nigeria,[82] found prenatal intention to breastfeed exclusively as a strong positive predictor.

A recent qualitative study conducted in rural communities of Katsina state, North Central Nigeria,[83] identified strong cultural beliefs and practices such as delayed breastfeeding of the first born child (3 - 4 days), preparation of the breasts for feeding with herbal concoctions, bathing of baby and mother, giving of prelacteal feeds, and traditional uvulectomy, as barriers to exclusivity. In Lagos, a community-based cross-sectional study

of recent mothers[70] identified lack of formal antenatal care attendance and delivery outside the healthcare facility as barriers to EBF. A recent baseline qualitative study by Alive and Thrive Nigeria[84] described social norms and perceptions of IYCF practices by mothers, significant others, and other stakeholders in Lagos and Kaduna states. Perceived breastmilk insufficiency, prevalent beliefs that the infant needs water, and mothers return to work, were identified as major barriers to EBF.

Reviewed primary studies identified facilitators of EBF to include knowledge of EBF/BF benefits,[79,81] and a positive family, community or workplace support system.[79,80] Early breastfeeding initiation/colostrum use,[75] prenatal EBF intention,[82] and personal determination,[80] were mentioned as facilitators in one study each.

Barriers to EBF commonly identified across studies included perceived breastmilk insufficiency and/or an unsatisfied baby,[68,75,80,83,84] or perception of baby needing water;[75,81–84] maternal health/nutrition/lactation problems,[75,80,84] the desire/need to return to work,[80,81,84] negative family and community pressures/lack of BF support,[80,81,83] delivery by caesarean section or outside a health facility,[70,79] and other negative cultural beliefs/practices.[75,81,83,84] Concern for physical appearance or breasts sagging came up in a handful of studies;[80,84] one study listed the difficulty of transiting infants to complementary feeding as a barrier.[80]

1.10. Breastfeeding promotion and support

In the previous section, the situation analysis of breastfeeding in Nigeria identified sub-optimal rates of exclusive breastfeeding and other practices. This section reviews literature on notable breastfeeding promotion strategies, some breastfeeding promotion interventions and their effectiveness in Nigeria as well as other similar countries.

1.10.1. Definitions

Breastfeeding support refers to any action, strategy or intervention, delivered with the goal of enabling and prolonging breastfeeding.[51] Breastfeeding support can be delivered in formal or informal settings, by HCPs or lay persons, in varying formats and durations, and ranges from the very simple to highly complex interventions.[51] Lack of support, on the other hand, could include a lack of information to support breastfeeding, absence/paucity of needed interventions for support, a negative expression/vibe directed towards a breastfeeding mother, or an outright expression of disapproval of one or more optimal breastfeeding practices.

The US Centers for Disease Control and Prevention (CDC) guide for support of breastfeeding mothers lists various components of breastfeeding support as follows: (a) maternity care (b) professional education (c) professional support (d) peer support (e) workplace support (f) early care and education support (g) education and information (to build capacity of mothers) (h) social marketing (for the promotion of breastfeeding practices), and (i) addressing the marketing of breast milk substitutes (infant formula).[85] Breastfeeding information refers to any knowledge or information that is made available for guidance and

support of breastfeeding. It includes interpersonal communication, print and mass media, information, education and communication (IEC) materials, social media, and other sources of information.

Box 1.2: WHO/UNICEF Ten Steps to successful breastfeeding (derived from: Guideline: protecting, promoting and supporting breastfeeding in facilities providing maternity and newborn services. Geneva: World Health Organization; 2017)

1. Have a written breastfeeding policy that is routinely communicated to all health care staff.
2. Train all health care staff in the skills necessary to implement this policy.
3. Inform all pregnant women about the benefits and management of breastfeeding.
4. Help mothers initiate breastfeeding within a half-hour of birth.
5. Show mothers how to breastfeed and how to maintain lactation even if they should be separated from their infants.
6. Give newborn infants no food or drink other than breast milk, unless medically indicated.
7. Practice rooming-in: allow mothers and infants to remain together 24 h a day.
8. Encourage breastfeeding on demand.
9. Give no artificial teats or pacifiers to breastfeeding infants.
10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic.

The WHO Guideline: protecting, promoting and supporting breastfeeding in facilities providing maternity and newborn services,[86] an update of the 'Ten Steps to Successful Breastfeeding', provides detailed guidance on support for breastfeeding within the ambit of facility care. The Global Strategy for Infant and Young Child Feeding, a comprehensive guideline based on sound scientific and epidemiological evidence, recommends that the health and other related sectors protect, promote and support optimum breastfeeding practices (a) through the health system, (b) in the community, and (c) for vulnerable children or those in difficult circumstances.[87] Ample research evidence has shown that multiple barriers mitigate against optimal breastfeeding practices, and thus a multi-faceted approach to breastfeeding support is required to reverse this trend.[88]

1.10.2. The Baby Friendly Hospital Initiative

The Baby Friendly Hospital Initiative (BFHI), established in 1992, is one of the targets of the *Innocenti* Declaration and the Global Strategy for Infant and Young Child Feeding, geared

towards the protection, promotion and support of breastfeeding.[14] It is now more often referred to as the 'Baby-friendly Initiative' to include additional components such as neonatal and community health.[14,15] The BFHI has been assessed as having achieved a good measure of success in the protection, promotion and support of breastfeeding globally, though not without some drawbacks.[14,16,89] A systematic review published in 2016 on the impact of the BFHI on breastfeeding outcomes[90] concluded that the initiative impacted positively on exclusive breastfeeding and other recommended infant feeding practices. It also observed a dose-response relationship between the number of BFHI steps women were exposed to and the odds of improved infant feeding outcomes.[90] A review of systematic reviews however expressed low confidence in the observed benefits of BFHI due to the low quality of previous studies/reviews.[91] A commentary on BFHI posited that poor endorsement and support from government, poor implementation of breastmilk substitutes code, and opposition/unwillingness to change, were some of the challenges faced in industrial nations.[14,15] Currently, commitment to breastfeeding across the globe is largely sub-optimal, due to low funding and the relatively low priority of breastfeeding promotion within maternal and child health (MCH) programs.[10] The initiative underwent evidence-based revisions in 2009 and 2017 for greater impact.[16]

The BFHI in Nigeria was launched in 1992 and has remained a cornerstone of breastfeeding promotion in the country; however, it is currently perceived to be in a state of 'fatigue' due to low funding and relatively low priority of breastfeeding promotion within maternal and child health programs.[10] Some of the gains in EIBF prevalence in Nigeria have been

attributed to the BFHI; however, EBF rates reportedly improved less impressively over the same period.[60]

1.10.3. Knowledge, attitudes, self-efficacy and breastfeeding-support practices of Health Care Professionals (HCPs) in Nigeria

A major source of education and support for breastfeeding comes from health care professionals (HCPs) within the formal health sector during pregnancy, delivery, and the postnatal period.[1,92] Previous assessments of breastfeeding programs within and outside Nigeria have shown that not all health workers attending to pregnant women or newborns had the requisite knowledge, attitudes or skills to provide needed support for breastfeeding issues.[1,14] The WHO states that the available evidence on the requisite knowledge and skills necessary for health workers to perform optimally in providing support for breastfeeding is limited in quality and quantity, and recommends further research in this area.[86]

An integrative review of literature on the barriers and facilitators to implementation of the BFHI searched 13 databases with relevant keywords.[15] The review included 45 English language articles from 16 countries; one included article was from Nigeria.[93] However, only about one-fifth of included studies were from LMICs. Findings were categorized into barriers and facilitators at various levels, and lack of health worker training was identified as one of the barriers to successful breastfeeding promotion. Some of the factors underpinning this barrier included outdated breastfeeding knowledge and skills, negative

attitude towards BFHI, strong traditional beliefs about breastfeeding, and respect for personal choice.[15]

There is a plethora of cross-sectional studies on breastfeeding knowledge among mothers in Nigeria, but few have been published which investigate breastfeeding support among HCPs; a summary of these studies is contained in Table 1.7. A cross-sectional study was conducted among HCPs at primary health care centres in Ibadan, southwest Nigeria, to assess their support for breastfeeding, with a response rate of 90.4% (n=386).[94] The study instruments were prepared in English and professionally translated into the main indigenous language (Yoruba), to ensure adequate understanding and to obtain valid responses. The HCPs had previously been trained in BFHI. The respondents were found to have a positive attitude, fair knowledge, and moderate support for breastfeeding. The published article does not clearly state what was measured as 'support for breastfeeding'. However, scrutiny of the study instrument obtained from the author reveals that under support, different types of questions were asked, including questions on self-efficacy, knowledge of managing breastfeeding problems, and specific breastfeeding support practices. Predictors of knowledge and delivery of support for breastfeeding included: young age of HCP, senior in profession, high knowledge score, more than five years post-training experience, and provision of sufficient opportunities to practice breastfeeding skills.[94]

TABLE 1.7: Summary of studies on HCP knowledge, attitudes, self-efficacy, and breastfeeding support

Author, date, location	Breastfeeding knowledge of HCPs	Breastfeeding attitudes of HCPs	HCP's involvement in breastfeeding support	Breastfeeding competence/ self-efficacy	Training in BF support
Okolo 2002, Jos[93]	Low proportion knew baby should be put to breast within 30 minutes of delivery (EIBF)	Suboptimal, had negative attitude towards withholding water from exclusive breastfeeding, and complementary feeding at six months	N/A	Less than 20% could demonstrate proper positioning and attachment of baby to breast	N/A
Ola-Olorun et al, 2006, Ibadan[94]	Knowledge of HCPs was fair	Positive attitude	Moderate support for breastfeeding. A mixed variable measuring different outcomes	N/A	N/A
Utoo 2012, Ikom, CRS[95]	Gaps found in breastfeeding knowledge, such as recommended duration of 2 years	N/A	N/A	N/A	N/A
Senbanjo 2014, Lagos[96]	N/A	N/A	About a quarter involved in BF support in last 3 months	N/A	70% had ever been trained in BF issues, but less than 2% in the last one year
Samuel 2016, Ibadan[97]	Low level of breastfeeding knowledge. Had general knowledge but lacked in-depth understanding of management of breastfeeding problems and complementary feeding practices	Attitudes were good towards adequacy of breastmilk for first six months and feasibility of EBF, but suboptimal in some regards, e.g. age at introduction of CF was dependent on child's readiness	Breastfeeding support practices - about 80% involved in counselling before intervention, fair attitude	N/A	N/A

Ikobah 2020, Calabar[98]	A quarter of respondents had satisfactory knowledge. Most had good knowledge of BF benefits and practices. Knowledge of common breastfeeding problems was generally not satisfactory	N/A	N/A	N/A	N/A
Alive & Thrive 2017, Lagos & Kaduna[99]	*Overall knowledge was high, but gaps observed in their knowledge*		About 40% involved in support activities in last six months		40% had been trained in IYCF in last 2 years

Also in Ibadan, Oyo state, a baseline survey was conducted prior to a training intervention among staff of public primary health care centres from 5 LGAs selected by cluster sampling method (n=124).[97] Paired t-tests were used to measure differences in staff knowledge, attitudes, and breastfeeding support practices before, immediately after, and one month after the training intervention; 88.7% of participants completed the survey. Breastfeeding knowledge at baseline was low; respondents' attitudes and breastfeeding support practices were rated as suboptimal. All the indices improved immediately after the training program, however on later follow-up after one month, most were on the decline. The study concluded that the participants had general knowledge of breastfeeding but lacked in-depth knowledge.[97]

In Keffi Local Government Area of Nasarawa State, Nigeria, a cross-sectional study of HCPs knowledge, attitude and breastfeeding practices was conducted among ten public and private health facilities selected from the three tiers of health care provision (n=250), and published in 2002; the method of sample selection was however not expressly stated.[93] Staff had not been trained in BFHI prior to the study. The results showed deficiencies overall and statistically significant differences between type of HCP in breastfeeding knowledge, attitudes and competencies, including sub-optimal knowledge of early breastfeeding initiation, negative attitude towards withholding water until six months, and timing of complementary feeds.[93] A cross-sectional survey of paediatric nurses and doctors at a tertiary hospital in Lagos, Nigeria, published in 2014, was conducted to assess their awareness of hospital breastfeeding policy, and their level of breastfeeding training, with a response rate of 89% (n=125).[96] It also assessed the breastfeeding practices of mothers

attending the outpatient clinic. About half of all staff in the concerned units (52%) were aware that the hospital had a written policy supporting breastfeeding, though the policy was not displayed in work areas. Seven out of ten HCPs had received training in breastfeeding support at some time in their career, but only two (1.6%) had been trained in the last one year preceding the study. Less than one quarter of the HCPs (23.5%) had been involved in breastfeeding counselling and support in the last three months.[96] The study concluded that BFHI policy implementation at the facility was sub-optimal.

A small cross-sectional study involving HCPs (doctors, nurse/midwives, community health officers/community health extension workers) from one facility in Ikom, Cross River state, Nigeria was conducted (n=36).[95] Respondents were selected by convenience sampling, and a self-administered questionnaire designed by the researchers was used for data collection. The study reported an appreciable knowledge gap among respondents and called for retraining of workers. The study had a number of drawbacks, including selection from a convenience sample and from one health facility, a very small sample size (with minimum sample size not indicated), and a non-validated study instrument.[95] A study of breastfeeding knowledge carried out amongst various cadres of health workers in Calabar, also in South-South Nigeria, was published in 2020, with 225 HCPs surveyed.[98] A self-administered questionnaire was used to obtain data from the respondents, selected by stratified sampling across tertiary, secondary, primary health care facilities, private hospitals and other medical centers in the city. The results showed that just over one quarter of respondents (27.1%) had satisfactory knowledge, which was equivalent to a score of 90% or more; it is not clear how the cut-off for knowledge grading was arrived at

or what proportion of those invited to take part responded to the questionnaire. The study concluded that though knowledge of breastfeeding was generally fair, the knowledge of management of breastfeeding problems was suboptimal.[98]

A non-governmental organization, Alive and Thrive Nigeria, as part of an infant and young child feeding evaluation in Lagos and Kaduna states, conducted a baseline survey of health providers' breastfeeding knowledge and support practices between February and April 2017.[99] This baseline was preparatory to an intervention which was recently conducted in the study areas. LGAs were randomly allocated into intervention and comparison groups in a ratio of 2:1 for the evaluation; a geographic information systems-based sampling method was used to select the sampling units for the health provider survey in each LGA. The study surveyed three groups of health providers, viz: facility-based HCPs, community pharmacists and chemists, and traditional birth attendants (TBAs) (n=370). The study questionnaire, which was different for and appropriate to each of the three groups, was interviewer-administered. About two-thirds of facility-based respondents worked in the private sector. My study did not include pharmacists, chemists, or TBAs, and only assessed knowledge of breastfeeding-specific IYCF indicators, whilst the A&T study covered all the IYCF indicators.[99] The A&T Health Provider survey assessed the knowledge and practice opportunities of the health providers surveyed, whereas my study in addition assessed HCP attitudes towards breastfeeding.

The results of this baseline qualitative study were published in a 2017 report not available in the public domain. Amongst the facility-based providers across the two states (n=159),

although overall knowledge was high, some knowledge gaps were identified by the survey: up to a quarter of providers would recommend infant formula for a child less than six months when the mother was not around. About 40% of providers had received training in Infant and Young Child Feeding (IYCF) strategies in the last two years; 37% and 43% of respondents had provided individual and group counselling respectively in the last six months.[99]

The studies described above found that knowledge of breastfeeding benefits and practices ranged from fair to good amongst HCPs surveyed but differed significantly by cadre of HCP in most studies. A finding common to all studies was that knowledge of practical breastfeeding issues and of management of breastfeeding problems was not as good as their general knowledge of breastfeeding. Only a few of the included studies looked at HCPs attitudes towards breastfeeding; in those that did, attitudes were positive overall, but suboptimal for withholding water during exclusive breastfeeding,[93] and for age at introduction of complementary feeds.[93,97] Breastfeeding support was looked at in a few of the included studies, and varied by the proportion and cadres of staff involved in counselling and support activities. No study reported on self-efficacy of health workers to support breastfeeding, although one study[93] found that only about a fifth of HCPs could correctly demonstrate positioning and attachment for breastfeeding. Two studies reported on training opportunities, with varying proportions of HCPs having been trained at one time or the other. There are important gaps in the literature that require additional research to be filled.

1.10.4. Community support for exclusive breastfeeding

Empirical studies and program evaluations have underscored the importance of families and communities in breastfeeding promotion and support; they are invaluable resources and yet often unrecognised or untapped.[14] One of the strategies towards increasing the effectiveness of breastfeeding programs therefore should be the capacity building of key family and community persons to improve infant and young child feeding.

In Nigeria (as with many other LMICs), it is also recognised that a large proportion of deliveries (61% in 2018) take place outside the formal health sector, thus many women and infants may not be able to access the full benefits of breastfeeding promotion through the BFHI. It is thus imperative to pay particular attention to community resources that can be used to provide breastfeeding support.[100,101] Community support has been identified as a vital link to an effective and sustainable program, whether as part of the BFHI or integrated into ongoing community activities.[16]

1.10.5. Baby-Friendly Community Initiative

The Baby Friendly Community Initiative (BFCI) is an expansion of the tenth step of the BFHI, which focuses on support for the breastfeeding mother after discharge from the hospital. Specifically, the tenth step of the BFHI seeks to foster the establishment of breastfeeding support groups, for support of breastfeeding in the home and community.[100,101] Reviews of

the BFHI have provided evidence to show that Step 10 was hitherto not being implemented as well as it should be for effective protection, promotion and support for breastfeeding.[16]

The BFCI operates through the implementation of an eight-point plan for the protection, promotion, and support for breastfeeding.[102] It has been piloted and implemented in several countries across the globe; documented experience of programs based on the BFCI framework in sub-Saharan Africa are available from The Gambia and Kenya.[101] The BFCI uses several strategies to create a supportive environment for breastfeeding in the home and community environment, while maintaining a vital link with HCPs in the formal health system. It is thus a comprehensive system that harnesses the benefits of BFHI, and adds to this the sustainability of support through community engagement.[101] Key features of the initiative are: community involvement; a continuum of breastfeeding, adequacy of complementary feeding, maternal nutrition, early childhood development, and hygiene; formation and training of mother support groups in the community; close linkages to the health facility; and derivation/adaptation of training messages from/to the cultural context of the served communities.[102] A longitudinal trial of the effectiveness of the BFCI in Kenya showed a statistically significant increase in the proportion of infants in the intervention group exclusively breastfed up until six months (79.2% vs 54.5%, $p < 0.05$), and in the duration of EBF (mean difference 0.62 months, 95%CI 0.38, 0.85; $p < 0.001$) when compared with the control group.[103]

1.10.6. Effectiveness of interventions to promote breastfeeding.

Various forms of interventions have been shown to successfully improve exclusive breastfeeding rates in different populations, spanning a spectrum of activities within the home/family, community, health service/health system, workplace, and the policy environment.[104] These interventions include (but are not limited to) training of health staff, provision of supportive supervision, home visits by health staff, public enlightenment campaigns, peer support, and women's participatory groups.[104–106] More recently, the provision of support remotely through electronic/e-health/digital platforms has become increasingly common.[107,108] Although statistics show a wide disparity within and between settings, regions and country types, the evidence regarding the use of these interventions for promoting exclusive breastfeeding rates is mounting; a number of systematic reviews have been conducted recently to address the question of which interventions provide the greatest improvements in promoting any and exclusive breastfeeding. Some of these reviews have focused on various or all forms of breastfeeding support across various contexts;[104,106] others have examined the role of peer support and/or community engagement in promoting breastfeeding practices.[109,110] A few of these reviews and a landmark trial are described in more detail below.

The Promotion of Breastfeeding Intervention Trial (PROBIT)[111] was conducted amongst maternity hospitals and affiliated polyclinics in Belarus using a cluster randomized design to promote breastfeeding duration and exclusivity, while investigating the effect of breastfeeding on infections. It is said to be the largest clinical trial conducted on breastfeeding, with a rich data set from several phases of follow-up; more than 17,000

healthy mother-infant pairs were recruited into the initial phase of the study between June 1996 and December 1997.[112] The trial showed an improvement in the duration and exclusivity of breastfeeding; infants in the intervention group were more likely to have been exclusively breastfed at 3 months (43.3% versus 6.4%, p< 0.001) and at 6 months (7.9% versus 0.6%; p=0.01). Infants in the intervention group were also more likely to be breastfed at 12 months, and less likely to have gastrointestinal infections and atopic eczema; however, the likelihood of having respiratory infections was not significantly lower than those in the control group. This study concluded that HCP intrapartum and postnatal support was effective in improving rates of EBF and other recommended infant feeding practices, and for improving child health outcomes.[111]

A Cochrane review of support for breastfeeding among healthy mothers and healthy babies was first published in 2012[105] and updated in 2017.[51] The updated review included 100 trials with more than 83,000 mother-infant pairs drawn from 29 countries spanning across different income groups; 73 studies representing 56,451 mother-infant pairs contributed data to the meta-analysis. The review investigated the effect of all forms of extra support versus usual care on several outcomes, including cessation of breastfeeding at six months, and conducted subgroup analyses. All forms of breastfeeding support were found to decrease EBF cessation at six months (average RR=0.88; 95%CI 0.85, 0.92}.

Subgroup analyses for cessation of exclusive breastfeeding up until six months showed a greater effect from lay persons compared with professionals or mixed support (X2 = 7.74, p = 0.02, I^2 = 73.1%); intensity of the intervention indicated by the number of postnatal

contacts (four to eight contacts compared with more than eight or less than four contacts; X^2 = 13.78, p = 0.003, I^2 = 78.2%); face-to-face compared with other types of support (X^2 = 37.55, p = <0.00001, I^2 = 94.7%); and high versus intermediate or low background rates of breastfeeding initiation (X^2 = 30.73, p = <0.00001, I^2 = 93.5%). Due to the high to very high heterogeneity observed in these analyses, the authors advised that the results be interpreted with caution. Differences in the timing of support given (antenatal and postnatal periods compared with postnatal period only) were not statistically significant.[51]

A systematic review and meta-analysis including 110 RCTs and quasi-experimental studies from developed and developing countries explored the effect of education or support given to mothers in either individual or group counselling sessions, and by lay persons or professionals.[106] It found that breastfeeding promotion activities increased rates of exclusive breastfeeding for all time periods below six months (EBF 1-5 months RR = 1.90, 95%CI 1.54, 2.34) and reduced breastfeeding cessation.

Sub-group analyses showed that individual and group counselling each had significant effects on exclusivity, which further increased when both were combined. Facility-based and community-based interventions, separately or in combination, resulted in statistically significant increases in EBF rates at 1-5 months, with community-based interventions having the largest effect (RR = 2.59; 95%CI 1.80, 3.73).[106] Most of the effects observed on subgroup analysis were however larger in developing than developed countries, and in some cases were not significant for developed countries. Reasons given for these differences were the inadequacy of breastfeeding support provided as part of usual care in

most developing countries, and the likelihood of greater success of breastfeeding promotion interventions in societies where breastfeeding is seen as normative behaviour, which is common to most developing countries. The evidence is however limited by the assessment of unclear to high risk of bias for most of the studies, and observed heterogeneity.[106]

Another systematic review by Sinha et al[104] looked at interventions in several contexts and their effects on improving exclusive breastfeeding and other recommended infant feeding practices. The review included 195 experimental, analytical, and observational studies spanning different country income-groups. EBF rates increased by 44% as a result of all interventions (RR = 1.44; 95%CI 1.38, 1.51; 130 estimates), with the effect size being larger for LMICs and rural areas when compared with HICs and urban areas. Interventions given in a combination of contexts resulted in a larger effect size, with the greatest resulting from a combination of the health system/services and community contexts (RR = 2.52; 95%CI 1.39, 4.59; 7 estimates).[104]

Another review by Kim et al in 2018[113] investigated interventions promoting exclusive breastfeeding up until six months included 27 RCTs and just over 36,000 mother-infant pairs. Breastfeeding promotion interventions resulted in an increased likelihood of exclusivity up until six months compared with standard care (OR = 2.73; 95%CI 1.83, 4.06). For type of intervention, the largest effects were obtained with the Baby Friendly Hospital Initiative (OR = 5.21; 95%CI 2.15, 12.61), and interventions with multiple components (OR = 3.22; 95%CI 1.46, 7.10). They also found that educational interventions, interventions

provided only before delivery (prenatally), and those that did not utilize a protocol for provider training, did not significantly increase the odds of exclusive breastfeeding up until six months.[113]

These studies and reviews provide evidence on what works to improve and promote exclusive and other recommended breastfeeding practices across the world. There is however a need to take a closer look at LMICs, where scaling up recommended breastfeeding practices is projected to have much-needed impact on infant and child survival and wellbeing.

1.10.7. Intervention studies of breastfeeding promotion in Nigeria

There are only a handful of breastfeeding promotion intervention studies from Nigeria in literature. A total of nine breastfeeding promotion studies are summarised in Table 1.8, comprising of four RCT/cRCTs,[107,108,114,115] two pre-post studies,[97,116] one cohort study,[117] and two cross-sectional studies.[118,119]Interventions were delivered in a variety of contexts: two in health systems & services, two were community based, two at the home/family level, and three were combinations of more than one context. Six studies evaluated EBF under or at 6 months, one study did not state the duration of EBF assessed, and two studies looked at other outcomes, such as breastfeeding knowledge; four studies also looked at EIBF rates.

The results showed a statistically significant increase in EBF rates after the interventions in four studies,[107,108,117,118] whilst one trial did not increase EBF rates significantly at 6

months;[115] one study did not report whether or not the increases were statistically significant.[116] All four studies that assessed EIBF had statistically significant increases. Knowledge of HCPs was increased by training programs in two studies,[97,118] and attitudes in one study.[97]

TABLE 1.8: Breastfeeding promotion intervention studies from Nigeria

STUDY ID	DESIGN	PARTICIPANTS	INTERVENTION	RESULTS	COMMENTS
Davies-Adetugbo 1997 Osun state[118]	Intervention study, with a comparative cross-sectional survey of participants recruited from health districts in intervention & control areas.	IC: Women in 3rd trimester, recruited by convenience from 3 health districts each in intervention and control communities (nIG=126; nCG=130). Three groups of HCP: (i) Control, (ii) Study Area – trained, (iii) study area - untrained	*Health systems/services & Community-based.* PHC workers in intervention districts were trained either for 2 days at a Trainers workshop, or in a one-day (8 hour) course at the district level. Community mobilization activities held in intervention districts with BF mothers, HCW & community leaders; BF & advantages discussed, formation of support groups encouraged.	***Change in BF practices*** EIBF for all deliveries: IG: 32%, CG 6%; p < 0.001 Early BF initiation at PHC facilities: IG: 47%; CG: 4%; p <0.001 ***HCP Knowledge*** HCP would recommend EIBF: Study area trained: 89%; CG: 46%; p<0.001 HCP would recommend EBF: Study area trained: 98.5%; CG: 36.5%; p<0.001 Average knowledge score: Study area trained: 9.4; CG: 6.1; p <0.001	Poorly reported study, results difficult to understand; a few errors in tables
Ojofeitimi 2000, Ile-Ife[119]	Comparative cross-sectional study to determine effect of BFHI on BF practices among attendees of BHFI and non-BFHI designated hospitals	BF mothers of infants < 30 months at time of interview, attending selected study facilities	*Health systems/services* No description of the existing program was provided, except that persistent and effective campaign of BF practices had been undertaken by the BFHI-designated hospital	EIBF (1 hr) was higher in the BFHI-designated facility: IG 70.5%, CG 52.3%. EBF (?duration): as at time of measurement more infants were EBF in BFHI centre: IG 75.1%; CG 34.6%	1. Observational study, assessing effect of an existing program, little or no description provided. 2. The comparison is lopsided, as the BFHI

					centre is an urban Comprehensive Health Centre, while the non-designated centre is a rural Maternity centre. 3. Duration of EBF at time of assessment not stated. Thus, evidence from this study should be interpreted with caution.
Qureshi 2011, Sokoto state[114]	Non-randomised trial of two communities	Biological mothers BF at time of study	*Home/family* Home visits conducted by female community volunteers for BF promotion, trained over 4 days.	***Breastfeeding practices*** EBF in children < 6 months: Intervention group: Pre: 55/179 (31%) Post: 75/179 (42%)	No post-intervention data is available for EBF in the control group. The results are therefore being reported here as a pre- and post-study
Flax 2014, Bauchi state[107]	Cluster RCT. Intervention: 40 groups (n=229); control 37 groups (n=232). Pregnant clients recruited from study clusters at baseline; post intervention data collected at ≥6 months	Microcredit clients, pregnant & aged 15-45 yrs	*Community-based* intervention consists of: (i) monthly (x10) BF learning sessions led by trained credit officers during microcredit meetings; (2) Weekly cell phone text and voice messages; (3) participant-generated songs & drama, at mthly meetings. Control clusters continued with regular microcredit meetings.	***Breastfeeding practices*** EIBF 1hr: SS increase IG: 70%, CG: 48%; OR=2.6 (95%CI 1.6, 4.1) EBF 6m: SS increase IG 64%, CG 43%; OR = 2.4 (95%CI 1.4, 4.0)	High coverage of intervention activities Delayed introduction of water accounted for most of the EBF increase seen in the intervention arm.

Flax 2017, Bauchi State[108]	As above	As above	*As above.* Further analysis of data within intervention arm only; association between participation in small group activities and EBF, EIBF. Comparison between small groups which met at least weekly, or every 2-4 weeks, versus those who never met.	***Breastfeeding practices*** EBF: Met at least weekly (OR = 5.6, 95%CI 1.6, 19.7), every 2 -4 weeks (OR = 3.1, 95%CI 1.0, 9.7) had higher odds of EBF up to 6 m Odds for EIBF was not SS (OR = 3.7; 95%CI 0.8, 17.2).	Small group meetings potentiated the effect of the community-based, multi-pronged intervention. A greater frequency increased the odds of EBF up to 6 m
Samuel, 2016, Ibadan, Oyo State[97]	Before and after clinic-based intervention. HCW (n = 124) selected by a cluster sampling technique. One ANC client was recruited for each HCW and included in the study (n = 162)	HCP from selected public PHC facilities ANC attendees at the selected facilities	*Health systems/services.* Two-day training program for HCPs on IYCF recommended feeding practices, counselling and support for breastfeeding. Data from ANC attendees used to ascertain care received and if counselling given	***HCP knowledge:*** Proportion of HCP who could list 3 advantages of BF to infant and to mother increased significantly ($p<0.05$). Proportion who could mention 3 common BF difficulties increased significantly ($p<0.05$) (Both waned after four weeks). ***HCP attitudes:*** Attitudes increased significantly after training ($p<0.05$) ***ANC attendees:*** Proportion of ANC attendees who reported receiving one-on-one IYCF counselling did not improve significantly after HCP training	Study did not ascertain environmental opportunity for improving counselling rates No other outcome indicator for ANC attendees to assess training
Ogaji 2020, Port Harcourt, Rivers State[115]	RCT – 2 arm IG: Mobile phone-based support plus usual care (n = 75), CG: Usual care (n=75). EBF rates &	Maternal-infant pairs recruited 1st week post-partum from a tertiary hospital in PH &	*Home & family:* IG: Biweekly (first month) and monthly (2^{nd} – 6^{th} month) phone-based advisory support from a paediatrician; approximately eight	***Breastfeeding practices*** EBF 6m: IG: 55.2%, n = 40; CG: 46.8%, n = 30 ($X^2 = 2.16$, $p = 0.141$) Mean duration of EBF:	Attrition: IG: 10.7%; CG: 14.7% The intervention had higher EBF rates and longer EBF duration,

	anthropometry measured before & after. Followed up mthly for 6 m. Follow up n = 131	randomly assigned. Inclusion: delivered in the hospital, resident in PH, intention to BF and have commenced BF postpartum; own a mobile phone	calls/participant. Support focused on benefits of EBF. CG: Usual care: post-natal, immunization and nutrition services	IG: 5.04 months, CG: 4.44 months; (t = 1.45; p=0.149) ***Anthropometry of infants*** Statistically significant difference in weight, length, weight for age z-scores in IG	though not statistically significant. May have greater effect in places without basic BF promotion activities
Flax 2022, Lagos[117]	Quasi-experimental longitudinal cohort study of women from private health facilities (clusters). n = 1200 (600/study arm)	Women recruited in 3rd trimester, followed up at 6- and 24-weeks PP. IC: In 3rd Trimester, at least 18 years, clients of included private HFs.	*Health systems/services, home & family, community* Multi-pronged intervention for IG: BFHI training of private hospital staff, counselling in-person and on WhatsApp, BCC materials distribution, mobile phone messaging, mass media messaging. CG: Usual care	***Breastfeeding practices*** EIBF: IG: 35%; CG: 33%; p = 0.65 EBF @ 6 weeks: IG: 83%; CG: 76%; p = 0.02 EBF @ 24 weeks: IG: 66%; CG: 52%; p < 0.001	Process of private health facility selection not clear; may be subject to some form of selection bias
Ralph-Opara, 2020[116]	Pilot pre and post intervention study of community influencers trained in breastfeeding support	Pregnant women from 40 HFs in the study area	*Home & family*[9] Counselling of pregnant women (6 contacts in 3rd trimester) and home visit support (6 contacts in first six months)	***Breastfeeding practices*** EIBF: Pre: 72%, Post: 93% EBF: Pre: 67%, Post: 84%	Only conference abstract of findings available. Further details not available on methods or results.

[9] Not clear from abstract if intervention had a health facility or community component

1.11. Overarching aims and objectives of thesis.

This background chapter has reviewed the benefits of breastfeeding and the justification for the recommended breastfeeding practices from the body of literature; it has critically examined the prevalence and trends of exclusive breastfeeding and other infant feeding practices globally, regionally, and within Nigeria. Factors affecting these practices have also been identified from existing literature. Breastfeeding promotion and support activities in Nigeria were reviewed to identify candidate interventions for scaling up exclusive breastfeeding rates.

From the body of existing literature, several cogent issues have been identified. Exclusive breastfeeding is extremely beneficial for infant, mother, and the larger society, especially in an LMIC such as Nigeria; however, despite some investments in breastfeeding promotion activities, such as the BFHI, exclusive breastfeeding rates are suboptimal. There is a paucity of documented studies in the body of literature that have assessed behavioural influences and breastfeeding promotion interventions on exclusive breastfeeding both in LMICS in general, and in Nigeria in particular. These gaps have informed the overarching aim and objectives of this thesis.

1.11.1. Over-arching aim

To explore candidate interventions, barriers and facilitators to exclusive breastfeeding up until 6 months in the context and setting of Lagos state, Nigeria.

1.11.2. Aims of each study

1. To determine the effect of various interventions on exclusive breastfeeding up until 6 months in LMICs with high breastfeeding initiation rates.

2. To determine the breastfeeding knowledge, attitudes, self-efficacy and support practices of health staff in public health facilities in Lagos state, with a focus on exclusive breastfeeding.

3. To identify the influences (facilitators and barriers) of mothers' breastfeeding practices in selected communities of Lagos state.

CHAPTER 2: METHODOLOGY

2.1. OVERVIEW OF THIS CHAPTER

This chapter examines the methodology, i.e. broader framework, consisting of the theories and assumptions, underpinning the body of research conducted for this doctoral thesis. It provides justification for the plurality of methods used. Two quantitative studies and one qualitative study form the body of research; this chapter explains the reason for the choice of methods, and how each study relates to the others.

I also examine the ontological and epistemological underpinnings of my research, and describe my journey in developing my personal philosophical standpoint.

2.2. CHOICE OF STUDY METHODS

2.2.1. Rationale for choice of methods employed for each of the included studies.

From the detailed review of literature on breastfeeding and its benefits, epidemiology, barriers and facilitators, it became apparent that there were a number of questions that could translate into valid research questions.

First, a wide gap was apparent between the actual and desired exclusive breastfeeding rates across the globe, and particularly in sub-Saharan Africa; this despite the proven benefits that exclusive breastfeeding confers, especially for LMICs. This brought about the decision to conduct a systematic review of the existing evidence, to find out the most effective

interventions for improving exclusive breastfeeding rates amongst LMICS, which is documented in Chapter 3.

The review of literature from Nigeria did not yield much by way of high-quality, robust studies on the knowledge and practices of healthcare professionals who are responsible for the care of women and infants, before, during and after delivery. A quantitative study using a cross-sectional design was therefore employed to ascertain the knowledge, attitudes, self-efficacy, and breastfeeding support practices of HCPs, and analytic methods were used to determine predictors of these variables; this forms Chapter 4 of this thesis.

With more emphasis on the influences on feeding practices outside the hospital setting, especially in countries such as Nigeria where only 39% of deliveries take place within a health facility, and only a slightly higher proportion (43%) are attended by skilled personnel[59], it was important to closely examine the communities where women lived to understand the dominant influences on infant feeding. Qualitative methods were adopted for the study exploring facilitators and barriers to exclusive breastfeeding practices in selected Lagos communities, as it required processes that could probe into the reasons behind observed practices and behaviour; this study is reported in Chapter 5.

2.2.2. Definition and description of mix of methods used in this thesis

As previously stated, the overarching aim of this thesis was to explore the potential interventions, barriers, and facilitators to exclusive breastfeeding in Lagos state, Nigeria. As described in the previous section, the component studies in the thesis were designed individually to answer specific research questions emanating from this overarching aim. The research method for each component study was chosen pragmatically, selecting the method that was adjudged most suitable for the particular research question and objective of the study;[120] the pragmatic approach is described in more detail forthwith.

In adopting a terminology for the methods used in this thesis, a short description of the approach adopted ensues.

Mixed methods research can be described as that which combines elements of quantitative and qualitative approaches – viewpoints, data collection, analysis, and/or inference techniques, so as to enhance the breadth and depth of understanding, and corroboration of the research findings [121,122] One of its key characteristics is the integration of findings from both approaches.[122,123] It can be employed in the bid to increase the knowledge and validity of a study.[121] Multi-methods research, on the other hand, is defined by most authorities as that which employs either a multiple qualitative or multiple quantitative approach within a study.[121] A quasi mixed-methods study has been described by some authorities as one in which

quantitative and qualitative methods are employed in data collection and analysis, but which lacks adequate integration of findings/inferences.[122]

A form of mixed- or multiple-methods approach was well suited for this thesis, because such an approach would enable the combination of large, representative samples and complex statistical analyses characteristic of quantitative surveys with a more exploratory approach for the socio-cultural and environmental contexts of the research problem through qualitative research.[121] Mixed methods research is seen as drawing on the strengths of both qualitative and quantitative research.[124] Pragmatists are researchers who promote the mixed/multiple-methods approach and de-emphasize the divide between quantitative and qualitative methods; they also advocate that the research question should dictate the research method used.[120,123]

Mixed methods research has been classified into various forms, based on a number of criteria/factors including the purpose, viewpoint, type/form of data collected, timing/sequence of data collection, and methods of data analysis/integration.[121] The methods employed in this thesis meet some of the criteria of a sequential mixed methods design, as the quantitative components came ahead of the qualitative survey, and the systematic review informed some aspects of subsequent research.[121,124] However, since the component studies answered different research questions, the findings were not synthesized but rather analysed

separately, these findings have been brought together and summarised in the overarching discussion.

2.3. Epistemological and philosophical/theoretical perspectives

Qualitative and quantitative research are often founded on different approaches. Theorists however posit that there are more similarities than differences between qualitative and quantitative research methods.[124,125] Quantitative research usually aims at generating knowledge that is free from bias and unaffected by context, which is a positivist view; it seeks to find a single 'truth',[126] whilst qualitative research is usually more about meaning than numbers.[127] It often does not seek a single answer or a single truth, and recognizes that subjectivity or contexts about the data is important. There are however different approaches to qualitative methods, (and research methods in general), based on the adopted ontological and epistemological perspective.[127] The actual definitions and alignments of philosophy and theory vary slightly among some of the authorities on the subject[128], but in this section a simple classification is laid out as an introduction, before I delve into my personal theoretical standpoint.

The methodology for any type of research is hinged on ***Ontology***, which refers to what constitutes reality, and ***Epistemology***, which refers to the nature of knowledge and how knowledge is generated.[127] The philosophical perspective of the researcher derives from the ontological and epistemological stance, which inform the methodology and research methods that are adopted in undertaking research.[126–129] Methodology refers to the overarching

framework for a study consisting of the theories and practices that underpin/inform it.[127] The research methods, on the other hand, refer to the actual tools and techniques that are employed in carrying out the research.[127,130]

2.3.1. Ontology

As earlier stated, ontology deals with what reality is. The spectrum of ontology ranges from the standpoint of ***realism,*** which posits that there is one reality (the truth, which is completely independent of human or social interactions), to ***relativism*** such that there is no true reality (the viewpoint of a reality that is constructed within the human mind, completely dependent on human interpretation, and therefore relative to these interpretations).[126–128] A middle ground between these ontological stances is ***critical realism***, which draws from both ends of the spectrum; this also assumes one reality exists, which however cannot be fully understood because of the imperfection of the measuring tools and of the human intellect, and thus requires critical or broad examination to determine. It acknowledges social and other subjective influences on the perception of reality.[126,127]

2.3.2. Epistemology

Epistemology deals with the nature of knowledge, and the validity, scope, and methods of its acquisition.[126,128] Epistemological standpoints can be aligned to ontological perspective along the spectrum between realism and relativism; the epistemological spectrum proposed by Crotty and referred to by other authors was adopted for the purpose of this brief

overview.[126,128,129] ***Objectivism*** aligns with the standpoint of realism, in that a 'single or objective truth' exists, independent of the human mind or social interactions, and the knowledge about that truth can be determined through the application of research methods which help to remove bias and other contaminants that may 'distort' the actual truth. In other words, knowledge is 'objective' or 'deductive'.[126,129] At the other end of the spectrum, ***Subjectivism***, which aligns with the ontological stance of relativism, identifies reality as not being single or objective, but rather pluralistic. It posits that reality only takes on meaning from the mind of the person interpreting it, and their own perspectives. ***Constructionism*** strides between these two epistemological standpoints; it takes socio-cultural context or perspective into account in the production of knowledge, and posits that there are multiple versions of truth or knowledge. Put in another way, knowledge is 'constructed' by the interaction of the human mind with its world.[126,129]

2.3.3. Philosophical/theoretical perspective

As earlier stated, the philosophical or theoretical perspective of the researcher guides the type of research undertaken. One's epistemological position can be related to their theoretical perspective. ***Positivism*** is at one extreme of the spectrum, and aligns with the objectivist epistemology, in that knowledge can be discovered or obtained through certain defined/scientific processes which help to remove biases and colourations, thereby uncovering the true position of that knowledge. It sees knowledge as objective, which can be determined as a single truth.[126,127] ***Post-positivism*** takes a similar position as above, but

acknowledges the influence of context on the person generating knowledge, which affects the information generated in some way.[127] It also acknowledges the imperfection of methods of discovering the truth, and in order to get as close to the truth as possible, it may be necessary to deploy multiple methods.[124,126] This perspective or worldview aligns with most research methods used in the natural sciences, but may also underpin some qualitative research.[124]

Constructivism lies at the other end of the spectrum, aligning with epistemological constructionism and subjectivism, and is often combined with/or considered as similar to interpretivism.[124] In this worldview, knowledge is considered as subjective, produced by our various contexts and interactions, and is a product of how it is understood by the producer of the knowledge. The constructivist standpoint does not accept that there is one truth or answer, but rather, that truth is dependent on the interpretations of the individual mind (constructivism), or on interactions with the socio-cultural context (interpretivism).[124,126] This viewpoint underpins some of the commonly used qualitative research methods.

Contextualism, as proposed by some authorities[127], adopts a mid-point between post-positivists and constructivists, and is related to the ontological position of critical realism. Knowledge is seen as a product of contexts and is coloured by the researcher's viewpoint; however, this standpoint still attempts to establish a single truth, although this may be difficult to ascertain.[127]

The ***transformative worldview***, also referred to as critical theory/inquiry, is a more recent worldview that looks at the research process as one that should result in change or transformation.[124,126] This standpoint underpins research such as participatory action, feminist, and emancipatory research, among others.[124]

Pragmatism, also referred to as a 'third paradigm', is another more recent worldview , which is a philosophical and methodological middle-ground, being a bridge between different epistemologies.[125] This is an approach that is pluralistic, problem-centered, and outcome-oriented, and posits that the research question should drive the methods, not just the ontological or epistemological standpoint, and permits the use of all necessary approaches in understanding the problem or apprehending the knowledge. Akin to more modern thinking about methodology, the existing standpoints are not 'mutually exclusive' but could actually be integrated and interchanged on a needs basis. This is one of the arguments supporting mixed methods research.[120,124,125,126]

My epistemological standpoint has evolved over time, and with my various roles; first as a medical doctor, then as a public health physician, and now as a post graduate researcher undertaking qualitative research. I am also a mother with personal breastfeeding experience, and this is an important context to consider in the way I view the data that has ensued from my current research.

In undergraduate and postgraduate medical training, I imbibed the world view of scientific epistemology, that is, I was raised to see science as the core of all I do, and that research is meant to produce the answers to hypothesis and questions. I had thus adopted a post-positivist worldview of research, and most of the research I generated and interacted with was quantitative. However, with my training and experience as a public health physician, I began to appreciate the fact that a lot of scientific phenomena are coloured by the context of the researched and the researcher and began to see the value added by qualitative research in public health. I therefore began to shift towards a contextualist/constructivist standpoint, where the context of the researcher could have a bearing on the knowledge generated. Furthermore, my experience helping other mothers to breastfeed successfully, and my own successful breastfeeding experience, consolidated my alignment with contextualism/constructivism. I however attempt to deploy 'emotional intelligence' and reflexivity to knowledge generation, in that I attempt to step back and put myself in the shoes of the other person/circumstance, so that I may better understand it while acknowledging, describing, and attempting to mitigate the impact of my own experiences and perspectives on the knowledge being generated.

Presently, I have adopted a pragmatic philosophical worldview, such that I align with whatever position supports the questions in the research being undertaken, and this has influenced the choice of mixed methods for this thesis.

2.4. CONCLUSION

In this chapter, I have been able to justify the use of different research methods for the studies included in this doctoral thesis, based on the research questions. I have also examined the ontological and epistemological approaches to research and have narrated my journey in developing a personal philosophical standpoint.

CHAPTER 3: IMPROVING EXCLUSIVE BREASTFEEDING IN LOW- AND MIDDLE-INCOME COUNTRIES: A SYSTEMATIC REVIEW AND META-ANALYSIS

This chapter of the thesis is published as:

OLUFUNLAYO TF, ROBERTS AA, MACARTHUR C, THOMAS N, ODEYEMI KA, PRICE M, & JOLLY K, 2019. Improving exclusive breastfeeding in low and middle-income countries: A systematic review. *Matern Child Nutr*. 2019;**15**:e12788. https://doi.org/10.1111/mcn.12788

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CONTRIBUTIONS

I conceived the idea for the review, developed the protocol and search strategy with input from KJ, CM, and NT. Title and abstract screening, and data extraction, were undertaken by me and AAR, with input from KJ and CM. I did the risk of bias assessment with KO and KJ. Meta-analysis was conducted by me with support from MP and KJ. I drafted the paper with input from KJ and CM. All authors critically reviewed the paper.

3.1. NEED FOR THIS SYSTEMATIC REVIEW

This chapter contains a review of evidence of effective interventions to promote exclusive breastfeeding (EBF), specifically in LMICs.

A rapid review of interventions to promote EBF in Nigeria that was carried out as part of the background chapter showed that few intervention studies have been conducted and at the time of designing the research for this thesis there were even fewer. The few existing studies were mostly poorly executed and/or documented, with very little evidence of what works to improve the rates of exclusive breastfeeding.

This necessitated the conduct of a systematic review of interventions promoting EBF. The scope was enlarged to include LMICs with high breastfeeding initiation, as at the time there was no evidence in the literature that such a review had been conducted. The review was published in *Maternal and Child Nutrition* in 2019, as well as in a special edition of the journal in July 2020 in honour of National Breastfeeding Month 2020.

The pdf version of the publication is attached forthwith and constitutes Chapter 3 of this Ph.D. thesis.

3.2. Improving exclusive breastfeeding in low- and middle-income countries: a systematic review and meta-analysis

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REVIEW ARTICLE

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Improving exclusive breastfeeding in low and middle-income countries: A systematic review

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Abstract

Exclusive breastfeeding (EBF) rates until 6 months in most low and middle income countries (LMICs) are well below the 90% World Health Organization benchmark. This systematic review sought to provide evidence on effectiveness of various interventions on EBF until 6 months in LMICs, compared with standard care. Experimental and observational studies with concurrent comparator promoting EBF, conducted in LMICs with high country rates of breastfeeding initiation, were included. Studies were identified from a systematic review and PUBMED, Cochrane, and CABI databases. Study selection, data abstraction, and quality assessment were carried out independently and in duplicate. Relative risks (RRs) with 95% confidence intervals (CIs) were calculated for individual studies and pooled. High heterogeneity was explored through prespecified subgroup analyses for the primary outcome (EBF until 6 months) by context and by intervention for the randomized controlled trials. Prediction intervals were calculated for each effect estimate. Sixty-seven studies with 79 comparisons from 30 LMICs were included. At 6 months, intervention group infants were more likely to be exclusively breastfed than controls (RR = 2.19, 95% CI [1.73, 2.77]; I^2 78.4%; 25 randomized controlled trials). Larger effects were obtained from interventions delivered by a combination of professional and laypersons (RR 3.90, 95% CI [1.25, 12.21]; I^2 46.7%), in interventions spanning antenatal and post-natal periods (RR 2.40, 95% CI [1.70, 3.38]; I^2 83.6%), and when intensity was between four to eight contacts/sessions (RR 3.20, 95% CI [2.30, 4.45]; I^2 53.8%). Almost every intervention conducted in LMICs increased EBF rates; choice of intervention should therefore be driven by feasibility of delivery in the local context to reduce infant mortality.

KEYWORDS

breastfeeding, developing countries, exclusive breastfeeding, intervention effectiveness, meta-analysis, systematic review

1 | INTRODUCTION

Infant nutrition plays a major role in child health and impacts significantly on survival. In low and middle income countries (LMICs), infants not breastfed are six to 10 times more likely to die in the early months than those breastfed (World Health Organization [WHO], 2009). The World Health Organization (WHO) and United Nations Children's Emergency Fund recommend that infants should be exclusively breastfed until 6 months of age, with breastfeeding continuing to be an important part of nutrition until at least 2 years

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(WHO, 2001; WHO, 2009). The benefits of exclusive breastfeeding (EBF) until 6 months are well documented, improving growth, health, and survival (Rollins et al., 2016; Sankar et al., 2015; Victora et al., 2016). A Lancet review of systematic reviews to describe breastfeeding rates internationally and benefits of breastfeeding concluded that protection, promotion, and support of breastfeeding is crucial to achieving several Sustainable Development Goals (Victora et al., 2016). If EBF rates were to attain near universal coverage 13.8% of all child deaths below 2 years in LMICs, corresponding to over 800,000 child deaths annually, could be averted (Victora et al., 2016).

Despite this, EBF rates are far below optimal; 37% of infants under 6 months in LMICs were exclusively breastfed in recent country surveys (Victora et al., 2016), well below the WHO 90% benchmark (United Nations Children's Fund [UNICEF] 2013). Despite evidence that early initiation of breastfeeding significantly reduces neonatal mortality, even in countries with high initiation rates, there is often a delay in initiating breastfeeding, with less than half (42%) of newborns globally breastfed within 1 hr (UNICEF, 2013).

Breastfeeding patterns differ markedly between LMICs and high income countries (HICs). Late breastfeeding initiation and low EBF rates characterize the patterns in most LMICs; in HICs, there is the added problem of short duration of any breastfeeding (McFadden et al., 2017; Victora et al., 2016). Previous systematic reviews of breastfeeding interventions have included HICs and LMICs studies combined (Haroon, Das, Salam, Imdad, & Bhutta, 2013; Jolly et al., 2012; McFadden et al., 2017; Renfrew, McCormick, Wade, Quinn, & Dowswell, 2012; Sinha et al., 2015); however, because culture, maternal education, maternity services, and feeding patterns differ considerably between HICs and LMICs, and much more than between LMICs, it is important that systematic reviews focused solely on LMICs are conducted to provide adequate evidence of what works there. A recent review by Sinha et al. investigated effectiveness of types of interventions in LMICs for EBF aged 1–5 months combined (Sinha et al., 2017) but did not ascertain interventions that would be effective in improving EBF up until the recommended 6 months of age for all. A review to determine which interventions work most effectively to improve EBF until 6 months is therefore critical to provide robust evidence for scaling-up breastfeeding intervention programmes in LMICs, thereby reducing mortality and accelerating progress towards the Sustainable Development Goals by 2030 (UNICEF and WHO, 2015). The main aim of this study therefore was to determine the effect of various interventions on breastfeeding exclusivity until 6 months in LMICs with high breastfeeding initiation rates.

Key messages

- In LMICs, delivery of any intervention to support breastfeeding (insufficient evidence for telephone support) will improve EBF rates, by approximately two-fold.
- Policy makers in LMICs should identify and implement interventions that best suit their resources, cultural context, and health service delivery system.
- More research is needed to determine how EBF rates are affected by telephone-based interventions, interventions targeting significant others (father, mother-in-law), and interventions conducted solely in the community, work place or policy contexts.

2 | METHODS

2.1 | Protocol and registration

The protocol for this systematic review is registered in PROSPERO International prospective register of systematic reviews, University of York: CRD42016037029.

2.2 | Eligibility criteria

This review included experimental and observational studies with concurrent comparator promoting EBF, conducted in LMICs (defined by World Bank's classification of countries by income [Fantom, 2016] at the time of primary study) with high country breastfeeding initiation rates (≥80% initiation; McFadden et al., 2017); almost all LMICs have high initiation rates. The interventions were delivered to mothers in the antenatal and/or post-natal period, in one or more contexts identified in previous conceptual frameworks as follows: health systems and services, home and family, community, workplace/employment, and policy environment (Rollins et al., 2016; Sinha et al., 2015). The comparator group comprised usual care.

2.2.1 | Exclusion criteria

Studies with interventions targeted primarily at sick mothers or babies or with special/medical needs, such as prematurity, low birth weight, or tuberculosis, were excluded.

2.3 | Outcomes

The primary outcome was the rate of EBF up until 6 months as defined by study authors. Secondary outcomes were EBF feeding rates at 0 to 1, 2 to 3, and 4 to 5 months of age; EBF rates of infants 0–5 months; early initiation of breastfeeding (proportion of infants put to breast within 1 hr of birth), and continued breastfeeding at 1 year (WHO, 2008). EBF rates were measured using 24-hr, 7-day, previous month, or since birth recalls; in some studies, assessment mode was not specified. The outcome measuring EBF of infants 0–5 months was derived from WHO Core Indicators for assessing infant and young child feeding practices (WHO, 2008) and included any study that assessed EBF among a group of infants between 0 and 5 months

of age; however, two estimates that measured EBF among infants 0–6 months were also included because they measured a cross section of children in the specified age range. Studies that reported EBF at several time points contributed data to each relevant meta-analysis.

2.4 | Information sources

Studies were identified from an earlier systematic review of breastfeeding interventions by Sinha et al. (2015). A systematic literature search was then carried out in PUBMED, Cochrane, and CABI databases for January 2014–November 2016, to identify studies published after the Sinha (2015) review was conducted. We searched references of included studies and contacted authors to obtain additional published and unpublished articles and if full text, translations, and/or additional data were needed. Grey literature was sought from Conference Proceedings Citation Index and Science Citation Index. No language restrictions were applied to the updated searches.

2.5 | Search strategy

The search was conducted using index terms and text words in various combinations relating to interventions to improve breastfeeding exclusivity in LMICs (electronic search strategy details in Appendix A). The search did not include individual LMIC country names as countries move between income groups, and we categorized the country according to its status when the study was undertaken.

2.6 | Study selection

Each paper from the Sinha review was screened for country; those in LMICs went on to full text review. After removal of duplicates, titles and abstracts identified from database searches were screened for eligibility; full texts of potentially eligible articles were then assessed for inclusion. Eligibility and inclusion were undertaken independently by two review authors (T. F. O. and A. A. R.), with a third reviewer resolving any disagreements (K. J. or C. M.).

2.7 | Data extraction

Data extraction was conducted using a proforma modified from Cochrane data abstraction form and entered into a database. Extracted information included study details, population characteristics, context, setting, methods, and results. Details of interventions are presented in relation to their context, setting and nature, duration and intensity, and timing in relation to the birth.

2.8 | Risk of bias in individual studies

Two authors independently assessed risk of bias using Cochrane tools for randomized controlled trials (RCTs), and nonrandomized studies of interventions (ACROBAT-NRSI; Higgins, Altman, & Sterne, 2011). Studies were judged as having a high risk of bias among RCTs if one or more domains were of high risk.

2.9 | Summary measures

Relative risks (RRs) for EBF with 95% confidence intervals (CIs) were used as summary measures; in studies that did not report RR, it was calculated from raw data where available. We explored clinical heterogeneity (by qualitatively comparing characteristics among included studies) and statistical heterogeneity (using χ^2 tests and I^2 statistic). We combined results from included studies for each outcome to give an overall estimate of treatment effect using random effects models throughout, on the assumption that included studies covered a range of populations, interventions, and contexts (Riley, Higgins, & Deeks, 2011). Where two or more interventions from the same study contributed to the same meta-analysis, the sample size in the control group was divided by the number of comparisons it contributed to within the meta-analysis. For meta-analyses containing 10 or more studies, potential publication bias was investigated by examining asymmetry on a funnel plot.

For cluster trials, we computed the design effect from data presented in the reports (intra-class correlation coefficients [ICC] and cluster adjusted estimates) and adapted the standard errors of the RR to make appropriate allowance for clustering (Higgins, Deeks, & Altman, 2011). Authors of some cluster trials were contacted to request to obtain their ICC; an average ICC (of included cluster trials that provided the ICC in their article) was computed and used for those cluster trials for which the adjusted RR or ICCs were not available (Higgins et al., 2011).

Prediction intervals (PIs) were calculated for effect estimates where there were at least three studies, to describe the range in which 95% of the distribution of the effects lie. These predict how the effectiveness of the intervention could vary from the average in different circumstances; for example, different contexts and populations (IntHout, Ioannidis, Rovers, & Goeman, 2016; Riley et al., 2011).

2.10 | Evidence synthesis

Included articles have been synthesized and reported narratively and in tables following PRISMA guidelines. Meta-analysis using Stata version 14.2 was conducted for randomized studies only for the a priori main analyses and then for all study types as secondary analysis. High heterogeneity was explored through prespecified subgroup analyses for the primary outcome by intervention characteristics—context, mode of delivery, type of intervention, timing, intensity, provider of the intervention, and target of intervention; this was done for RCTs as this review focuses on high quality studies that are likely to give more precise results. We have also undertaken subgroup analyses for all study types combined to enable comparison with other published systematic reviews. Meta-regression was conducted to calculate P values for differences observed in subgroup analysis. Sensitivity analysis was also conducted for the primary outcome by study size and bias judgement.

2.11 | Ethical approval

Ethical approval was not required for this systematic review.

3 | RESULTS

3.1 | Study selection

The search identified 7,698 titles; after removal of duplicates, 6,947 underwent title/abstract screening. 183 full text articles were assessed for eligibility, and 67 studies were eligible for inclusion, comprising 79 comparisons between intervention and control (Figure 1). The meta-analysis includes 64 studies with 76 comparisons. No study was excluded for having a breastfeeding initiation rate below 80%. References of included studies are in Appendix B.

3.2 | Study characteristics

3.2.1 | Study design

This review includes 44 RCTs (of which 23 were cluster-RCTs), seven quasi-experimental studies, 12 nonrandomized intervention studies, and four observational studies (Appendix C). Table 1 summarizes characteristics of included randomized trials; characteristics of non-RCTs are contained in Appendix D.

3.2.2 | Location, setting, and participants

Studies were undertaken in 30 LMICs (Table 1). Of studies reporting setting, 10 were in rural settings, 27 in urban areas, four in peri-urban/suburban settings, and one in a combination of settings.

Interventions were directed primarily at mothers and/or pregnant women in 61 intervention arms, mother plus a significant family member in four arms, and health workers in 10 arms. Four study arms provided their intervention to married women in the community.

3.2.3 | Characteristics of usual care

Usual care varies both within and between countries and geographical regions. For example, usual care consisted of in-hospital care and follow up by a community nurse after discharge in Wuhan, China (Study 69); breastfeeding health talk at immunization clinic, health education leaflets during antenatal or post-natal visits, and advice from health care workers under the framework of BFHI in Malaysia

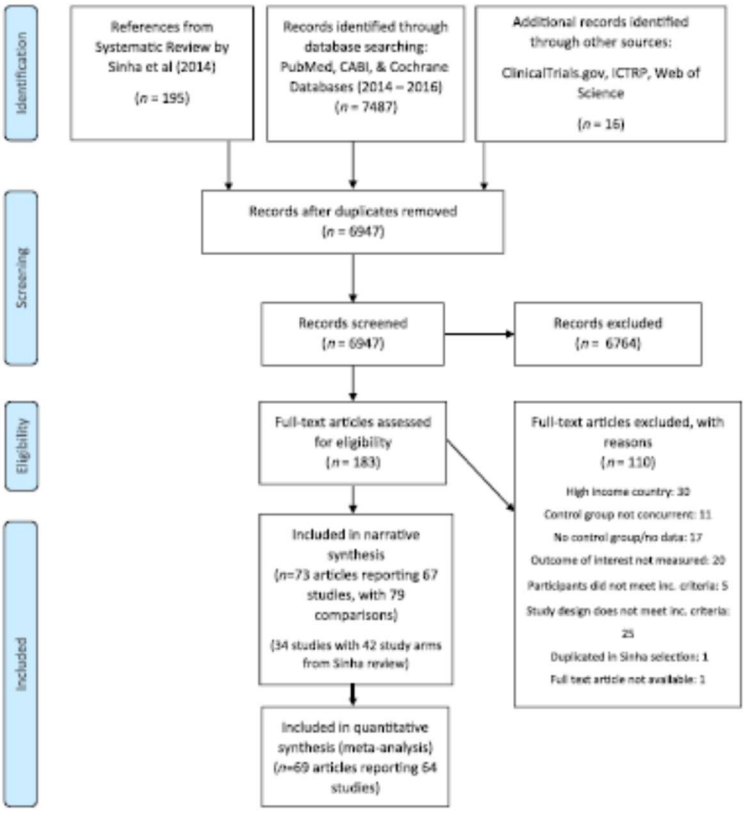


FIGURE 1 PRISMA flow diagram. CABI: Centre for Agriculture and Biosciences International; ICTRP: International Clinical Trials Registry Platform; inc.: inclusion

TABLE 1 Summary table of study characteristics

Characteristic	Number of studies	Number of articles	Reference numbers
Study design			
RCT	21	23	3, 4, 5, 6, 7, 10, 13–15, 19, 22, 25, 28, 33, 37, 38, 39, 43, 47, 51, 56, 66, 69
Cluster RCT	23	26	8, 9, 11, 12, 18, 23, 26, 29 & 58, 30, 34, 35, 36, 40, 44, 46, 48 & 73, 50, 52, 57, 60 & 61, 67, 68, 70
Quasi-experimental	7	7	24, 31, 32, 42, 45, 53, 71
Nonrandomized study of intervention	12	13	1, 16 & 17, 20, 21, 27, 41, 54, 55, 59, 62, 65, 72
Observational	4	4	2, 49, 63, 64
WHO region			
African region	16	19	3, 20, 23, 29 & 58, 30, 34, 35, 40, 46, 48 & 73, 49, 50, 60 & 61, 65, 68, 70
Americas	16	18	7, 13–15, 19, 21, 22, 38, 39, 43, 44, 47, 55, 62, 63, 64, 66, 67
South East Asia	13	13	1, 6, 8, 9, 11, 26, 27, 31, 37, 51, 54, 57, 71
Eastern Mediterranean (including Egypt)	10	10	2, 4, 10, 12, 18, 24, 28, 33, 52, 72
Western Pacific region & China	8	9	16, 17, 25, 32, 41, 42, 53, 56, 69
European region	4	4	5, 36, 45, 59
Intervention context (code)	Number of studies	Number of study arms	
health systems/services	N/A	23	1, 2, 6, 27, 30, 31, 36, 38, 46a, 49, 51a, 51b, 53, 55a, 55b, 62, 63, 64, 65, 67, 70a, 70b, 72
home/family context		27	5, 10a, 10b, 19, 22, 26, 29 & 58, 32, 34, 39, 40b, 43, 44a, 44b, 46b, 48, 50, 52, 56, 57a, 57b, 60–61BF, 60–61U, 60–615A, 66, 68, 73
community interventions		6	9, 20, 23, 40a, 59, 71
Context combinations			
Context 1 + 2		15	3, 4, 7, 13–15a, 13–15b, 24, 25, 28, 33, 37, 41, 42, 45, 47, 69
Context 2 + 3		5	12, 18, 21, 35, 54
Context 1 + 3		Nil	
Context 1 + 2 + 3		3	8, 11, 16–17
Setting		N/A	
Rural	10		12, 16 & 17, 20, 23, 35, 40, 48 & 73, 52, 54, 68
Urban	27		3, 6, 7, 13–15, 19, 22, 24, 25, 26, 27, 28, 29 & 58, 31, 33, 34, 38, 42, 43, 45, 46, 50, 55, 59, 62, 63, 67, 70
Peri-urban/suburban	4		21, 30, 44, 60 & 61
Rural & urban/suburban	1		36
Not specified	25		1, 2, 4, 5, 8, 9, 10, 11, 18, 32, 37, 39, 41, 47, 49, 51, 53, 56, 57, 64, 65, 66, 69, 71, 72
Intervention directed at	N/A		
Mothers/pregnant women		61	1, 2, 3a, 3b, 4, 5, 6, 7, 10a, 10b, 11, 12, 16–17, 18, 19, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 37, 38, 39, 40b, 41, 42, 43, 44, 45, 46a, 46b, 47, 48 & 73, 50, 51a, 51b, 52, 55a, 56, 57a, 57b, 58, 59, ode of delivery60–61BF, 60–61U, 60–615A, 62, 66, 68, 69, 71, 72
Mother + father/other family member		4	13–15a, 13–15b, 53, 55b
Health workers		10	20, 21, 36, 49, 63, 64, 65, 67, 70a, 70b
Combined/other groups		4	8, 9, 40a, 54
Type of intervention	N/A		
Education		16	2, 6, 9, 22, 23, 27, 30, 32, 40a, 51b, 55a, 55b, 59, 64, 66, 67
Support		1	31

(Continues)

TABLE 1 (Continued)

Characteristic	Number of studies	Number of articles	Reference numbers
Combination		60	1, 3a, 3b, 4, 5, 7, 10a, 10b, 11, 12, 13–15a, 13–15b, 16–17, 18, 19, 20, 21, 24, 25, 26, 28, 29 & 58, 33, 34, 35, 36, 37, 38, 39, 40b, 41, 42, 43, 44a, 44b, 45, 46a, 46b, 47, 48 & 73, 49, 50, 51a, 52, 53, 54, 56, 57a, 57b, 60–61BF, 60–61U, 60–61SA, 62, 63, 68, 69, 70a, 70b, 71, 72
Not specified/not applicable		2	8, 65
Mode of delivery of intervention	**Number of studies**	**Number of study arms**	
Face to face	54	66	1, 2, 3a, 3b, 5, 6, 7,9, 10a, 10b, 11, 12, 13–15a, 13–15b, 16–17, 18, 19, 20, 21, 22, 24, 26, 27, 29 & 58, 30, 31, 34, 35, 36, 38, 39, 40a, 40b, 41, 44a, 44b, 45, 46a, 46b, 47, 48 & 73, 49, 50, 51a, 51b, 52, 53, 54, 55a, 55b, 57a, 57b, 59, 60–61BF, 60–61U, 60–61SA, 63, 64, 65, 66, 67, 68, 70a, 70b, 71, 72
Telephone (voice/SMS)	3	3	32, 43, 56
Combination	9	9	4, 23, 25, 28, 33, 37, 42, 62, 69
Not specified/not applicable	1	1	8
Timing of intervention	N/A		
Antenatal		6	2, 4, 6, 46a, 53, 59
Post-natal		27	1, 5, 7, 10a, 10b, 11, 13–15a, 13–15b, 19, 22, 24, 25, 27, 31, 33, 39, 43, 45, 47, 51a, 51b, 55a, 55b, 56, 62, 66, 69
Both		34	3a, 3b, 12, 16–17, 18, 21, 26, 28, 29 & 58, 30, 32, 34, 35, 37, 38, 40b, 41, 42, 44a, 44b, 46b, 48 & 73, 49, 50, 52, 54, 57a, 57b, 60 & 61BF, 60 & 61U, 60 & 61SA, 68, 70a, 70b
Not specified/not applicable		12	8, 9, 20, 23, 36, 40a, 63, 64, 65, 67, 71, 72
Intensity (number of sessions)	N/A		
≤3		21	1, 2, 4, 5, 10b, 28, 31, 33, 38, 43, 44b, 45, 46a, 47, 51a, 51b, 53, 55a, 55b, 67, 72
4–8		26	6, 7, 10a, 11, 12, 13–15a, 13–15b, 16–17, 24, 29 & 58, 30, 35, 39, 40b, 44a, 46b, 48 & 73, 52, 54, 59, 60 & 61BF, 60 & 61U, 60 & 61SA, 62, 68, 69
≥9		19	3a, 3b, 9, 18, 19, 22, 23, 25, 26, 27, 32, 34, 37, 40a, 50, 56, 57a, 57b, 66
Not specified/not applicable		13	8, 20, 21, 36, 41, 42, 49, 63, 64, 65, 70a, 70b, 71
Intervention delivered by			
Professional	40	47	1, 3a, 3b, 6, 7, 10a, 10b, 13–15a, 13–15b, 16–17, 18, 19, 20, 21, 22, 24, 25, 27, 28, 29 & 58, 31, 34, 36, 37, 38, 41, 42, 43, 45, 46a, 47, 49, 50, 51a, 51b, 53, 55a, 55b, 56, 62, 63, 66, 67, 69, 70a, 70b, 72
Para-professional	5	5	8, 12, 30, 35, 52
Lay	10	14	9, 26, 39, 40a, 40b, 44a, 44b, 46b, 48, 60 & 61BF, 60 & 61U, 60 & 61SA, 68, 71
Lay + professional/para-professional	6	7	4, 11, 54, 57a, 57b, 59, 65
Not specified/not applicable	5	5	2, 5, 32, 33, 64

Multiple entries were allowed for studies with more than one study arm.

(Study 56); session on breastfeeding promotion as part of standard nutrition education in a slum in Kenya (Study 46), and a facility-based 6-week post-natal visit for support and follow up in Jordan (Study 33). However, for each included study, the intervention(s) provided services above/beyond the usual care for the study context, in quality, coverage, and/or intensity.

3.2.4 | Context and type (nature) of intervention

More than 70% of interventions were delivered within a single context —health systems and services, home and family, or the community (56 study arms), with the rest (23 study arms) delivered in multiple contexts (any combination). Three-quarters (75.9%) of interventions employed both education and breastfeeding supports (60 study arms).

3.2.5 | Personnel delivering interventions and mode of delivery

Interventions were delivered face to face (55 studies), by phone/SMS (three studies), and by a combination of face to face and telephone (nine studies).

Interventions were delivered by a range of personnel, including doctors, nurses, midwives, nutritionists, lactation counsellors, community health workers, traditional birth attendants, peer

educators/counsellors, religious leaders, and other laypersons (details in Table 1).

3.2.6 | Timing and intensity of interventions

Interventions ranged from a single session to over 20 sessions, spanning pregnancy up to the end of the first year. Of the interventions that specified planned contacts, 21 offered three or less, 26 had four to eight contacts, and 19 at least nine contacts.

More details on included studies and characteristics of interventions are in Table 2.

3.2.7 | Risk of bias

Among randomized trials, nine (36%) were assessed to be low risk for bias. (Summary of risk of bias assessment in Appendices E and F).

3.3 | Primary outcome: EBF until 6 months

a. RCTs only

This outcome includes 25 comparisons from 18 RCTs involving 29,483 participants and compared all forms of interventions with standard care. Pooled results showed that infants receiving an intervention had more than a twofold increase in EBF rates (RR = 2.19, 95% CI [1.73, 2.77]; I^2 = 78.4%, 95% PI [0.81, 5.94]) compared with controls (Figure 2).

b. All study types

This outcome includes 35 comparisons from 29 studies involving 33,684 participants, comparing all forms of interventions with usual care. The results followed a similar pattern as that for RCTs only, as infants receiving an intervention also had more than a twofold increase in EBF rates (RR = 2.27, 95% CI [1.88, 2.76]; I^2 = 83.1%, 95% PI [0.89 to 5.79]) compared with controls (Figure 3).

3.4 | Subgroup analyses of EBF until 6 months

a. RCTs only

Table 3 summarizes effect estimates for EBF until 6 months from subgroup analyses. Interventions delivered in a single context more than doubled EBF rates compared with controls, whether conducted in the health facility (RR = 2.25, 95% CI [1.01, 4.99]) or home/family context (RR = 2.20, 95% CI [1.43, 3.37]). No RCTs were conducted solely in the community context.

Interventions delivered in a combination of health services and home/family contexts more than doubled EBF rates (RR = 2.38, 95% CI [1.68, 3.39]), whereas interventions in a combination of home/family and community contexts increased EBF rates by nearly 50% (RR = 1.49, 95% CI [1.19, 1.87]) compared with controls (Table 3, Figure S1). There was no evidence of a difference between the effect of interventions in single versus multiple contexts (P = 0.95).

Table 3 and Figures S1–S4 report subgroup analyses by personnel delivering the intervention, timing and intensity of contacts, mode of delivery, and study type. Meta-regression analyses found no significant differences between different delivery characteristics. The largest effect sizes were for interventions delivered by a combination of professional/para-professional and laypersons (RR = 3.90, 95% CI [1.25, 12.21]); those delivered by a combination of face to face and telephone methods (RR = 2.33, 95% CI [1.42, 3.84]); interventions combining education and support (RR = 2.29, 95% CI [1.77, 2.98]); and those delivered across antenatal and post-natal periods (RR = 2.40, 95% CI [1.70, 3.38]).

PIs were calculated for each effect estimate; the PI reports the range in which 95% of the distribution of the effects lies. The majority of the intervals are greater than zero and thus mainly in favour of the breastfeeding interventions; however, they mainly overlap zero indicating that the interventions may not always be effective. The strongest PIs were found for interventions delivered by laypersons (95% PI [1.00, 7.80]) and for interventions with four to eight contacts (95% PI [1.35, 7.59]). This implies that there is a high level of certainty that future interventions deploying these characteristics will yield positive results.

b. All study types

The results by context and delivery characteristics for all study designs are similar to those for RCTs only and are reported in Table 3.

3.5 | Sensitivity analysis

A sensitivity analysis by study size (>500 participants) gave a similar effect estimate to that for all RCTs with wider confidence interval (RR = 2.43, 95% CI [1.64, 3.61]); a similar effect size was also obtained from a sensitivity analysis by bias judgement (low risk) with RR = 2.23 (95% CI [1.54, 3.22]; Table 3; Figure S5).

There was no evidence of a small study effect such as publication bias (Figure S6).

3.6 | Secondary outcomes

Secondary outcomes are in Table 4 and Figures S7–S12. Breastfeeding rates at all secondary endpoints for the interventions were significantly higher than usual care for all study designs combined for all outcomes, compared with the findings for RCTs only. The largest effect sizes for EBF (RCTs only) were at 2 to 3 months (RR = 1.91, 95% CI [1.33, 2.73] with PI [0.40, 9.17]) and 4 to 5 months (RR = 1.76, 95% CI [1.41, 2.19] with PI [0.81, 3.81]). For the pooled RCTs, the effects of interventions on early initiation of breastfeeding and EBF in populations below 6 months were not significantly higher than controls.

4 | DISCUSSION

This systematic review has clearly established that a wide range of different interventions, in different settings, and by different types of providers significantly improves EBF in LMICs with high breastfeeding

TABLE 2 Characteristics of studies and intervention: randomized controlled trials

Study ID	Study & location	Study design	Participants	Intervention characteristics	Primary outcome (EBF until 6 months) assessed?	Method of outcome assessment
03	Aidam (2005) Ghana	RCT	Pregnant women in third trimester, with FT singleton delivery; *n* = 137	*Health systems/services & home/family setting* BF education given prenatally (IG1) or perinatally (IG2) with home visits post-partum by trained staff CG: education on other health-related topics	Yes	24-hr recall
04	Ansari (2014) Iran	RCT	Primips >36 weeks GA attending public health centres, with intention to BF; *n* = 120	*Health systems/services & home/family setting* Group training sessions prenatally on benefits of BF + peer education + phone counselling + standard care CG: standard care	Yes	Not specified
05	Aksu (2011) Turkey	RCT	Primips with FT vaginal delivery at study hospital; *n* = 60	*Home/family setting* Single post-partum education session during home visit + standard care CG: standard care	Yes	Not specified
06	Akter (2012) Bangladesh	RCT	Pregnant women in seventh month of pregnancy attending government facility; *n* = 115	*Health systems & services* Group antenatal nutrition education between 7 & 9 months of pregnancy CG: standard care	No	24-hr recall
07	Albernaz (2003) Brazil	RCT	Women at 37–42 weeks GA with singleton birth, resident in area, & intending to BF; *n* = 167	*Health systems/services & home/family setting* Post-natal lactation counselling video session in hospital + home visits & 24-hr telephone hotline CG: standard care	No	Not stated
08	Arifeen (2009) Bangladesh	c- RCT	All women ever married 15–49 years & children <5 years; *n* = 3,115	*Health systems/services, home/family & community setting* Implementation of facility & community components of IMCI, involving VHW & community leaders CG: standard care	No	Not stated
09	Azad (2010) Bangladesh	c-RCT with factorial design	Married WRA + other female members; *n* = 30,952			*Community setting* Women's group participatory learning & action meetings (20 cycles) with peer educators
No	Not stated					
10	Bashour (2008) Syria	RCT	Women with FT healthy infant, resident in study area; *n* = 877	*Home/family setting* Four (IG1) or one (IG2) home visits post-partum providing information, education and support CG: standard care	No	Not stated
11	Bhandari (2003) India	c-RCT	All infants born & residing in study communities during recruitment period; *n* = 895	*Health systems/services, home/family & community setting* Repeated EBF counselling at multiple opportunities through existing PHC services, home visits & community meetings	Yes	24-hr recall Since birth recall
12	Bhutta (2011) Pakistan	c-RCT	All pregnant women in study areas; *n* = 4,474	*Home/family & community environment* Home visits by lady health workers; ante + post-natal + community health committee group education	No	Not stated

(Continues)

TABLE 2 (Continued)

Study ID	Study & location	Study design	Participants	Intervention characteristics	Primary outcome (EBF until 6 months) assessed?	Method of outcome assessment
				sessions; training of TBAs (*Dais*)		
13, 14, 15	de Oliveira[a] (2014) Brazil (with Bica, 2014 and da Silva, 2016)	RCT	Adolescent mothers living with or without maternal grandmothers; *n* = 320	*Health systems/services & home/family setting* Single post-natal counselling session at maternity + home visits CG: standard care at BFI facility	Yes	Previous month recall
18	Brasington (2016) Egypt	c-RCT	Pregnant women & women with child (ren) < 2 years; *n* = 3,445	*Home/family & community setting* Monthly antenatal & post-natal home visits with individual & family counselling sessions + further sessions for children at risk	No	24-hr recall
19	Coutinho (2005) Brazil	RCT	Mothers of FT normal delivery with birth weight >2,500 g; *n* = 350	*Health systems & services/home & family setting* Post-natal home visits up to 6 months + BFHI training of maternity staff CG: BFHI training of maternity staff	No	24-hr recall
22	Feldens (2006) Brazil	RCT	Mothers with healthy FT in public health facility; *n* = 372	*Home/family setting* Home visits post-natally for nutrition counselling by trained fieldworkers until 12 months	No	Since birth recall
23	Flax (2014) Nigeria	c-RCT	Microcredit clients, pregnant, & aged 15–45 years; *n* = 390	*Community setting* BF learning sessions during microcredit meetings + cellphone SMS & voice messages + participant-generated songs & drama	Yes	Since birth recall
25	Gu (2016)[b] China	RCT	Healthy primipara, with husband or grandmother able to attend intervention activities; *n* = 285	*Health systems/services & home/family setting* Individual, group, & telephone counselling sessions held post-partum in hospital & home until 6 months CG: standard care	Yes	Not specified
26	Haider (2000) Bangladesh	c-RCT	Pregnant women 16–35 years resident in study area; *n* = 653	*Home/family setting* Home-based peer counselling (10–15 visits) in antenatal & post-natal period up to fifth month CG: standard care	No	24-hr recall Previous month recall
28	Heidari (2016) Iran	RCT	Primipara >18 years with singleton pregnancy; *n* = 70	*Health systems/services & home/family setting* Two prenatal & one post-natal group BF counselling session with key family members + regular SMS messages CG: standard care	No	Not stated
29 & 58	Ijumba (2015) S. Africa (with Tomlinson, 2014)	c-RCT	Pregnant women ≥17 years, resident in study area; *n* = 3,656	*Home/family setting* Ante- & post-natal home visits by CHWs providing education using motivational interviewing techniques CG: three home visits from CHW, focusing on social welfare	No	24-hr recall
30	Jakobsen (1999) Guinea Bissau	c-RCT	Mothers of FTND registered during pregnancy; *n* = 963	*Health systems and services* Ante- & post-natal health education sessions during routine clinic visits, until 9-month post-partum	No	Not stated

(Continues)

TABLE 2 (Continued)

Study ID	Study & location	Study design	Participants	Intervention characteristics	Primary outcome (EBF until 6 months) assessed?	Method of outcome assessment
33	Khresheh (2011) Jordan	RCT	Primiparous women with vaginal delivery at study hospitals; *n* = 90	*Health systems/services & home/family setting* Individual BF education session post-natally + follow-up phone calls CG: standard care	Yes	Not specified
34	Kimani-Murage (2016) Kenya	c-RCT	Pregnant women 12–49 years old, resident in study communities; *n* = 1,110	*Home/family setting* Regular, comprehensive, home-based nutritional counselling by trained CHWs, from pregnancy until first birthday CG: standard care, including counselling by CHWs not specially trained	Yes	3-day recall Since birth recall
35	Kirkwood (2013) Ghana	c-RCT	All pregnant women and newborns resident in intervention zones; *n* = 15,594	*Home/family and community setting* Ante- & post-natal home visits by community-based surveillance volunteers CG: standard care	No	24-hr recall
36	Kramer (2001) Republic of Belarus	c-RCT	Mothers of healthy FT infants, intending to BF; *n* = 17,046	*Health systems and services* BFHI training, emphasizing health worker support for BF initiation and maintenance CG: standard care	Yes	Since birth recall
37	Kupratakul (2010) Thailand	RCT	Pregnant women <32 weeks GA attending ANC, & having a telephone; *n* = 80	*Health systems/services & home/family setting* Single KSPES session antenatally + telephone follow up ± home visits where necessary CG: standard education programme	Yes	Not specified
38	Langer (1998) Mexico	RCT	Women with single pregnancy in labour (<6 cm dilated), no previous vaginal delivery or indication for elective C/S; *n* = 724	*Health systems and services* Support from a *Doula* during delivery and immediate post-partum period CG: standard care	No	Not stated
39	Leite (2005) Brazil	RCT	Mothers of healthy singletons weighing <3,000 g; *n* = 1,003	*Home/family setting* Home visits post-partum by lay counsellors until 4 months after delivery CG: standard care	No	Not stated
40	Lewycka (2013) Malawi	c-RCT with factorial design	Women 10–49 years in study community (IG1) and all pregnant women (IG2); *n* = 2,286	*Home/family & community setting* IG1: women's group intervention: community mobilization action cycle of 20 meetings IG2: volunteer peer counselling ante- & post-natally (five visits). CG: standard care	Yes	Not stated
43	Malowsky (2016) Ecuador	RCT	Mothers ≥15 years, Spanish-speaking, recruited after delivery from study facilities; *n* = 135	*Home/family setting* 48 hr post-discharge counselling session via telephone + telephone support in neonatal period CG: standard care	No	Not specified
44	Morrow (1999) Mexico	c-RCT	All pregnant women residing in study area; *n* = 130	*Home/family setting* Six (IG1) or three (IG2) home visits by peer counsellors ante- & post-natally	No	7-day recall

(Continues)

TABLE 2 (Continued)

Study ID	Study & location	Study design	Participants	Intervention characteristics	Primary outcome (EBF until 6 months) assessed?	Method of outcome assessment
				CG: standard care		
46	Ochola (2012) Kenya	c- RCT	Pregnant HIV-negative women accessing antenatal services; *n* = 360	*Health systems/services & home/family setting* IG1: single, one-on-one BF counselling session prenatally at health facility IG2: intensive, home-based counselling sessions prenatally & post-natally by peer counsellors until 5 months post-partum CG: standard care	Yes	24-hr recall Since birth recall
47	de Oliveira (2006) Brazil	RCT	Mothers of healthy singletons weighing >2,500 g in the study hospital; *n* = 211	*Health systems/services & home/family setting* Post-natal BF counselling session prior to discharge + 2 home visits in first month CG: standard care	No	Since birth recall
48, 73	Penfold (2014) Tanzania (with Hanson, 2015)	c-RCT	All pregnant women in study communities; *n* = 512 (*n* = 14, 295 for Hanson, 2015)	*Home/family setting* Home visits during pregnancy & early neonatal period by lay community volunteers CG: standard care	No	Not stated
50	Rotheram-Borus (2014) South Africa	c-RCT	Pregnant women ≥18 years, living in study clusters; *n* = 1,152	*Home/family setting* Home visits by trained CHWs, ante- & post-natally, to deliver health messages including EBF CG: standard care	Yes	Not stated
51	Sharma (2013) India	RCT	Pregnant women who delivered at term in study facility; *n* = 1,412	*Health systems and services* IG1: post-natal counselling session IG2: video demonstration on BF CG: standard care	No	Not stated
52	Sikander (2015) Pakistan	RCT	Married women 17–40 years in third trimester, resident in study area; *n* = 358	*Home/family setting* Psycho-educational sessions integrated into routine LHW home visits, ante- & post-natally CG: home visits from routinely trained LHW	Yes	24-hr recall
56	Tahir (2013) Malaysia	RCT	Pregnant women who received at least one prenatal BF education session, with telephone access; *n* = 357	*Home/family setting* Post-natal lactation counselling by phone twice monthly until 6 months CG: standard care	Yes	24-hr recall Since birth recall
57	Talukder, (2016) Bangladesh	c-RCT	Pregnant women in second & third trimester & mothers of children 0–6 months; *n* = 1,147	*Home/family setting* Home visits (ante- & post-natal) by trained TBAs & community volunteers (IG1) + support from field supervisors (IG2), until 6 months	No	24-hr recall
60, 61	Tylleskar (2011) Burkina Faso, Uganda, & South Africa (with Engebretsen, 2014)	c-RCT	Visibly pregnant women intending to BF, with singleton live birth & resident in study area; *n* = 2,579 (nBF = 794, nUG = 765, nSA = 1,020)	*Home/family setting* Ante- & post-natal home visits by trained peer counsellors CG: received standard care in Burkina Faso & Uganda; in S. Africa peer supporters helped with vital registration and benefits	Yes	24-hr recall 7-day recall
66	Vitolo (2005) Brazil	RCT	Mothers of healthy FT infants with birth weight >2,500 g; *n* = 500	*Home/family setting* Post-natal home visits (10 sessions) until 12 months	Yes	Not stated

(Continues)

TABLE 2 (Continued)

Study ID	Study & location	Study design	Participants	Intervention characteristics	Primary outcome (EBF until 6 months) assessed?	Method of outcome assessment
67	Vitolo (2014) Brazil	c-RCT	Pregnant women in third trimester attending health facilities; $n = 693$	*Health systems and services* Single session update for health professionals focused on improving infant feeding practices	Yes	Since birth recall
68	Waiswa (2015) Uganda	c-RCT	All pregnant women and their newborns identified in study communities; $n = 1,787$	*Home/family setting* Home visits (five sessions) in antenatal and early post-natal period by volunteer CHWs + health facility strengthening CG: standard care + health facility strengthening	No	Not stated
69	Wu (2014)[a] China	RCT	Primipara ≥ 18 years, healthy FT infant & intention to BF; $n = 74$	*Health systems/services & home/family setting* Three individualized self-efficacy enhancing sessions early post-partum; third session by telephone CG: standard care	No	Not stated
70	Yotebieng (2015) Democratic Republic of Congo	c-RCT	Mothers delivering healthy singleton at study facilities & intending to attend well-baby clinics; $n = 975$	*Health systems and services* Training of health staff in Steps 1–9 (IG1) & Steps 1–10 (IG2) of successful BF CG: standard care	Yes	24-hr recall 7-day recall

Note. c-RCT: cluster randomized controlled trial; RCT: randomized controlled trial; IG: intervention group; CG: control group; BF: breastfeeding; EBF: exclusive breastfeeding; FT: full term; FTND: normal delivery; GA: gestational age; IMCI: integrated management of childhood illnesses; KSPES: knowledge sharing practices with empowerment strategic programme; VHW/CHW: village/community health worker; WRA: women of reproductive age; PHC: primary health care; TBA: traditional birth attendant; BFI/BFHI: baby friendly (hospital) initiative; SMS: short message service.

[a]Not included in meta-analysis.

[b]A very similar article with the same study results. Wan (2016) was not included in the review, because it did not contribute any additional results. It is cited as an additional reference.

initiation. The estimate of the average effect of the interventions ranged from a twofold to threefold increase in the proportion of women breastfeeding exclusively until 6 months: This was robust to study type and exclusive of studies with a high risk of bias.

4.1 | Principal findings

Pooled results for all types of interventions showed more than a doubling in EBF rates at 6 months for RCTs and all study types (RR 2.19 and 2.27, respectively). This effect is of a greater magnitude than estimates found in reviews that included studies from LMICs and HICs combined, which ranged from 44% increase in EBF rates (RR 1.44; 95% CI [1.38, 1.51]; Sinha et al., 2015) to 22% reduction in likelihood of stopping EBF before 6 months (McFadden et al., 2017). This difference could be due in part to the effect of large differences in control arm breastfeeding rates between LMICs and HICs on treatment effects calculated on the RR scale. Sinha et al. (2015) obtained a pooled estimate for interventions in LMICs (57 studies) with RR of 1.69 (95% CI [1.54, 1.86]); however, their analysis pooled outcomes from studies capturing EBF rates from any age between 0 and 5 months, so studies may have had the final outcome measure at any time prior to 6 months. Therefore, this is not comparable with our primary outcome, which captured EBF rates at 24 to 26 weeks (6 months) only. Sinha's more recent review (Sinha et al., 2017) reported an odds ratio for EBF rates between 1 and 5 months in LMICs of 3.08 (95% CI [2.57, 3.68]) for all study designs, in 61 studies reported in English. Haroon et al. also reviewed breastfeeding interventions, reporting that in combination, these had a large and significant effect on EBF rates in infants across ages 1–5 months old in developing countries (RR = 2.88, 95% CI [2.11, 3.93]), whereas effects were nonsignificant in developed countries (Haroon et al., 2013). McFadden et al. also combined EBF at all ages up to 6 months and showed significant effects across low/middle and high income settings (McFadden et al., 2017).

Most of the high-burden countries for neonatal and maternal mortality are LMICs, particularly sub-Saharan Africa and south Asia, which generally have weak health care systems and low levels of community participation; these have been identified as important determinants of breastfeeding practices, as described in a conceptual model on breastfeeding (Rollins et al., 2016). What is provided as standard maternity care in most HICs may only be delivered as part of a funded intervention in an LMIC and not usually available routinely from the health service due to lack of capacity. For example, many interventions in this review would be usual care within the U.K. context (Studies 5, 6, 10, 36). Breastfeeding patterns

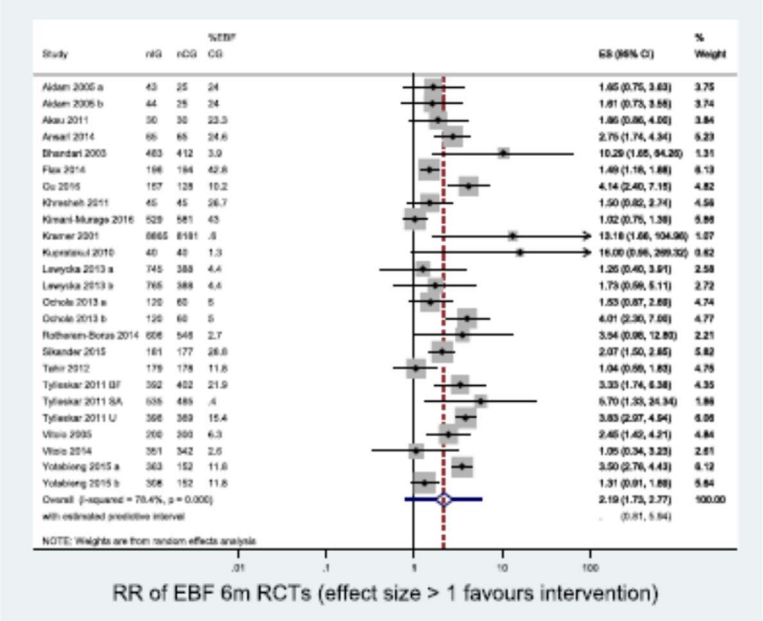


FIGURE 2 Exclusive breastfeeding at 6 months (RCTs): all interventions versus standard care. EBF: exclusive breast feeding; %EBF: CG percent of EBF in control group; ES: effect size; nCG: number in control group; nIG: number in intervention group; RCT: randomized controlled trial; RR: relative risk

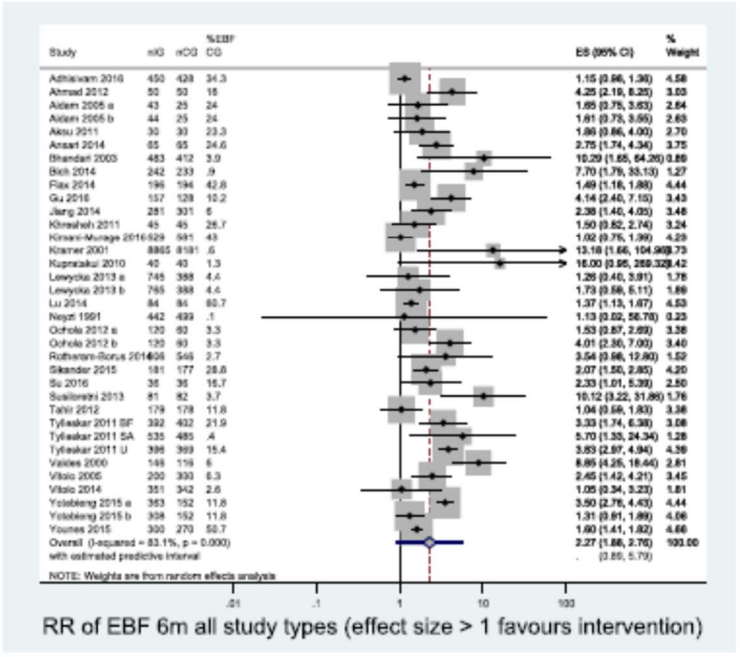


FIGURE 3 Exclusive breastfeeding at 6 months (all study types): all interventions versus standard care. EBF: exclusive breast feeding; %EBF: CG percent of EBF in control group; ES: effect size; nCG: number in control group; nIG: number in intervention group; RCT: randomized controlled trial

TABLE 3 Summary of effect estimates for EBF until 6 months

Variable	No. of estimates	No. of participants	Pooled ES	Lower limit 95% CI	Upper limit 95% CI	I^2 (%)	Lower limit PI	Upper limit PI	P value	Meta-reg P value
All interventions by study type										0.493
RCTs	25	29,483	2.188	1.731	2.766	78.4	0.81	5.94	0.000	
Non-RCTs	10	4,211	2.429	1.752	3.368	85.5	0.90	6.97	0.000	
All studies	35	33,694	2.274	1.877	2.755	83.1	0.89	5.79	0.000	
Subgroup analysis (RCTs only)										
By intervention context										0.981
Health systems & services	4	18,714	2.246	1.011	4.990	87.7	0.07	67.57	0.000	
Home & family	9	6,116	2.197	1.433	3.368	84.8	0.53	9.09	0.000	
Community	N/A	–	N/A				–	–		
Combined context										
Health systems & services/home & family	8	1,082	2.384	1.678	3.386	55.6	0.89	6.42	0.027	
Home & family/community settings	3	2,676	1.490	1.190	1.866	0.0	0.35	6.40	0.923	
Health systems & services/home & family/community	1	895	10.289	1.648	64.261	N/A	–	–	–	
Single versus combined context										0.949
Single context	13	24,830	2.191	1.547	3.103	84.9	0.64	7.51	0.000	
Combined context	12	4,653	2.187	1.606	2.977	61.6	0.86	5.54	0.003	
Mode of delivery of intervention										0.936
Face to face	19	28,151	2.255	1.704	2.983	78.2	0.78	6.56	0.000	
Telephone (voice/SMS)	1	357	1.042	0.595	1.825	0.0	–	–	–	
Face to face + telephone	5	975	2.333	1.419	3.837	76.7	0.44	12.30	0.002	
Type/nature of intervention										0.363
Education	3	1,583	1.670	1.148	2.427	38.4	0.04	64.03	0.197	
Education + support	22	27,900	2.292	1.765	2.976	79.2	0.79	6.63	0.000	
Intervention delivered by										
Professional/para-professional	13	22,693	2.019	1.416	2.878	81.6	0.59	6.86	0.000	0.900
Layperson	7	5,225	2.800	1.924	4.074	55.9	1.00	7.80	0.035	
Lay + professional/para-professional	2	1,025	3.900	1.246	12.208	46.7	–	–	0.171	
Other group/not specified/not applicable	3	540	1.517	1.229	1.871	0.0	0.39	5.92	0.865	
Timing of intervention										0.784
Antenatal	2	310	2.101	1.185	3.725	60.2	–	–	0.113	
Post-natal	6	2,187	2.179	1.319	3.599	69.5	0.45	10.45	0.006	
Antenatal + post-natal (combined)	13	7,724	2.395	1.697	3.380	83.6	0.72	7.94	0.000	
Not specified/not applicable	4	19,262	1.569	0.891	2.763	36.2	0.21	11.51	0.195	
Intensity of intervention (number of contacts)										0.992
≤3	5	1,153	1.852	1.362	2.518	15.7	0.95	3.62	0.314	
4–8	7	5,165	3.199	2.299	4.450	53.8	1.35	7.59	0.043	
≥9	10	5,144	1.755	1.256	2.452	68.4	0.65	4.76	0.001	
Not specified/not applicable	3	18,021	2.761	1.111	6.861	90.9	0.00	105726.73	0.000	
Intervention targeted at										0.996
Mothers/pregnant women	21	10,769	2.185	1.701	2.807	75.8	0.81	5.90	0.000	
Health care provider	4	18,714	2.246	1.011	4.990	87.7	0.07	67.57	0.000	
Mother + other family member	N/A		N/A							
Combined group/other	N/A		N/A							

(Continues)

TABLE 3 (Continued)

Variable	No. of estimates	No. of participants	Pooled ES	Lower limit 95% CI	Upper limit 95% CI	I^2 (%)	Lower limit PI	Upper limit PI	P value	Meta-reg P value
Sensitivity analysis										
By bias judgement										
Low risk	9	4,673	2.226	1.541	3.215	80.4	0.73	6.75	0.000	
All RCTs	25	29,483	2.188	1.731	2.766	78.4	0.81	5.94	0.000	
By study size										
≥500 participants	13	27,236	2.429	1.637	3.605	83.7	0.64	9.27	0.000	
All RCTs	25	29,483	2.188	1.731	2.766	78.4	0.81	5.94	0.000	
Subgroup analysis (all studies)										
By intervention context										0.739
Health systems & services	8	20,026	2.631	1.502	4.611	92.1	0.41	17.09	0.000	
Home & family	10	6,698	2.207	1.503	3.242	83.0	0.60	8.06	0.000	
Community	1	570	1.603	1.408	1.824	N/A	N/A	N/A	N/A	
Combined context										
Health systems & services/home & family	10	2,191	2.159	1.518	3.072	70.5	0.74	6.29	0.000	
Home & family/community settings	3	2,676	1.490	1.190	1.866	0.0	0.35	6.40	0.923	
Health systems & services/home & family/community	3	1,533	9.337	4.159	20.964	0.0	0.05	1767.51	0.953	
Single versus combined context										0.880
Single context	19	27,294	2.268	1.740	2.955	88.1	0.77	6.65	0.000	
Combined context	16	6,400	2.289	1.715	3.055	69.5	0.89	5.87	0.000	
Mode of delivery of intervention										0.875
Face to face	26	31,350	2.307	1.819	2.925	83.7	0.84	6.33	0.000	
Telephone (voice/SMS)	2	939	1.583	0.704	3.557	77.2	N/A	N/A	0.036	
Face to face + telephone	7	1,405	2.513	1.626	3.886	85.8	0.62	10.13	0.000	
Type/nature of intervention										0.771
Education	5	2,265	2.134	1.407	3.237	67.0	0.55	8.31	0.017	
Education + support	30	31,429	2.317	1.863	2.881	84.7	0.86	6.27	0.000	
Intervention delivered by										0.621
Professional/para-professional	19	25,489	2.104	1.575	2.810	85.1	0.69	6.42	0.000	
Layperson	8	5,795	2.476	1.610	3.808	85.4	0.64	9.60	0.000	
Lay + professional/para-professional	3	1,188	5.440	1.926	15.362	64.9	0.00	509515.44	0.058	
Other/not specified/not applicable	5	1,222	2.014	1.389	2.920	60.9	0.62	6.58	0.037	0.480
Timing of intervention										
Antenatal	4	482	2.517	1.662	3.812	46.2	0.54	11.65	0.134	
Post-natal	9	4,268	2.356	1.396	3.977	85.2	0.43	13.00	0.000	
Antenatal + post-natal (combined)	17	9,112	2.502	1.843	3.397	85.1	0.78	7.98	0.000	
Not specified/not applicable	5	19,832	1.563	1.317	1.855	19.4	1.05	2.33	0.291	
Intensity of intervention (number of contacts)										0.545
≤3	9	3,144	1.843	1.277	2.659	69.9	0.62	5.49	0.001	
4–8	10	6,065	4.085	2.852	5.850	63.9	1.47	11.36	0.03	
≥9	11	5,726	1.813	1.329	2.472	67.7	0.70	4.68	0.001	
Not specified/not applicable	5	18,759	1.912	1.278	2.860	91.4	0.46	7.98	0.000	
Intervention targeted at										0.364
Mothers/pregnant women	29	14,745	2.197	1.802	2.678	81.6	0.91	5.31	0.000	
Health care provider	4	18,714	2.246	1.011	4.990	87.7	0.07	67.57	0.000	
Mother and/or other family member	1	72	2.333	1.010	5.391	N/A	N/A	N/A	N/A	

(Continues)

TABLE 3 (Continued)

Variable	No. of estimates	No. of participants	Pooled ES	Lower limit 95% CI	Upper limit 95% CI	I^2 (%)	Lower limit PI	Upper limit PI	P value	Meta-reg P value
Combined group/other	1	163	10.123	3.217	31.857	N/A	N/A	N/A	N/A	
By study size										0.547
<500 participants	18	3,487	2.422	1.858	3.157	77.2	0.88	6.63	0.000	
≥500 participants	17	30,207	2.135	1.586	2.875	87.3	0.73	6.29	0.000	

Note. CI: confidence interval; ES: effect size; RCT: randomized controlled trial; EBF: exclusive breastfeeding; SMS: short message service; PI: prediction interval.

TABLE 4 Summary of effect estimates for secondary outcomes

Variable	No. of estimates	No. of participants	Pooled ES	Lower limit 95% CI	Upper limit 95% CI	I^2 (%)
Exclusive breastfeeding at 0–1 month						
RCTs	19	53,034	1.268	1.163	1.382	78.3
All studies	27	57,642	1.315	1.220	1.418	87.5
Exclusive breastfeeding at 2–3 months						
RCTs	17	28,161	1.910	1.335	2.733	97.8
All studies	25	31,031	1.891	1.421	2.517	97.7
Exclusive breastfeeding at 4–5 months						
RCTs	15	6,982	1.757	1.411	2.187	72.9
All studies	26	10,345	1.842	1.538	2.207	79.5
Exclusive breastfeeding of infants less than 6 months (0–5 months)						
RCTs	5	8,057	1.604	0.677	3.802	84.4
All studies	7	8,961	1.503	1.028	2.197	80.1
Early initiation of breastfeeding						
RCTs	20	48,003	1.113	0.997	1.242	76.1
All studies	26	50,629	1.176	1.041	1.329	88.1
Continued breastfeeding at 12 months						
RCTs	3	820	1.463	1.029	2.079	68.8
All studies	4	1,402	1.367	1.039	1.800	62.2

Note. CI: confidence interval; ES: effect size; RCT: randomized controlled trial.

differ distinctively along country income category lines, with HICs generally having shorter breastfeeding durations overall, whereas LMICs tend towards later initiation but high overall initiation rates with low levels of breastfeeding exclusivity (Victora et al., 2016).

Our review fills the major gap from previous reviews by exploring effectiveness of various different interventions by context, setting, and intervention characteristics (e.g., duration and intensity) solely in LMICs and for the key WHO target of EBF until 6 months. Hitherto this had only been done with the outcome measured at any time point prior to 6 months (McFadden et al., 2017; Sinha et al., 2017) or for high and low/middle income countries combined (Haroon et al., 2013; McFadden et al., 2017; Sinha et al., 2015), with meta-analysis including all study designs (Sinha et al., 2017), despite the substantial differences in services, maternal attitudes, and practices between high and low/middle income countries.

Interventions delivered in health systems and services and in home and family contexts each more than doubled EBF rates until 6 months, which is consistent with the combined LMIC and HIC findings from Sinha et al. (2015). Among RCTs only, two intervention delivery modes had PIs consistent with high level certainty that future interventions with these features would yield positive results: delivery by laypersons and interventions with four to eight planned contacts. Similar to other reviews (McFadden et al., 2017; Sinha et al., 2015, 2017), our effect estimates were associated with high heterogeneity thus should be interpreted with caution. We did not find convincing statistical evidence of differences between subgroups in meta-regression analyses, which contrasts with findings of McFadden et al. (2017). The McFadden review reported significantly greater effects on cessation of EBF before 6 months for lay support versus professionals, four to eight post-natal contacts versus fewer or larger numbers of contacts, and face to face versus telephone alone or other delivery modes (McFadden et al., 2017). We found no evidence from RCTs that interventions using telephone alone affected EBF rates; however, the pooled estimate of one RCT and one non-RCT (Studies 32, 56) was 1.58, though not statistically significant (95% CI [0.70, 3.56]); this is an area that should be explored in future LMIC studies. In addition, we did not find a significantly greater effect in the RR of EBF at 6 months in trials with interventions in multiple contexts, rather than just single contexts. Other authors have reported higher odds ratios of EBF at any time between 1 and 5 months for interventions in multiple contexts, but consistent with our findings, these were not statistically significant on meta-regression (Sinha et al., 2015; Sinha et al., 2017).

4.2 | Strengths and weaknesses of the study and in relation to other studies

This systematic review was conducted robustly according to standard protocols, with study selection and data extraction independently in duplicate. Unlike other reviews, we provide detail of risk of bias of individual studies and detail the interventions delivered. Sinha et al. (2017) reported an attenuation in effect in low quality studies and studies that did not take confounding into account. We focused on RCTs and cluster RCTs in the meta-analyses of the subgroups of intervention characteristics of delivery, and we provide a comprehensive range of prespecified subgroup analyses. To enable comparison with other systematic reviews and to include the full range of evidence about interventions that may be more feasible to implement outside of an RCT, we also reported subgroup analyses for all study designs. Limitations resulted from poor quality of reporting of some studies. There were also issues in harmonizing outcome measures due to varying recall criteria and follow-up periods between studies (even after including secondary outcomes to accommodate some of the variations) and in adjusting for clustering in cluster trials that did not provide values for the ICC and design effect. The high heterogeneity in many of the effect estimates even after subgroup analysis is likely due to the wide variety of interventions and contexts included in this review; thus, some caution is needed in interpretation of results. To help summarize the heterogeneity more clearly, when three or more studies were included in the meta-analysis, we calculated PIs to help ascertain whether the intervention would likely work in the majority of settings or whether due to unexplained heterogeneity would work well in some settings but less effectively, or not at all, in others.

The meta-analysis had insufficient studies conducted solely in the community context for a robust subgroup analysis of this setting, and there were also no studies from the work environment or policy context from LMICs that met our inclusion criteria. Our review also did not include sufficient number of randomized studies targeted at significant "others" such as fathers and mothers-in-law to determine their influence on EBF interventions; the few studies that were included were either non-RCTs (Studies 53, 55b) or did not have data that could be used in meta-analysis (Study 13).

5 | CONCLUSIONS

This review, based on high quality study designs, has conclusively established that interventions to improve breastfeeding exclusivity in LMICs on average resulted in a twofold increase in rates of EBF until 6 months of age. All interventions, except telephone alone, were effective. We concur with calls for scaling up of effective national breastfeeding programmes (Pérez-Escamilla & Hall Moran, 2016). Stakeholders in countries, regions, and communities should therefore identify and implement interventions that best suit their resources, cultural context, and health service delivery system, to reduce infant and under-five mortality.

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CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

CONTRIBUTIONS

TFO, KJ, CM, and NT conceived the idea for the review. TFO developed the protocol and search strategy with input from KJ, CM, and NT. TFO and AAR undertook inclusion, exclusion, and data extraction with input from KJ and CM. TFO, KO, and KJ did risk of bias assessment. TFO undertook the meta-analysis with support from MP and KJ. TFO drafted the paper with input from KJ and CM. All authors critically reviewed the paper.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

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APPENDIX A

ELECTRONIC SEARCH STRATEGY

String of search terms utilized:

1. Breast Feeding OR Breastfeeding OR (Exclusive AND Breastfeeding [All fields]) OR (Any AND Breastfeeding [All fields]) OR (Continued AND Breast feeding [All Fields]) OR Breastfeeding, early initiation, OR Lactation, Human OR Breast Milk [Index terms])
2. (Counseling OR education, peer OR Social media OR mass media OR health promotion OR health education OR community participation OR (intervention [All Fields]) OR family practice OR support, breastfeeding OR health worker OR physician OR workplace OR Policy OR Legislations OR law [Index Terms])
3. (BFHI [All Fields] OR (Baby Friendly Hospital Initiative [All Fields]) OR Baby Friendly Initiative [All Fields]) OR Baby friendly Hospital [All Fields]) OR Baby Friendly Community Initiative OR Rooming in OR Perinatal care OR Postnatal care OR health services OR hospital OR health facility OR health system OR healthcare system OR health program [Index Terms]
4. #1 AND (#2 OR #3)
5. Autobiography [Publication Type]) OR Biography [Publication Type]) OR Case report [Publication Type]) OR Editorial [Publication Type]) OR Guideline [Publication Type]) OR Interview [Publication Type]) OR Letter [Publication Type]) OR Legal case [Publication Type]) OR News [Publication Type]) OR Newspaper article [Publication Type]) OR Personal Narratives [Publication Type]) OR Video-audio media [Publication Type]
6. #4 NOT #5

APPENDIX B

REFERENCES OF STUDIES INCLUDED IN THE SYSTEMATIC REVIEW

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APPENDIX C
LIST OF STUDIES BY STUDY DESIGN

ID #	Study
Randomized controlled trial	
3	Aidam (2005)
4	Ansari (2014)
5	Aksu (2011)
6	Akter (2012)
7	Albernaz (2003)
10	Bashour (2008)
13	Bica (2014)
14	de Oliveira (2014)
15	da Silva (2016)
19	Coutinho (2005)
22	Feldens (2006)
25	Gu (2016)
28	Heidari (2016)
33	Khresheh (2011)
37	Kupratakul (2010)
38	Langer (1998)
39	Leite (2005)
47	de Oliveira (2006)
51	Sharma (2013)
56	Tahir (2013)
66	Vitolo (2005)
69	Wu (2014)
Cluster randomized controlled trials	
8	Arifeen (2009)
9	Azad (2010)
11	Bhandari (2003)
12	Bhutta (2011)
18	Brasington (2016)
23	Flax (2014)
26	Haider (2000)
29	Ijumba (2015)
30	Jakobsen (1999)
34	Kimani-Murage (2016)
35	Kirkwood (2013)
36	Kramer (2001)
40	Lewycka (2013)
44	Morrow (1999)
46	Ochola (2012)
48	Penfold (2014)
50	Rotheram-Borus (2014)
52	Sikander (2015)
57	Talukder (2016)
58	Tomlinson (2014)
60	Tylleskar (2011)

(Continued)

ID #	Study
61	Engebretsen (2014)
67	Vitolo (2014)
68	Waiswa (2015)
70	Yotebieng (2015)
73	Hanson (2015)
Quasi-randomized controlled trials	
24	Froozani (1999)
31	Jesmin (2015)
32	Jiang (2014)
42	Lu (2014)
45	Neyzi (1991)
53	Su (2016)
71	Younes (2015)
Nonrandomized controlled trials	
1	Adhisivam (2016)
16	Bich (2014)
17	Bich (2016; referred to as 2015 earlier)
20	Davies-Adetugbo (2005)
21	Dearden (2002)
27	Haque (2002)
41	Li (2015)
43	Malowsky (2016)
54	Susiloretni (2013)
55	Susin (2008)
59	Turan (2003)
62	Valdes (2000)
65	Villadsen (2016)
72	Zeidi (2015)
Cross-sectional (observational) studies	
2	Ahmad (2012)
49	Reinsma (2016)
63	Venancio (2012)
64	Venancio (2016)

APPENDIX D

CHARACTERISTICS OF STUDIES AND INTERVENTION: NONRANDOMIZED CONTROLLED TRIALS AND OBSERVATIONAL STUDIES

Study ID	Study & location	Study design	Participants	Intervention characteristics	Primary outcome assessed? (EBF 6 months)
01	Adhisivam (2016) India	NRSI	Primiparous mothers in post-natal wards of a tertiary hospital	*Health systems and services* Single, video-based health education programme post-natally, reinforced by lactation counsellor CG: standard care	Yes
02	Ahmad (2012) Pakistan	Observational (retrospective cohort)	Mothers breastfeeding after delivery, with at least one previous child	*Health systems and services* Single antenatal counselling conducted in previous pregnancy CG: standard care	Yes
16, 17	Bich (2014) Viet Nam (with Bich, 2016)	NRSI	Wives 7–30 weeks pregnant & their husbands	*Health systems/services, home/family and community settings* Antenatal & post-natal home visits (four visits) + fathers' group counselling sessions + mass media + community mobilization activities CG: standard care	Yes
20	Davies-Adetugbo (2005) Nigeria	NRSI	Pregnant women recruited in third trimester	*Community setting* Training of health staff + formation of community BF support groups CG: health staff not trained	No
21	Dearden (2002) Guatemala	NRSI	LLLG BF counsellors. Pregnant women were recruited for LLLG activities	*Home/family & community setting* Antenatal & post-natal BF promotion & support activities by La Leche League: mother-to-mother support groups (one focus), home visits, community education, referrals. Supported by community liaisons CG: health staff did not receive special training	No
24	Froozani (1999) Iran	Quasi-experimental	Primipara or women unsuccessful with BF in previous child, with healthy FT infant	*Health systems/services & home/family setting* Post-partum BF education programme, with follow-up visits at home or in hospital until 4 months CG: standard care	No
27	Haque (2002) Bangladesh	NRSI	Pregnant women attending maternity centres for delivery	*Health systems and services* Repeated BF counselling post-partum (eight sessions) until 12 months CG: standard care	No
31	Jesmin (2015) Bangladesh	Quasi-experimental	Pregnant, >32 weeks gestation, had FT healthy infant by C/S	*Health systems and services* Post-natal support in the post-operative period by health professionals CG: standard care	No
32	Jiang (2014) China	Quasi-experimental	Primipara with singleton fetus, having mobile phone	*Home/family setting* Weekly SMS on BF from 28th week of pregnancy until 12 months after delivery CG: standard care	Yes
41	Li (2015) China	NRSI	Primiparous women with singleton delivery	*Health systems/services & home/family setting* Perinatal health education course for pregnant women through multimedia lectures, video playback, experiential learning & brochures. Post-partum visits in special circumstances CG: standard care	No
42	Lu (2014) China	Quasi-experimental	Primipara, FT live singleton, intention to BF + rural household registration	*Health systems/services & home/family setting* Health education model of support, skill and self-confidence (3S) + weekly telephone follow-up CG: standard care	Yes
45	Neyzi (1991) Turkey	Quasi-experimental	Primips with vaginal delivery, birth weight >2,500 g	*Health systems/services & home/family setting* Single group BF education session + video on BF practice in hospital post-natally; second session at home on Days 5–7 post-partum. CG: had group session on another topic + home visit not focused on EBF	Yes

(Continued)

Study ID	Study & location	Study design	Participants	Intervention characteristics	Primary outcome assessed? (EBF 6 months)
49	Reinsma (2016) Cameroun	Observational	Mothers 18–50 years & infants 0–8 months residing in study areas	*Health systems and services* Training of nutrition counsellors & integration into existing ante- & post-natal health care services to improve IYCF CG: standard care	No
53	Su (2016) China	Quasi-experimental	Primiparous females with singleton fetus + father in intervention group	*Health systems and services* Single, group education session conducted ante-natally with fathers in intervention group CG: standard care	Yes
54	Susiloretni (2013) Indonesia	NRSI	Pregnant >28 weeks, willing to deliver with village midwife + fathers & other family member	*Health systems & services, home/family & community setting* Multilevel EBF promotion conducted through home visits, advocacy, training & media CG: standard care	Yes
55	Susin (2008) Brazil	NRSI	Couples living together with healthy FT infant, have initiated BF & domiciled in study area	*Health systems and services* Single health education session on BF promotion given to mothers in IG1, mothers + fathers in IG2; plus 18-min video followed by open discussion, & leaflets on BF promotion CG: standard care	No
59	Turan (2003) Turkey	NRSI	Primiparous women	*Community setting* Antenatal group participatory education programme; eight sessions over 1 month CG: standard care	No
62	Valdes (2000) Chile[a]	NRSI	Women delivered at selected facility and exclusively breast feeding on Day 30	*Health systems and services* Post-natal. Monthly counselling & support sessions for working women during well-baby visits CG: standard care, including BF hospital support until Day 30	Yes
63	Venancio (2012) Brazil	Observational	Infants <1 year attending immunization clinics	*Health systems & services* Assessment of effect of BFHI on infant feeding outcomes	No
64	Venancio (2016) Brazil	Observational	Mothers with infants <6 months at clinic visit	*Health systems & services* Evaluation study of BFHI implementation through training & certification of basic health units on infant feeding practicesCG: did not receive intervention elements	EBF < 6 months Continued BF 12 months
65	Villadsen (2016) Ethiopia	NRSI	Pregnant women receiving ANC at study facilities	*Health systems & services* Participatory ANC strengthening intervention in public health delivery system within study area CG: standard care	EBF 1 month
71	Younes (2015) Bangladesh	Quasi-experimental	Women 15–49 years & resident in intervention communities	*Community setting* Participatory learning & action cycle, focusing on health issues for under 5 s including BF promotion. All clusters received health services strengthening initiatives	Yes
72	Zeidi (2015) Iran	NRSI	Primipara recruited at 7–8 months of pregnancy	*Health systems/services* Three hospital-based group educational sessions CG: standard care	No

[a]Chile was classified as LMIC until 2013.

CG: control group; IG: intervention group; NRSI: nonrandomized study of intervention; BFHI: baby-friendly hospital initiative; BF: breastfeeding; EBF: exclusive breastfeeding; ANC: antenatal care; FT: full term; IYCF: infant and young child feeding; C/S: caesarean section; SMS: short message service; LLLG: La Leche League Guatemala.

APPENDIX E
BIAS SUMMARY TABLE FOR RANDOMIZED STUDIES

Study ID	Random sequence generation (selection bias)	Allocation concealment (selection bias)	Blinding of outcome assessment (detection bias)	Incomplete outcome data (attrition bias)	Selective reporting (reporting bias)	Other sources of bias	Bias judgement
Aidam (2005)	Low	High	High	UC	UC	UC	High
Aksu (2011)	Low	UC	High	Low	UC	UC	High
Akter (2012)	Low	UC	High	UC	UC	UC	High
Albernaz (2003)	Low	Low	Low	UC	UC	UC	Low
Ansari (2014)	Low	UC	UC	Low	Low	UC	Low
Arifeen (2009)	UC	UC	UC	Low	Low	UC	Low
Azad (2010)	Low	High	High	UC	UC	UC	High
Bashour (2008)	Low	Low	Low	UC	UC	UC	Low
Bhandari (2003)	Low	Low	Low	UC	UC	UC	Low
Bhutta (2011)	Low	Low	Low	UC	Low	Low	Low
Bica (2014), de Oliveira (2014), & da Silva (2016)	Low	High	Low	UC	UC	UC	High
Brasington (2016)	UC	UC	UC	UC	UC	UC	UC
Coutinho (2005)	Low	UC	Low	Low	UC	UC	Low
Feldens (2006)	Low	UC	Low	UC	Low	Low	Low
Flax (2014)	Low	UC	Low	Low	Low	UC	Low
Gu (2016)	Low	UC	UC	High	UC	UC	High
Haider (2000)	Low	Low	High	UC	UC	Low	High
Heidari (2016)	UC	UC	UC	UC	UC	UC	UC
Ijumba (2015) & Tomlinson (2014)	Low	High	Low	Low	Low	UC	High
Jakobsen (1999)	UC	UC	UC	High	Low	UC	High
Khresheh (2011)	Low	Low	High	High	UC	UC	High
Kimani-Murage (2016)	Low	High	UC	UC	UC	UC	High
Kirkwood (2013)	Low	High	High	Low	Low	UC	High
Kramer (2001)	Low	Low	High	Low	Low	Low	High
Kupratakul (2010)	Low	Low	UC	Low	Low	Low	Low
Langer (1998)	Low	Low	UC	Low	Low	UC	Low
Leite (2005)	Low	Low	Low	Low	Low	Low	Low
Lewycka (2013)	Low	High	UC	Low	UC	UC	High
Malowsky (2016)	Low	UC	UC	High	UC	UC	High
Morrow (1999)	Low	Low	High	Low	UC	UC	High
Ochola (2012)	Low	UC	Low	High	Low	UC	High
De Oliveira (2006)	UC	High	Low	Low	Low	UC	High
Penfold (2014) & Hanson (2015)	Low	UC	High	Low	Low	Low	High
Rotheram-Borus (2014)	UC	UC	UC	Low	Low	UC	Low
Sharma (2013)	Low	Low	UC	High	UC	UC	High
Sikander (2015)	UC	UC	Low	Low	Low	UC	Low
Tahir (2013)	Low	High	Low	Low	UC	UC	High
Talukder (2016)	Low	Low	Low	UC	UC	UC	Low
Tylleskar (2011) BF[a]	Low	High	Low	Low	Low	UC	High
Tylleskar (2011) U	Low	High	Low	Low	Low	UC	High
Tylleskar (2011) SA	Low	High	Low	High	Low	UC	High
Vitolo (2005)	UC	High	High	Low	Low	Low	High
Vitolo (2014)	Low	UC	Low	UC	UC	UC	Low
Waiswa (2015)	Low	Low	High	UC	Low	UC	High

(Continued)

Study ID	Random sequence generation (selection bias)	Allocation concealment (selection bias)	Blinding of outcome assessment (detection bias)	Incomplete outcome data (attrition bias)	Selective reporting (reporting bias)	Other sources of bias	Bias judgement
Wu (2014)	UC	UC	High	Low	UC	UC	High
Yotebieng (2015)	Low	Low	UC	Low	Low	UC	Low

Note. UC: unclear.

[a]With Engebretsen (2014).

APPENDIX F
BIAS SUMMARY TABLE FOR NONRANDOMIZED STUDIES OF INTERVENTIONS

Study ID	Bias due to confounding	Bias due to participant selection	Bias in measurement of interventions	Bias due to departures from intended interventions	Bias due to missing data	Bias in measurement of outcomes	Bias in selection of the reported result	Bias judgement
Adhisivam (2016)	Serious risk	Low risk	Low risk	No information	Low risk	No information	Low risk	Serious risk
Ahmad (2012)	No information	No information	Serious risk	No information	Critical risk	Serious risk	Moderate risk	Critical risk
Bich (2014/2016)	Moderate risk	Low risk	Low risk	Low risk	Low risk	Moderate risk	Low risk	Moderate risk
D-Adetugbo (1997)	No information	No information	Moderate risk	Moderate risk	Moderate risk	Serious risk	Low risk	Serious risk
Dearden (2002)	Moderate risk	Moderate risk	Moderate risk	Serious risk	No information	No information	Low risk	Serious risk
Froozani (1999)	Moderate risk	Low risk	Low risk	No information	Low risk	Moderate risk	Moderate risk	Moderate risk
Haque (2002)	No information	Low	Low risk	No information	Serious risk	No information	Low risk	Serious risk
Jesmin (2015)	Moderate risk	Moderate risk	No information	No information	Moderate risk	No information	Low risk	Serious risk
Jiang (2014)	Moderate risk	Moderate risk	Low risk	Low risk	Low risk	Low risk	Moderate risk	Moderate risk
Li (2015)	Moderate risk	Moderate risk	Low risk	No information	Low risk	Low risk	Low risk	Moderate risk
Lu (2009)	Moderate risk	Low risk	Low risk	No information	Low risk	Low risk	Low risk	Moderate risk
Neyzi (1991)	Low risk	Moderate risk	Low risk	No information	Moderate	Low risk	Moderate risk	Moderate risk
Reinsma (2016)	Moderate risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Moderate risk
Su (2016)	Serious risk	Moderate risk	Low risk	Low risk	Low risk	Moderate risk	Moderate risk	Serious risk
Susiloretni (2013)	Moderate risk	Moderate risk	Low risk	Low risk	Low risk	Moderate risk	Low risk	Moderate risk
Susin (2008)	Moderate risk	Moderate risk	Low risk	No information	Low risk	Low risk	Low risk	Moderate risk
Turan (2003)	Moderate risk	Serious risk	Low risk	No information	Moderate risk	Moderate risk	Low risk	Serious risk
Valdes (2000)	Serious risk	Moderate risk	Low risk	No information	No information	Serious risk	Low risk	Serious risk
Venancio (2012)	Moderate risk	Low risk	Low risk	Serious risk	Low risk	Low risk	Low risk	Serious risk
Venancio (2016)	Serious risk	Moderate risk	Moderate risk	No information	Low risk	Low risk	Low risk	Serious risk
Villadsen (2016)	Moderate risk	Low risk	Low risk	Moderate risk	Low risk	Moderate risk	Low risk	Moderate risk
Younes (2015)	Serious risk	Moderate risk	Low risk	Low risk	Moderate risk	Moderate risk	Moderate risk	Serious risk

3.3. Additional evidence on interventions to improve EBF rates in Nigeria

Since the conduct of this review, there have been additional studies that have contributed to the body of knowledge about the effectiveness of interventions in breastfeeding promotion programs. A systematic review and meta-analysis of RCTs by Kim et al in 2018,[113] which assessed interventions promoting EBF up to six months, was conducted with 27 included studies from HICs and LMICs (n = 36,051). Findings were that EBF-promoting interventions increased the likelihood of EBF at six months by nearly three-fold (OR=2.77; 95%CI 1.81, 3.76); the BFHI was found to be the most effective of the types of interventions investigated. The review identified five strategies that potentiate the effect of EBF promotion interventions, viz: interventions with multiple components, led by a professional (as opposed to a lay person), spanning across the pre- and post-natal periods, carried out in both hospital and community settings, and the availability of provider training protocol for the intervention.[113] These findings are largely in consonance with that from my systematic review..

In Nigeria, a small RCT on the effectiveness of mobile phone-based support for breastfeeding at a teaching hospital in Port-Harcourt, Rivers State,[115] did not significantly improve EBF rates at six months compared with usual care (p=0.430). A multi-pronged intervention among select private hospitals in Lagos by Alive & Thrive Nigeria[117] consisted of HCP training on BFHI, provision of physical/remote breastfeeding support, and reinforcement of IYCF messages through behaviour change communication materials, mobile phone messages, and the mass media. The intervention was provided in both antenatal and postnatal periods. A statistically

significant increase in EBF was observed at 6 weeks (intervention group (IG) = 83%, control group (CG) = 76%; p = 0.02) and at 6 months (IG = 66%, CG = 52%; p < 0.001) among mothers from hospitals in the intervention group when compared with controls.[117] Alive & Thrive Nigeria also carried out a community-based intervention in Lagos[116] involving the use of community volunteers known as Breastfeeding Guardians, who were trained and equipped to support breastfeeding issues among pregnant women and lactating mothers. Although rates of exclusive breastfeeding in this pre- and post-study increased following the intervention, the report does not provide much detail on the methods employed, and does not say whether or not the increases were statistically significant; only an abstract of the study, which Is a conference proceedings, is available.[116]

CHAPTER 4: SURVEY OF BREASTFEEDING KNOWLEDGE, ATTITUDES, AND PROFESSIONAL SELF-EFFICACY AMONG HEALTH CARE PROFESSIONALS

4.1 Background

4.1.1. Support for breastfeeding

Many women require breastfeeding support to successfully breastfeed, in particular to maintain exclusive breastfeeding.[88,131,132] Support therefore needs to be embedded within the health system of any community or country, for it to be effective. The 'Global Strategy for Infant and Young Child Feeding' lists the provision of skilled breastfeeding support within the health system as one of the critical interventions of any national feeding policy.[87] This support is expected to be carried out under the auspices of the Baby Friendly Hospital Initiative.[12,13] The most recent breastfeeding guidelines, published by WHO in 2017, provide updated guidance on the support of breastfeeding before, during, and after delivery.[86]

4.1.2. Gaps in literature on the knowledge, attitudes, self-efficacy, and breastfeeding-support practices of Health Care Professionals in Nigeria

As earlier mentioned, health care professionals (HCPs) are a major source of breastfeeding education and support within the formal health sector.[1,92] The rapid review of literature I conducted on HCPs' knowledge, attitudes, and self-efficacy for breastfeeding support (see section 1.10.3) brought to the fore the paucity of available literature from Nigeria, both in quantity and quality. As a recap of my observations, breastfeeding knowledge was good overall, but knowledge of management of breastfeeding problems was deficient. Few studies looked at HCP attitudes, which were identified as positive overall but deficient in some areas

critical to exclusivity, such as the withholding of water before six months, and wrong timing of introduction of complementary feeds. Few studies looked at the provision of breastfeeding support and the competence of HCPs providing it; with regards to training, findings indicated that recent breastfeeding training rates were suboptimal. No studies were found that assessed the professional self-efficacy of HCPs in the Nigerian context.

This review of existing research has identified important gaps in the literature, and several limitations in some of the available studies which include small sample size, unclear study selection procedure, unrepresentative samples, use of non-validated study instruments, and poor reporting of study results; all these have negative effects on their internal and external validity. At the time this survey for this thesis was being conceptualised, the Alive and Thrive Nigeria baseline survey had not been concluded or published. Several gaps existed in the available literature, especially in the areas of HCP attitudes, support practices, and self-efficacy; not much information was available on practices that related specifically to the support of breastfeeding exclusivity. There was a need for additional studies that addressed some of the aforementioned gaps in literature on HCPs' breastfeeding knowledge, attitude, self-efficacy, and support practices. This will help inform how policy makers and program implementers can better train and equip HCPs to provide much-needed breastfeeding support, geared towards improving optimal exclusive breastfeeding rates in Lagos State, and in Nigeria.

4.2 Aims and objectives.

4.2.1. Aim

To determine the breastfeeding knowledge, attitudes, self-efficacy and support practices of health care professionals in public health facilities in Lagos state, Nigeria, with a specific focus on exclusive breastfeeding.

4.2.2. Specific objectives

1. To conduct a survey of health care professionals (HCPs) in public primary, secondary, and tertiary health facilities in Lagos state, Nigeria
2. To determine the breastfeeding knowledge, attitudes, self-efficacy, and support practices among the HCPs
3. To assess HCPs' training in breastfeeding support.
4. To determine factors associated with HCPs knowledge, attitudes, and self-efficacy, for breastfeeding support.

4.3. Study methods

4.3.1. Setting

Lagos state, located in the Southwestern part of Nigeria on the Bight of Benin, is the smallest of the 36 states of Nigeria in terms of land mass, but the largest in terms of population. Estimates of its population range between 15 and 24 million inhabitants, and it is classified as

both a metropolis and a megacity.[133,134] Lagos, also known as the commercial capital of Nigeria, is one of the fastest-growing cities in the world, with an estimated growth rate of six to eight percent per annum.

Lagos state is divided into five administrative divisions, and further subdivided into 20 local government areas (LGAs); more recently, 37 local council development areas were carved out of the existing LGAs.[133] The states' gross domestic product is approximately one-quarter of that of the entire nation, indicating its importance in trade, commerce, and the economy. Despite its economic potentials, the megacity does not have adequate resources to match its teeming population, with resultant socioeconomic inequalities.[133,135]

In terms of health workforce, although Nigeria has one of the largest stock in Africa in absolute numbers, it is estimated to be still grossly below the HCP/population ratio for the various cadres/health professions.[136,137] This has been worsened by, amongst other things, a strong wave of migration to other countries that are offering a more attractive work environment, superior benefit packages, and better living standards.[138]

4.3.2. Study population

This study included HCPs in the formal public sector in Lagos state who were involved in the care of pregnant women and/or lactating mothers.

4.3.2.1. Inclusion/exclusion criteria

Those eligible for inclusion were HCPs in the formal public sector in Lagos State, whose job description entailed caring for pregnancy and/or lactating women. These included doctors, nurses/midwives, community health officers (CHOs), community health extension workers (CHEWs), nutritionists, health educators, and other health care professionals. They also had to have worked for at least one year in their profession to be eligible for inclusion in the study, so that they would be able to speak about their opportunities for practice of breastfeeding support and counselling.

CHOs and CHEWs are cadres of community health workers (CHWs) in the Nigerian health system; these are polyvalent health workers who have received standardized training outside the formal nursing or medical curricula, and were instituted to form the major workforce for primary health care delivery in Nigeria.[139,140]

4.3.3. Study design

This was a cross-sectional study. This design was selected to reach a large number of HCPs that were representative of the occupation groups in Lagos state, so that valid inferences could be made from the data.

4.3.4. Sample size estimation

To estimate the minimum number of health care professionals to be interviewed, the formula to determine the confidence interval of a proportion was employed.[141] This study was powered on one of its main outcome measures; *viz*, the knowledge of health workers about breastfeeding. Initially, it was thought to use the proportion of those who knew the recommended duration for exclusive breastfeeding, which is 6 months. However, studies to determine HCPs knowledge of exclusive breastfeeding in the city of Ibadan[94] and in Ife south LGA[118], both in south-west Nigeria, measured a slightly different variable (knowledge of EBF as best nutrition for first 4-6 months, following earlier and currently-outdated guidelines; estimated at 90.2% and 98.5% of respondents respectively).[94,118] Due to the paucity of similar studies from Nigeria in the literature, another measure was used as proxy – knowledge of the optimum duration of breastfeeding. In the Ibadan study,[94] 50% of respondents correctly stated the optimal duration of breastfeeding to be at least 2 years; this value was used in calculation of the minimum sample size for this study. With a sample size of 200 participants the 95% confidence interval of this proportion is 43.1% to 56.9%.

4.3.5. Sampling method

Health workers were selected from public primary and secondary level health facilities across the state by a multi-stage sampling technique, as follows:

Stage 1: There are 20 Local Government Areas (LGAs) in Lagos State, with four being classified as rural, and the remaining 16 as urban LGAs. To reflect both rural and urban areas proportionately, one rural and four urban LGAs were selected purposively; these were LGAs in which the research team had previously established a working relationship, to facilitate community entry. A second rural LGA was later added to ensure the calculated minimum sample size was attained.

Stage 2: In each of the selected LGAs, a list of the public primary and secondary health facilities was obtained; one secondary health facility and three primary health care (PHC) centres were selected per LGA by simple random sampling.[†††] Where the PHC facilities selected were small and had few eligible participants, additional PHCs within the LGA were sampled until the required numbers were obtained.

Stage 3: A list of all HCPs in each selected facility was obtained; a proportionate to size sampling method was adopted for each health care facility to ensure that eligible cadres of HCPs were represented. Four to eight staff per PHC centre, and four to six staff per department of each secondary level centre, were recruited into the study. Potential participants were stratified by profession and grade and then randomly selected from each stratum to obtain the required

[†††] One of the selected LGAs, Ojo LGA, did not have a public secondary-level centre (general hospital/maternal and child health centre) as at the time of data collection. Staff from the Maternal and Child Health centre in Amuwo Odofin LGA, an adjacent LGA, were recruited into the study, as this was the facility designated to provide secondary-level services to residents of Ojo LGA.

number of health workers from each facility. This ensured that a cross section of the different types of HCPs were included in the study.

Collection of baseline quality improvement data:

In addition, data were collected from a sample of health staff meeting the inclusion criteria at the tertiary institution where the PG researcher is domiciled – Lagos University Teaching Hospital. This served as baseline quality improvement data for service delivery within the hospital.

4.3.6. Data Collection Technique

The study tool was administered by experienced fieldworkers trained by the researcher in the classroom and in the field, in a two-day training session. The Medical Officer of Health for each selected LGA was approached; the purpose and logistics for the study were explained, and his/her cooperation sought for entry/permission into the selected facilities. A list of all primary (PHC) and secondary (MCH) centres was obtained and used to select the health facilities included in the study, using the sampling technique described earlier.

The officers in charge of the selected health facilities were contacted and informed about the study, and their permission to collect data from staff working in their facility was sought. A list of all HCPs in that facility was then obtained to facilitate selection of respondents by stratified

sampling. Once recruited, they were given a study instrument by the fieldworker to complete and return within the data collection period. Some study instruments were filled and returned immediately; however, for the most part several return visits to the facility were undertaken by the researcher and field assistants, and a staff member was usually co-opted to keep the questionnaires for each facility until they were picked up. Data were collected over a period of ten months, between July 2018 and May 2019, from a total of 55 health facilities across six LGAs of Lagos state.

A pilot study was conducted in April 2018 amongst ten eligible staff of a PHC centre in Oshodi-Isolo LGA, a contiguous urban LGA in Lagos not included in the study. The observations from the pilot study informed a few changes in the study instrument and study logistics, including having the interviewers check the questionnaires immediately after they had been filled to ensure completeness and proper answering of the questionnaires. A few sentences in the study instrument were reworded for clarity. The order of signatories in the informed consent form were also reversed for better flow.

4.3.7. Data Collection Instrument

4.3.7.1. Breastfeeding questionnaire and checklist used by Ingram et al, 2011.

The Breastfeeding Questionnaire and Checklist used by Ingram et al in the UK in 2011 was adapted for use in this study.[142] This data collection instrument was derived from earlier studies by Scott et al 2003,[143] and Ingram 2006,[144] and designed to assess HCPs breastfeeding

knowledge, attitudes, and professional self-efficacy in breastfeeding support. It consisted of the following sections:

Section 1 was on breastfeeding attitudes of HCPs and had 13 five-point Likert questions; the Iowa Infant Feeding Scale, previously tested for validity and reliability in the USA,[145] formed an integral part of this section. Section 2, which elicited HCPs breastfeeding knowledge, consisted of seven Likert-type questions on breastfeeding knowledge, and five multiple choice questions on breastfeeding management. Section 3 had three questions that asked about HCPs personal (or spousal) breastfeeding history and breastfeeding experience. The HCP Self-Efficacy scale formed the last section of the instrument, and consisted of five questions to assess the confidence of HCPs in carrying out breastfeeding support activities; this section was underpinned by Bandura's social learning (self-efficacy) theory of behaviour change.[146]

4.3.7.2. Sources of material used for adaptation of the study instrument.

Some questions were taken from a survey of health workers on breastfeeding in Ibadan, South West Nigeria by Ola-Olorun et al[94], and added to the questionnaire to elicit breastfeeding information that was context-specific.

Additional questions were derived from the review of a body of literature on breastfeeding, to fill gaps on context-specific or updated knowledge and practices about breastfeeding.

4.3.7.3. Description of adapted study instrument used in data collection

The adapted study instrument used in data collection consisted of several sections: socio-demographic data, a questionnaire measuring knowledge and attitudes of HCPs about breastfeeding, a checklist assessing evidence-based management of breastfeeding problems, a self-efficacy tool assessing staff confidence in helping and supporting mothers to breastfeed, and a section assessing training and practice opportunities of respondents (see Appendix 5 for adapted study instrument).

Section A: Socio-demographic characteristics

A section on socio-demographic information was included to elicit participant information, guided by review of literature. Socio-demographic data obtained from participants included age in years, sex, marital status, ethnic group, profession/occupation, department, and years of practice since graduation. To maintain anonymity, participants' names were not requested; a unique ID number was used to identify respondents for the purpose of retrieval of questionnaires after administration, and for tracking in case of missing data and other issues.

Section B: Attitudes of HCPs towards breastfeeding

To assess the attitudes of HCPs towards breastfeeding, the 13 Likert-type questions from the Ingram questionnaire were included, with response options ranging from strongly agree to strongly disagree on a five-point scale. One question (B13), which asked about fathers feeling left out if a mother breastfeeds, was replaced by a question asking if it was practicable for

mothers to breastfeed exclusively for six months, due to the socio-cultural background and the need for additional information on attitudes towards exclusive breastfeeding.

Section C: Breastfeeding knowledge of HCPs

The breastfeeding knowledge questions were of three types: seven questions in the Likert scale format; five 'one best answer' questions, and five 'multiple response' questions on breastfeeding management, which covered the treatment of common issues such as mastitis, breast milk insufficiency, attachment to the breast, sore nipples, and nipple thrush. These multiple response questions had several possible 'correct' responses, and the participant could choose multiple options.

In this section, the question on supplemental feeding in the Ingram questionnaire (C2) was changed to 'giving other fluids apart from breastmilk', as this was more relevant to the Nigerian context. A question on giving a formula feed before the first breastfeed (C3) was modified to ask about pre-lacteal feeds. Questions C6 and C7 were reworded slightly for clarity, though the essence of the questions remained the same.

Five 'one best answer' questions (C8 – C12) in which respondents were required to choose the best option were added to the questionnaire, based on recommended infant feeding practices; two of these questions were taken from the tool by OlaOlorun et al, 2006,[94] whilst the other three were derived from the review of additional literature. These questions were to elicit

responses on timing of breastfeeding initiation, frequency of breastfeeding, recommended duration of exclusive breastfeeding, timing of introduction of complementary feeds, and suitable/ideal time to advise mothers to stop breastfeeding completely.

The five multiple-response questions on breastfeeding management from the Ingram questionnaire were included in the adapted instrument (C13 – C17) and remained essentially the same, with only one or two sentences reworded for clarity.

Section D: Personal breastfeeding experience

This section was an adaptation of Section 3 of the breastfeeding questionnaire by Ingram et al, 2011[142], which assessed the personal breastfeeding practices and experiences of the HCPs. It was expanded to six from the original three questions in the Ingram questionnaire to increase the layers of information obtained.

Section E: Health professional self-efficacy scale

The Self-Efficacy tool consisted of five questions which assessed the health worker's perceived ability and confidence to plan and carry out specific tasks, including teaching correct breastfeeding positioning and attachment, identifying and solving breastfeeding problems, supporting breastfeeding women and exclusive breastfeeding up to six months. This section of the questionnaire was adopted unchanged from The Breastfeeding Questionnaire.[142]

Section F: Training and Practice Opportunities

The section on training and practice opportunities for HCPs was adapted from the study tool by OlaOlorun et al[94], which asked respondents about their practice of breastfeeding counselling and support at their workplaces, and the forms of breastfeeding training received pre-service and in-service. For comparability with the study by OlaOlorun from which this part of the study instrument was adapted, respondents were asked about their practice opportunities in the last 12 months. It also inquired about whether they perceived the need for further training in breastfeeding management, and asked clients to benchmark previous training received with their professional self-efficacy. Two questions were added to inquire about the HCP's willingness to be trained in, and to provide support for, the BFCI.

The time required for completing the questionnaire, estimated from the pilot study, was between 12 and 30 minutes.

4.3.7.4. Scoring system adopted for outcome measures.

The **breastfeeding attitude score** summed up responses from 13 Likert five-point questions with a maximum of 65 points obtainable (13 questions x 5 options), with a high score representing a positive attitude towards breastfeeding. The attitude score was graded as follows: a negative attitude was adjudged to be the range of scores for disagree, strongly disagree and neutral (agree, strongly agree and neutral for questions which were reverse scored), which was 39 points or less. Positive attitude was taken as the range of scores for

'agree' (or 'disagree' in reverse-scored questions), which was between 40 and 52 points, while strongly positive attitude was from 53 to 65 points, the range of possible scores for 'strongly agree' (or strongly disagree for reverse-scored questions). A similar approach was adopted by OlaOlorun et al in the grading of attitude scores in their study.[94]

The **knowledge composite score:** After data collection, the scoring of the Likert-type questions on knowledge was modified; the questions were merged into a dichotomous response of 'yes' or 'no', which was deemed more appropriate for the assessment of respondents' knowledge. Responses for strongly disagree and disagree were merged as 'no'; agree and strongly agree were combined to form 'yes', and neutral was renamed 'uncertain/not sure'. After conversion into yes/no format, each correct response was awarded one mark, giving a total obtainable score of seven for the first set of questions. The five one best answer questions were scored one mark for each correct response, giving a total obtainable score of five marks. The five multiple response questions had a maximum obtainable score of 16 correct responses, with one mark awarded for each correct response.

When summed up, the maximum obtainable score for the knowledge questions was 28. The median was used as the cut-off point for grading; a summative knowledge score of 14 points or less was graded as poor/unsatisfactory knowledge, and a score of 15 points or more as good/satisfactory knowledge about breastfeeding issues.

Each of the five **questions on self-efficacy** were scored along a scale ranging from 1 (not at all confident) to 10 (completely confident) for each question, giving a maximum of 50 for the five questions. Cut off points for the grades were derived from the scale and set as follows: a score of 20 points or less was considered not at all or barely confident; a score of 21 to 30 was fairly confident, 31 to 40 was termed very confident; and 41 to 50 graded as highly/completely confident.

The study instruments were adapted from tools that were validated for use in the UK,[142–144] a previous study designed locally to measure breastfeeding knowledge,[94] as well as an extensive literature review. The scoring system for all the sections except the self-efficacy score were developed during this study from the adapted questionnaire.

In adapting the UK study instrument for this study, a lot of time was invested in the review of literature, construct of the questions, and pre-testing, as earlier described. However, I could not undertake all the steps needed for cross-cultural adaptation and validation, due to the cost and time implications of the process.[147] The steps for validation and cross-cultural adaptation of a study instrument or measure include the assessment for reliability, validity, and responsiveness.[148,149] This often includes the assessment of content validity, pre-testing and the collection of data for validation, factor analysis, tests for dimensionality, assessment of reliability using Cronbach alpha, and the use of bivariate and multivariate analysis to assess validity.[145,150–152]

Pitfalls arising from the use of a non-validated study instrument or measurement scale include lack of clarity of the questions being asked, and/or losing the original meaning of what was to be asked. Although English is the language of educational instruction in Nigeria, it may be spoken or interpreted differently in Nigeria than in the UK where the adapted tool had previously been used.[147,153] Hence the importance of cross-cultural adaptation and validation of the adapted study tool.

4.3.8. Data Analysis

Data were cleaned upon retrieval of questionnaires and entered into a database using IBM SPSS version 26. Descriptive statistics were calculated, and frequency tables generated with all variables to summarize the data; regression was used to determine association between variables. Variables showing significance from univariate analysis, or from previous research, were put into a multivariate regression model.

The three main outcome measures in this study were respondents' knowledge, attitudes, and professional self-efficacy towards breastfeeding and its support. These were subjected to univariate analysis with the independent variables of interest. Since most of the variables were categorical in nature, 'dummy variables' were created for each variable of interest where there were more than two categories. The data in the regression model were checked for the various assumptions of multiple regression, to ensure that the results were reliable and valid, by a number of tests. The assumption of a linear relationship between the independent and

dependent variables was met by the data, and no evidence of multi-collinearity was found between the variables in the regression. From the Cook's distance values obtained, there was no evidence of influential outliers in the data that could bias the regression model. From the P-P plots, the values of the residuals were normally distributed, except for the regression model investigating self-efficacy and the relationship with other variables. It was also observed that the self-efficacy score was skewed, and the variance of the residuals from the self-efficacy data did not appear to be similar (a somewhat funnel-shaped scatterplot), indicating that the assumption of homoscedasticity may have been violated. Thus, the data on self-efficacy of respondents and its relationship with other variables should be interpreted with caution.

4.3.9. Ethical considerations

Ethical approval was obtained from the Health Research and Ethics Committee of the Lagos University Teaching Hospital, Idi-Araba, Lagos, Nigeria, and the Ethics Committee of the University of Birmingham, United Kingdom (UK) (Appendices 2.2 - 2.4). Permission to conduct the study was obtained from the gatekeepers of the selected health facilities – Lagos State Ministry of Health, Lagos State Primary Health Care Board, Medical Officers of Health of the included Local Government Areas, and Medical Directors of the included secondary and tertiary-level facilities.

Written informed consent was obtained from respondents after they had been duly briefed on the nature of the study. They were assured of confidentiality of all information obtained, and

of their freedom to drop out of the study at any stage before completion of the data collection process without any consequences.

4.3.9.1. Research governance

Safety: It was not anticipated that there would be any harm directly resulting from participation in this study, as participants were only required to complete a questionnaire eliciting largely non-sensitive information.

Data access, storage and disposal: Documents from this study were stored in a locked filing cabinet with limited access within the research office. The use of computers for data analysis was in compliance with University of Birmingham regulations for safe storage, and data has been archived for 10 years according to University of Birmingham policy.

4.4. Results

Of the 480 questionnaires administered, 385 were completed and returned and are included in the analysis, giving a response rate of 80.2%.

4.4.1. Socio-demographic characteristics of respondents

Most respondents were between the ages of 30 – 49 (61.6%), with mean age of 40.4 years. (Table 4.1) There was a preponderance of female respondents (83.1%); majority of

respondents were currently married (79.7%), and of Yoruba ethnicity (79.2%). The nursing midwifery professions (midwife, nurse, nurse/midwife) constituted about 45% of all respondents, followed by doctors at 30.4%. About three in ten respondents worked in a child welfare department, and more than half (58.2%) were from a primary health care (PHC) facility. About 30% of all respondents had between 6 to 10 years of practice.

Table 4.1: Socio-demographic characteristics of participants

Variable	**Frequency (N=385)**	**%**
Age (years)		
20 – 29	53	13.8
30 – 39	135	35.1
40 – 49	102	26.5
50 – 59	83	21.6
≥60	3	0.8
Non-response	9	2.3
Total	385	100.0
Sex		
Female	320	83.1
Male	65	16.9
Total	385	100.0
Marital status		
Single	61	15.8
Currently Married	307	79.7
Divorced/separated/widowed	12	3.1
Non-response	5	1.3
Total	385	100.0

Ethnicity		
Yoruba	305	79.2
Ibo	52	13.5
Hausa	4	1.0
Edo/Delta tribes	15	3.9
Other	7	1.8
Non-response	2	0.5
Total	385	100.0
Occupation		
Medical doctor	117	30.4
Midwife/Nurse midwife	129	33.5
Nurse	40	10.4
Community Health Officer	22	5.7
Community Health Extension Worker	67	17.4
Other	10	2.6
Total	385	100.0
Current Department		
Antenatal Clinic	55	14.3
Maternity	61	15.8
Postnatal Clinic	4	1.0
Child welfare	114	29.6
Paediatrics	55	14.3
General Outpatient	42	10.9
Obstetrics & Gynaecology	12	3.1
Community Health	5	1.3
Other	25	6.5
Non-response	12	3.1
Total	385	100.0

Years of practice		
1 – 5	70	18.2
6 – 10	114	29.6
11 – 20	94	24.4
≥21	98	25.5
Non-response	9	2.3
Total	385	100.0
Facility Type		
Primary Health Care (PHC) Centre	224	58.2
General Hospital/Maternal & Child Care Centre	85	22.1
Tertiary Centre	76	19.7
Local Government Area		
Ibeju-Lekki	55	14.3
Ikorodu	51	13.3
Mainland	36	9.4
Mushin	123	31.9
Ojo	67	17.4
Surulere	53	13.8

4.4.2: Personal breastfeeding experience

Nearly three-quarters (74%) of respondents said they (or their spouses in the case of male HCPs) had exclusively breastfed at least one child up to 3 months or longer; however, about one-fifth had no breastfeeding experience (Table 4.2).

Table 4.2. HCP personal breastfeeding experience

CATEGORY	Frequency (N=385)	%
At least one child exclusively breastfed ≥ 3 months	285	74.0
Some (any) BF experience	20	5.2
No experience (no child or never breastfed child)	73	19.0
Non-response	7	1.8

4.4.3: Perception of personal breastfeeding experience

Most respondents who had ever breastfed had a positive experience (277/305; 90.8%); 5.6% were indifferent, whilst less than one percent (0.7%) reported the experience of breastfeeding as negative.

4.4.4. Respondents' knowledge of breastfeeding

Table 4.3 shows the proportion of respondents who answered the true/false knowledge questions correctly. Their level of knowledge was high, with nearly two-thirds (63%) of respondents answering at least six out of seven questions correctly. Knowledge was least good regarding the use of supplemental feeds in the case of poor weight gain or milk inadequacy.

TABLE 4.3. Knowledge of breastfeeding – True/False option questions

Qu no.	VARIABLE (N=385)	Yes/True (%)	No/False (%)	Undecided (%)	Non-response (%)
C1.	A woman who is exclusively breastfeeding is less likely to become pregnant three months after delivery than a woman who is formula feeding (True)	331 (86.0)	39 (10.1)	15 (3.9)	0 (0.0)
C2.	Giving other fluids alongside breast milk may hinder the establishment of a good milk supply in the newborn (True)	306 (79.5)	49 (12.7)	26 (6.7)	4 (1.0)
C3.	Giving pre-lacteal feeds (e.g. water, glucose water, herbal tea) to a healthy newborn before initiation of breastfeeding is acceptable (False)	22 (5.7)	353 (91.7)	9 (2.3)	1 (0.3)
C4.	Frequent breastfeeding in the early newborn period can help reduce jaundice (True)	317 (82.3)	38 (9.9)	28 (7.3)	2 (0.5)
C5.	Growth patterns of breastfed infants differ from those of formula fed infants (True)	320 (83.1)	21 (5.5)	39 (10.1)	5 (1.3)
C6.	If a breastfed infant is not gaining weight after a few weeks of birth, the mother should be encouraged to begin supplementing with formula (False)	73 (19.0)	276 (71.7)	32 (8.3)	4 (1.0)
C7.	A mother of an infant who feels she has insufficient breast milk should “top up” with a bottle of formula milk after each feed (False)	62 (16.1)	294 (76.3)	28 (7.3)	1 (0.3)

Specific knowledge of optimum breastfeeding practices was asked of respondents (see Table 4.4), two-thirds (66.8%) got either four or all five questions correct. The question on total duration of breastfeeding obtained the least correct responses; just over 60% would recommend continuing breastfeeding until 24 months (61.9%).

Table 4.4. Knowledge of breastfeeding – one best answer type questions

S/N	Question	FREQ (N=385)	%
C8	**Advice given to clients on when to initiate breastfeeding in a healthy newborn**		
	a) Within 30 minutes to one hour after delivery (correct)	335	86.9
	b) After the baby has been weighed, bathed, and has rested	22	5.7
	c) Within 24 hours following the delivery	20	5.2
	d) When 'good' milk starts flowing, usually by 3rd day of life	1	0.3
	e) When baby displays signs of hunger, e.g. rooting, crying, etc.	6	1.6
	Non-response	1	0.3
C9	**How frequently HCP will counsel a mother to feed a healthy newborn**		
	a) 8-12 times a day	97	25.3
	b) Every hour	20	5.5
	c) On demand, i.e. when baby displays feeding cues such as rooting, crying, etc. (correct)	257	66.3
	d) Other	10	2.6
	Non-response	1	0.3
C10	**Best description of advice HCP would give to a pregnant woman or recent mother of a healthy, full-term infant about feeding choices.**		
	a. Recommend exclusive breastfeeding up to six months, even if the mother is going back to work soon (correct)	345	90.1
	b. Recommend exclusive breastfeeding up to when she will return to work, then supplement with formula	29	7.6
	c. Recommend breastfeeding with allowance for water and/or other fluids	0	0.0
	d. Recommend breastfeeding with formula supplementation	0	0.0
	e. Recommend the use of prophylactic antibiotics in the newborn before commencing breastfeeding	0	0.0
	f. Make no recommendation; the parents should decide based on their circumstances	6	1.6
	Non-response	3	0.8
C11.	**At what age HCP would recommend the introduction of complementary foods**		
	a. At 3-5 months	0	0.0
	b. At 6 months (correct)	300	78.3
	c. At 7 – 9 months	39	10.2
	d. When the baby starts to reach for foods while mother/others are eating	4	1.0
	e. When breast milk no longer satisfies	4	1.0
	f. Other	1	0.3
	Non-response	35	9.1

C12.	**For how long HCP would encourage a breastfeeding mother to continue breastfeeding**		
	a. Until baby is at least 12 months old	45	11.7
	b. Until baby is at least 18 months old	49	12.8
	c. Until baby is at least 24 months old (correct)	237	61.9
	d. When the baby stops accepting breast milk	16	4.2
	e. Other	2	0.5
	Non-response	34	8.9

In Table 4.5, respondents' application of knowledge to the management of breastfeeding problems is presented. Their performance in this section was not quite as high as in the previous knowledge sections; of the maximum score of 16, 145 respondents (37.7%) scored five points or less, 159 (41.3%) scored between six and ten points, and 81 (21.0%) scored between 11 and 15 points. No respondent scored the maximum 16 points. Sub-optimal knowledge and practices of respondents were identified in relation to continued feeding in the event of mastitis and/or thrush. The results also showed gaps in their knowledge of symptoms of poor attachment to the breast during feeding.

Table 4.5. Knowledge of breastfeeding – patient management problem with multiple response

S/N	OPTIONS	FREQ (N = 383)	%
C13	**If a woman develops mastitis, what do you usually advise her to do about breastfeeding**		
	a) Continue to feed on both sides (T)	143	37.3
	b) Stop feeding on affected side (F)	162	42.5
	c) Stop feeding altogether (F)	8	2.1
	d) Unsure/don't know	4	1.0
	e) Other	12	3.1

C14	**If a mother complains of breast milk insufficiency, which of the following options will help to resolve the problem:**		
	a) Increase frequency of breast milk feedings (T)	197	51.4
	b) Top up each breastfeed with a bottle of formula (F)	7	1.8
	c) Seek expert assistance with positioning and attachment (T)	224	58.5
	d) Advise mother to drink more fluids (T)	304	79.4
	e) Unsure/don't know	2	0.5
	f) Other	9	2.3
C15	**Which of the following symptoms could indicate poor attachment at the breast:**		
	a. Baby feeds very frequently and is unsettled (T)	170	44.4
	b. Mother has sore and cracked nipples (T)	292	76.2
	c. Mother reports repeated engorgement (T)	188	49.1
	d. Mother has mastitis (T)	126	32.9
	e. Unsure/don't know	0	0.00
	f. Other	1	0.3
C16.	**If a mother complains of sore nipples which of the following options will help to resolve the problem:**		
	a. Stop feeding on the affected side (F)	283	73.9
	b. Check for symptoms of nipple thrush (T)	142	37.1
	c. Advise mother to apply breast milk to nipples (T)	53	13.8
	d. Seek expert assistance with positioning and attachment (T)	288	75.2
	e. Advise mother to apply lanolin to nipples (T)	0	0.0
	f. Unsure/don't know	4	1.0
	g. Other	5	0.75
C17.	**The symptoms of nipple thrush can include:**		
	a. Nipples are pink, sensitive and tender (T)	150	39.2
	b. Nipples are cracked (T)	144	37.6
	c. Shooting, burning pains in the breast (T)	116	30.3
	d. Breast is lumpy and red (F)	344	89.8
	e. White patches on nipple or breast (T)	242	63.2
	f. Unsure/don't know	28	7.3
	g. Other	1	0.3

The composite/summative knowledge score, as presented in Table 4.6, comprised scores from the three types of knowledge questions. Of a maximum obtainable score of 28 points, the mean knowledge score was 17.0 with a standard deviation of 4.1; 70.1% of respondents scored above 14 points in the knowledge section and were graded as having acceptable knowledge.

Table 4.6 – Graded composite knowledge score

Summative knowledge score	**Frequency (N=385)**	**%**
Acceptable knowledge (>14 points)	270	70.1
Sub-optimal knowledge (≤14 points)	115	29.9
Total	385	100.0

4.4.5. Attitude towards breastfeeding

More than 90% of all respondents felt that breast milk was the ideal food for babies, and about 95% felt that it was beneficial to mothers' health (see Table 4.7). About 95% of respondents also posited that exclusive breastfeeding for six months is practicable. The proportion of respondents with a positive attitude towards breastfeeding mothers who occasionally drank alcohol was lower than that for the other attitude questions asked. The role of health professionals in influencing mothers to breastfeed, the expectation of sore nipples as a normal part of breastfeeding, and the likelihood of formula-fed babies being overfed, were other questions that elicited divergent views from the respondents.

Table 4.7. Attitude of respondents towards breastfeeding and breastfeeding practices

S/N	Variable	SD** (%)	D* * (%)	N*** (%)	A* (%)	SA* (%)	NR**** (%)
B1	Health professionals should actively encourage mothers seen in their practice to try breastfeeding (SA/A)*	4 (1.0)	0 (0.0)	2 (0.5)	44 (11.4)	335 (87.0)	0 (0.0)
B2	Formula feeding is a good way of letting fathers care for the baby (SD/D)**	204 (53.0)	123 (31.9)	16 (4.2)	28 (7.3)	12 (3.1)	2 (0.5)
B3	Breast milk is the ideal food for babies (SA/A)	9 (2.3)	1 (0.3)	1 (0.3)	35 (9.1)	330 (85.7)	9 (2.3)
B4	A mother who occasionally drinks alcohol should not breastfeed her baby (SD/D)	82 (21.3)	176 (45.7)	49 (12.7)	49 (12.7)	20 (5.2)	9 (2.3)
B5	Mothers intending to breastfeed should expect sore nipples as a normal part of breastfeeding (SD/D)	103 (26.7)	118 (30.6)	32 (8.3)	91 (23.6)	38 (9.9)	3 (0.8)
B6	Health professionals have little influence on a woman's decision to continue breastfeeding (SD/D)	86 (22.3)	145 (37.7)	18 (4.7)	113 (29.3)	22 (5.7)	1 (0.3)
B7	A breastfed baby is likely to have fewer infections than a formula fed baby (SA/A)	24 (6.2)	20 (5.2)	5 (1.3)	71 (18.4)	262 (68.1)	3 (0.8)
B8	Formula fed babies are more likely to be overfed than breastfed babies (SA/A)	26 (6.7)	46 (11.9)	31 (8.0)	148 (38.4)	133 (34.5)	1 (0.3)
B9	Breastfeeding is beneficial to a mother's health (SA/A)	2 (0.5)	6 (1.6)	4 (1.0)	83 (21.6)	288 (74.8)	2 (0.5)
B10	Breast milk alone can satisfy most babies for approximately the first six months of life (SA/A)	5 (1.3)	5 (1.3)	3 (0.8)	72 (18.7)	297 (77.1)	3 (0.8)
B11	Formula milk is more easily digested than breast milk (SD/D)	269 (69.9)	90 (23.4)	3 (0.8)	1 (0.3)	16 (4.2)	6 (1.6)
B12	Breastfeeding provides health benefits for infants that cannot be provided by formula (SA/A)	6 (1.6)	13 (3.4)	4 (1.0)	92 (23.9)	267 (69.3)	3 (0.8)
B13	It is practicable for mothers to breastfeed exclusively for six months (SA/A)	3 (0.8)	4 (1.0)	6 (1.6)	83 (21.6)	288 (74.8)	1 (0.3)

*SA – strongly agree, A - agree

**SD – strongly disagree, D – disagree

***N – neutral

****NR – non-response

The mean attitude score was 55.3 (standard deviation (SD) 5.2) out of a maximum obtainable score of 65 points. The median and modal scores were the same, at 56.0 points each.

Table 4.8 shows the graded attitude scores. After grading, the attitude of respondents was for the most part positive, as less than one percent of respondents were graded as having a negative attitude. A quarter of respondents had a positive attitude, while three-quarters (74.5%) obtained a score that corresponded to a strongly positive attitude towards optimum infant feeding practices.

Table 4.8. Graded attitude score

Attitude score	**Frequency**	**%**
Negative attitude (≤39)	3	0.8
Positive attitude (40 – 52)	95	24.7
Strongly positive attitude (53 – 65)	287	74.5
Total	385	100.0

4.4.6: Respondents' professional self-efficacy

This section reports the scores from a self-assessment of the confidence and competence of respondents to carry out certain tasks relating to breastfeeding support (see Table 4.9). The self-efficacy raw score dataset was negatively skewed. The mean score was 44.1 (SD 6.6) out of a maximum obtainable score of 50 points, while the median was 46.0 and the mode was 50.0. When graded, three-quarters of respondents (76.6%) felt highly or completely confident about their ability to perform various tasks in support of breastfeeding.

Table 4.9: Graded professional self-efficacy scores

Score Grade	Freq	%
Not at all/barely confident (≤ 20)	5	1.3
Fairly confident (21 – 30)	7	1.8
Very confident (31 – 40)	68	17.7
Highly/completely confident (41 – 50)	295	76.6
Non-response	10	2.6
Total	385	100.0

4.4.7. Training and practice opportunities for breastfeeding counselling and support

As shown in Table 4.10, about three-quarters of respondents stated that they had been involved in counselling and providing technical support for breastfeeding in the last 12 months, and almost 90% would routinely initiate a discussion with their client on breastfeeding.

Table 4.10: Practice of breastfeeding counselling

	Freq (N = 385)	**%**
Type of support provided		
a. Counselled client on BF problems at least twice in last 12 months	37	9.6
b. Taught client about BF techniques at least twice in last 12 months	30	7.8
c. Has counselled about BF problems AND techniques in last 12 months	294	76.4
d. Has not counselled client on BF support or techniques in last 12 months	19	4.9
e. Has never counselled a mother on BF techniques or problems	2	0.5
f. Non-response	3	0.8

How often HCP would initiate a discussion on breastfeeding with client		
a. Routinely	332	86.2
b. Occasionally	45	11.7
c. Hardly ever	1	0.3
d. Never have/would not initiate a discussion	0	0
e. Unsure/don't know	3	0.8
f. Non-response	4	1.0

About 90% of respondents said that they received pre-service training in breastfeeding, and just slightly less had received in-service training (see Table 4.11); however, a third (33.8%) had not been trained in breastfeeding in the last three years, and 90% perceived the need for additional training. About 60% of respondents were willing to be trained in the BFCI, and would support the initiative.

Table 4.11. Respondents' training opportunities

Variable	**Freq (n = 385)**	**%**
Received pre-service breastfeeding training		
Yes	346	89.9
No	23	6.0
Can't remember	16	4.1
Received in-service training		
Yes	330	85.7
No	35	9.1
Can't remember	13	3.4
Non-response	7	1.8
Type of in-service training received (n =330)		
Lecture/Seminar	109	33.0
More interactive learning modes	30	9.1
Both methods of training	185	56.1
Other	6	1.8

Perception of level of clinical instruction received		
Adequate	325	84.4
Inadequate	35	9.1
Grossly inadequate	4	1.0
Unable to assess	10	2.6
No preparation	3	0.8
Non-response	8	2.1
Trained in Breastfeeding management in last three years		
Yes	246	63.9
No	130	33.8
Cannot recall	9	2.3
Perceived need for additional breastfeeding education/training		
Yes	349	90.6
No	18	4.7
Not sure	16	4.2
Non-response	2	0.5
Willing to be trained in Baby Friendly Community Initiative (BFCI)		
Yes	232	60.2
No	1	0.3
Not sure	3	0.8
Non-response	149	38.7
Willing to support BFCI		
Very willing	216	56.1
Somewhat willing	16	4.2
Not at all willing	2	0.5
Not sure	151	39.2

4.4.8: Association between knowledge and respondent characteristics

The overall mean knowledge score of respondents was 17.0 (SD 4.1) of a maximum score of 28 points. Simple linear and multiple regression analyses were used to investigate the relationship between the mean knowledge score and respondents' characteristics (findings in Table 4.12).

For gender, the knowledge score for males was significantly lower than that for females (adjusted mean difference (adjusted MD) 2.9 points; 95%CI -4.30, -1.40). No differences were observed between ethnic groups in mean knowledge score.

The mean score of medical doctors was similar to that of the nurse/midwife reference group, but that of CHWs was significantly lower (adjusted MD=-1.49, 95%CI -2.74, -0.25). Years of practice was found to be associated with mean knowledge score; respondents with more than 20 years of experience had a significantly higher mean knowledge score than those with 10 or fewer years of practice (adjusted MD=1.61, 95%CI 0.49, 2.73). The mean knowledge score of those at working in a tertiary level setting was significantly higher than that of the primary care reference group (adjusted MD=3.42, 95%CI 1.56, 5.28). Whether or not HCPs had personally breastfed a child was not significantly associated with HCP knowledge, but respondents with a negative experience breastfeeding had a significantly lower mean knowledge score than those whose experience was positive (adjusted MD=-2.17, 95%CI -4.07, -0.27).

After adjusting for all variables, mean knowledge scores were similar across LGAs. Breastfeeding training in the last three years did not improve the mean knowledge score significantly (Table 4.12).

Table 4.12: Mean composite knowledge score and association with respondents' characteristics.

Characteristic	Mean knowledge score (SD)	Unadjusted mean difference (95%CI)	Adjusted mean difference[#] (95%CI)
All (N = 385)	17.00 (4.08)	N/A	N/A
Gender			
Female (n = 320)	17.20 (3.96)	Reference	Reference
Male (n = 65)	16.00 (4.50)	-1.20 (-2.29, -0.12)*	-2.85 (-4.30, -1.40)*
Ethnicity			
Yoruba (n = 305)	16.99 (3.99)	Reference	Reference
Ibo (n = 52)	16.85 (4.41)	-0.14 (-1.35, 1.06)	-1.19 (-2.61, 0.24)
Other (n = 28)	17.36 (4.43)	0.37 (-1.22, 1.95)	-0.72 (-2.51, 1.08)
Type of HCP			
Nurse/midwife (n = 171)	17.42 (3.78)	Reference	Reference
Medical doctor (n = 117)	17.55 (4.33)	0.13 (-0.82, 1.07)	0.30 (-1.10, 1.70)
CHW/other HCP (n = 97)	15.59 (3.97)	-1.83 (-2.83, -0.83)*	-1.49 (-2.74, -0.25)*
Years of practice			
≤10 (n= 184)	16.28 (3.70)	Reference	Reference
11 – 20 (n = 94)	17.15 (4.20)	0.81 (-0.18, 1.81)	0.48 (-0.63, 1.58)
≥ 21 (n = 98)	18.15 (4.38)	1.82 (0.84, 2.80)*	1.61 (0.49, 2.73)*
Level of health care provision/health care setting			
Primary (n=224)	16.33 (3.74)	Reference	Reference
Secondary (n=85)	16.41 (3.78)	0.08 (-0.89, 1.05)	0.43 (-1.02, 1.89)
Tertiary (n=76)	19.62 (4.34)	3.29 (2.28, 4.30)*	3.42 (1.56, 5.28)*
Breastfeeding experience			
No experience of breastfeeding (n=73)	16.32 (3.43)	Reference	Reference
Some breastfeeding experience (n=20)	17.10 (4.05)	0.79 (-1.23, 2.80)	-1.62 (-7.44, 4.19)
Exclusively breastfed (self/partner) at least one child ≥ three months (n=285)	17.19 (4.21)	0.87 (-0.18, 1.92)	-1.43 (-6.95, 4.08)
Perception of breastfeeding experience			
Positive (n=277)	17.32 (4.20)	Reference	Reference
Negative/indifferent (n=19)	15.95 (4.80)	-1.37 (-3.35, 0.61)	-2.17 (-4.07, -0.27)*
Location of practice (LGA)			
Mushin (n=123)	18.30 (4.22)	Reference	Reference

Ibeju-Lekki (n=55)	16.35 (3.61)	-1.96 (-3.23, -0.68)*	0.21 (-1.60, 2.02)
Ikorodu (n=51)	15.69 (3.68)	-2.62 (-3.92, -1.31)*	-1.19 (-2.95,
Mainland (n=36)	16.92 (3.84)	-1.38 (-2.87, 0.10)	0.57)
Ojo (n=67)	16.52 (3.98)	-1.78 (-2.97, -0.59)*	0.13 (-1.87, 2.14)
Surulere (n=53)	16.57 (4.20)	-1.74 (-3.02, -0.45)*	0.61 (-0.96, 2.19)
			-0.19 (-1.93,
			1.54)
Received training in last 3 years			
Yes (n=246)	16.85 (4.03)	Reference	Reference
No/cannot recall (n=139)	17.25 (4.15)	0.40 (-0.45, 1.25)	0.81 (-0.19, 1.80)

CI: confidence interval; HCP: healthcare professional; CHW: community health worker; n: number; SD: standard deviation

[#]Model was adjusted for all the variables reported in this table

4.4.9: Association between attitude and respondents' characteristics

This study also investigated the relationship between respondents' mean attitude score and their characteristics (findings in Table 4.13). The mean attitude score overall was 55.3 (SD 5.21) points, out of a maximum of 65 points. There was no significant difference between the mean score of male HCPs when compared with that of females, and mean attitude score did not differ significantly by ethnic group.

Doctors were found to have a similar mean attitude score as that of the nurses/midwives; however, the mean score of CHWs was significantly lower than that of the nurses/midwives reference group (adjusted MD=-2.58; 95%CI -4.24, -0.93). The mean attitude score of respondents increased with years of practice, with the difference between the reference group and those with more than 20 years of experience being statistically significant (adjusted MD=1.60; 95%CI: 0.11, 3.09). Mean attitude score also increased by level of healthcare delivery, with the differences between primary and higher levels of care being statistically significant; there was however no significant association observed between

location of practice and HCP mean attitude score. There was no statistically significant association between breastfeeding experience, or respondents' perception of this experience, and the mean attitude score. Breastfeeding training was also not significantly associated with the mean attitude score.

Table 4.13: Mean attitude score and association with respondents' characteristics

Characteristic	Mean attitude score (SD)	Unadjusted mean difference (95%CI)	Adjusted mean difference[#] (95%CI)
All (n = 385)	55.33 (5.21)	N/A	N/A
Gender			
Female (n = 320)	55.36 (5.38)	Reference	Reference
Male (n = 65)	55.20 (4.33)	-0.16 (-1.56, 1.24)	-1.64 (-3.56, 0.29)
Ethnicity			
Yoruba (n = 305)	55.16 (4.86)	Reference	Reference
Ibo (n = 52)	56.48 (4.88)	1.32 (-0.22, 2.85)	0.07 (-1.84, 1.97)
Other (n = 28)	55.04 (8.54)	-0.13 (-2.15, 1.89)	-1.37 (-3.76, 1.03)
Type of HCP			
Nurse/midwife (n = 171)	55.99 (5.42)	Reference	Reference
Medical doctor (n = 117)	56.62 (4.47)	0.62 (-0.55, 1.80)	1.25 (-0.62, 3.12)
CHW/other HCP (n = 97)	52.62 (4.73)	-3.38 (-4.62, -2.13)*	-2.58 (-4.24, -0.93)*
Years of practice			
≤10 (n= 184)	54.63 (4.88)	Reference	Reference
11 – 20 (n = 94)	55.45 (6.18)	0.80 (-0.47, 2.08)	0.54 (-0.93, 2.01)
≥ 21 (n = 98)	56.58 (4.63)	1.94 (0.68, 3.20)*	1.60 (0.11, 3.09)*
Level of health care provision/health care setting	54.04 (5.40)	Reference	Reference
Primary (n=224)	56.47 (4.13)	2.43 (1.18, 3.68)*	2.00 (0.07, 3.93)*
Secondary (n=85)	57.87 (4.51)	3.83 (2.53, 5.13)*	3.36 (0.88, 5.84)*
Tertiary (n=76)			
Breastfeeding experience			
No experience (n=73)	54.95 (3.77)	Reference	Reference
Some experience (n=20)	55.25 (5.75)	0.31 (-2.30, 2.91)	-0.10 (-7.85, 7.65)
Exclusively breastfed (self/partner) at least one child ≥ three months (n=285)	55.42 (5.52)	0.47 (-0.88, 1.82)	-0.40 (-7.75, 6.94)
Perception of breastfeeding experience			
Positive (n=277)	55.64 (5.50)	Reference	Reference
Negative/indifferent (n=19)	55.21 (4.71)	-0.43 (-2.97, 2.12)	-1.47 (-4.01, 1.06)
Location of practice (LGA)			
Mushin (n=123)	56.48 (4.97)	Reference	Reference
Ibeju-Lekki (n=55)	54.84 (5.30)	-1.64 (-3.30, 0.01)	1.25 (-1.16, 3.66)
Ikorodu (n=51)	54.80 (5.03)	-1.68 (-3.37, 0.02)	1.15 (-1.20, 3.50)
Mainland (n=36)	55.17 (4.15)	-1.31 (-3.25, 0.62)	2.51 (-0.16, 5.18)
Ojo (n=67)	54.52 (6.47)	-1.96 (-3.51, -0.41)*	0.98 (-1.12, 3.08)
Surulere (n=53)	54.83 (4.47)	-1.65 (-3.33, 0.03)	0.08 (-2.24, 2.39)

Received training in last 3 years Yes (n=246) No/cannot recall (n=139)	 55.55 (4.90) 54.94 (5.72)	 Reference -0.61 (-1.70, 0.45)	 Reference -0.53 (-1.86, 0.80)

CI: confidence interval; HCP: healthcare professional; CHW: community health worker; n: number; SD: standard deviation [#]Model was adjusted for all the variables reported in this table

4.4.10. Association between professional self-efficacy and respondent characteristics

As shown in Table 4.14, the overall mean professional self-efficacy score was 44.1 (SD 6.6) out of a total score of 50. There was no difference in the mean score of males compared to that of females. Ethnicity did not show any significant association with the mean self-efficacy score.

The nursing/midwifery HCPs had the highest mean self-efficacy score of the three groups, the score for CHWs was significantly lower (adjusted MD=-3.09; 95%CI -4.99, -1.19). Respondents working in higher levels of health care had similar mean self-efficacy scores as those in primary care. Increasing decade of practice were significantly and positively associated with professional self-efficacy.

Mean self-efficacy score of respondents in Ibeju-Lekki LGA was significantly higher than that of the reference location (adjusted MD=2.84; 95%CI 0.07; 5.60). Respondents' breastfeeding experience, and their perception of this experience, were not significantly associated with self-efficacy; no association was observed between breastfeeding training in the previous three years and self-efficacy.

Table 4.14: Mean professional self-efficacy score and association with respondents' characteristics.

Characteristic	Mean self-efficacy score (SD)	Unadjusted mean difference (95%CI)	Adjusted mean difference[#] (95%CI)
All (n = 375)	44.07 (6.55)	N/A	N/A
Gender			
Female (n = 313)	44.63 (6.51)	Reference	Reference
Male (n = 62)	41.21 (5.99)	-3.42 (-5.18, -1.67)*	-1.83 (-4.07, 0.41)
Ethnicity			
Yoruba (n = 298)	44.13 (6.26)	Reference	Reference
Ibo (n = 49)	43.20 (8.68)	-0.93 (-2.91, 1.06)	-0.59 (-2.78, 1.61)
Other (n = 28)	44.89 (5.20)	-0.76 (-1.79, 3.31)	-0.40 (-3.14, 2.34)
Type of HCP			
Nurse/midwife (n = 166)	45.92 (6.28)	Reference	Reference
Medical doctor (n = 114)	42.32 (5.97)	-3.60 (-5.12, -2.08)*	-1.45 (-3.60, 0.70)
CHW/other HCP (n = 95)	42.92 (6.87)	-3.01 (-4.61, -1.40)*	-3.09 (-4.99, -1.19)*
Years of practice			
≤10 (n= 179)	42.72 (6.86)	Reference	Reference
11 – 20 (n = 92)	44.54 (6.92)	1.95 (0.36, 3.54)*	1.73 (0.04, 3.43)*
≥ 21 (n = 95)	46.53 (4.46)	3.94 (2.36, 5.51)*	2.58 (0.86, 4.31)*
Level of health care provision/health care setting			
Primary (n=218)	44.67 (6.08)	Reference	Reference
Secondary (n=83)	42.67 (7.44)	-2.00 (-3.65, -0.35)*	-1.67 (-3.89, 0.55)
Tertiary (n=74)	43.84 (6.65)	-0.84 (-2.56, 0.89)	-0.18 (-3.04, 2.68)
Breastfeeding experience			
No experience (n=68)	41.37 (7.67)	Reference	Reference
Some experience (n=18)	45.94 (4.30)	4.58 (1.21, 7.94)*	-3.68 (-15.91, 8.55)
Exclusively breastfed (self/partner) at least one child ≥ three months (n=283)	44.54 (6.24)	3.17 (1.46, 4.89)*	-3.75 (-15.70, 8.21)
Perception of breastfeeding experience			
Positive (n=273)	44.73 (6.16)	Reference	Reference
Negative/indifferent (n=19)	43.11 (5.29)	-1.63 (-4.48, 1.23)	-1.10 (-4.06, 1.86)
Location of practice (LGA)			
Mushin (n=120)	43.15 (7.47)	Reference	Reference
Ibeju-Lekki (n=54)	44.63 (5.93)	1.48 (-0.63, 3.59)	2.84 (0.07, 5.60)*
Ikorodu (n=48)	44.29 (5.83)	1.14 (-1.06, 3.34)	0.34 (-2.38, 3.06)
Mainland (n=34)	44.38 (6.77)	1.23 (-1.27, 3.73)	2.22 (-0.84, 5.29)
Ojo (n=67)	43.87 (6.68)	0.72 (-1.25, 2.68)	0.27 (-2.14, 2.68)
Surulere (n=52)	45.44 (4.93)	2.29 (0.16, 4.43)*	1.67 (-0.99, 4.33)
Received training in last 3 years			
Yes (n=238)	44.73 (6.51)	Reference	Reference
No/cannot recall (n=137)	42.92 (6.48)	-1.81 (-3.18, -0.44)*	-0.03 (-1.56, 1.49)

CI: confidence interval; HCP: healthcare professional; CHW: community health worker; n: number; SD: standard deviation

*Statistically significant [#]*Model was adjusted for all the variables reported in this table*

4.5. Discussion

This study of health care professionals in Lagos state, Nigeria, aimed to elucidate their breastfeeding knowledge, attitudes, self-efficacy of breastfeeding support, and support practices, with a view to better understanding the predictors of these outcomes among health care professionals working in public health facilities.

4.5.1. Summary of main findings

The level of breastfeeding knowledge of HCPs in this study was high overall, but critical gaps were found in the application of knowledge to management of breastfeeding problems, especially in areas that related to breastfeeding exclusivity. The attitudes of HCPs were largely positive, but critical gaps were also identified, such as what role the HCP should play in breastfeeding support. Most HCPs indicated that they were highly/completely confident in the performance of breastfeeding support activities. About three-quarters of HCPs in this study had been involved in breastfeeding counselling and support activities in the previous year; however, one-third of them had not been trained in breastfeeding/breastfeeding support in the last three years.

Respondents in the nursing profession had high levels of knowledge, positive attitudes to BF and the highest self-efficacy score, doctors had similar knowledge, attitudes, and self-efficacy scores as the nurse/midwives; the CHWs had significantly lower knowledge, attitudes, and self-efficacy scores than the nurse/midwife reference group. Longer length of practice was associated with higher knowledge, positive attitudes, and a higher self-

efficacy score. Male gender was associated with a significantly lower knowledge score than females. No association was observed between respondents' ethnicity and knowledge, attitudes, or self-efficacy.

The personal breastfeeding experience of respondents was not associated with HCPs knowledge, attitudes, or self-efficacy, but those who had a negative or indifferent perception of their breastfeeding experience had significantly lower knowledge scores.

Mean knowledge and attitude scores did not differ significantly by location of practice; but HCPs working in Ibeju-Lekki LGA had a significantly higher mean self-efficacy score than those from Mushin, the reference LGA. HCPs providing tertiary care had significantly higher knowledge and attitude scores than primary level providers but had similar mean self-efficacy scores; those at secondary level had similar knowledge and self-efficacy scores as their primary level counterparts but scored significantly higher in attitude. Breastfeeding training within the past three years was not associated with significantly higher knowledge, attitudes, or self-efficacy scores.

4.5.2. Knowledge of breastfeeding and breastfeeding support

The deficiencies identified in the practical application of respondents' knowledge to solving breastfeeding problems are aspects that are critical to improving EBF rates. Approximately one-fifth of respondents would recommend topping up with formula to solve perceived milk insufficiency or poor weight gain, and slightly less did not think added fluids would

hinder breast milk supply in the newborn. In the Alive and Thrive Nigeria survey among HCPs in Lagos and Kaduna states, about 15% of respondents recommended giving formula or other liquids/foods in the event of milk insufficiency.[99] These knowledge gaps would negatively affect exclusive breastfeeding rates, and should be a target of future intervention programs, such as training/capacity building programs of HCPs and prospective mothers.

One in four respondents would recommend timed or scheduled feeds eight to twelve times a day to their clients; previous research has documented that some HCPs still hold on to outdated recommendations, or possess fragmented information about breastfeeding, due to inadequate pre- or in-service training.[154,155] This points to the need for regular updates in the training of health workers in breastfeeding knowledge and support, especially when there are new or updated recommendations, or following recruitment or redeployment of HCPs. Just above 60% of respondents would recommend continued breastfeeding up till at least 24 months in accordance with the guidelines; in a study by OlaOlorun among health workers in Ibadan, Nigeria, about half of all respondents recommended that babies should be breastfed for at least two years.[94] Their study suggested that the reason for the HCPs sub-optimal knowledge of total breastfeeding duration could have been a lack of knowledge of the recommendation, lack of understanding of the importance of prolonged breastfeeding, or a lack of acceptance of the prolonged duration due to the influence of traditional and cultural values.[94]

Respondents' performance in the section on management of breastfeeding problems was not as good as in the other knowledge sections, with gaps observed in relation to the recommendation to continue feeding when a mother has mastitis or thrush, need to increase frequency of feeds when breast milk is insufficient, and knowledge of symptoms of poor attachment to the breast. In the study among HCPs in Ibadan, a large proportion of respondents (70.2%) recommended against breastfeeding in situations where the mother had mastitis.[94] This is another important knowledge gap that needs to be addressed through interventions such as training of HCPs and education/counselling of mothers; research has shown that many cases of reported breastmilk insufficiency can be prevented by skilled counselling and support from HCPs.[27] However, this study found no association between knowledge of HCPs and breastfeeding training in the last three years; the need for adequate evaluation of breastfeeding training programs, which vary widely in duration, scope, content, and mode of delivery, has been previously documented.[92,154] A secondary analysis of data from a systematic review that investigated the effectiveness of training strategies for HCPs in LMICs rated 'educational outreach visits' (training on-site by an expert) as a preferred mode of training above group in-service training, peer-to-peer training, or self-study, and found training combined with clinical practice at the work site to have the highest mean effectiveness.[156] However, educational outreach visits may not be a feasible option for the majority of HCPs working in resource-poor countries, where such expert trainers are often in short supply. It has been posited that due to the paucity of evidence on what strategies are most effective in improving health worker knowledge and practices, any health worker improvement interventions should be accompanied by

adequate monitoring of health worker practices and modification of the intervention(s) as required to suit the context.[157,158]

4.5.3. Attitudes towards breastfeeding and breastfeeding support

Although the overall attitude of respondents in this survey was strongly positive, just as with knowledge, there were some gaps identified in their attitudes. There were divergent views about the influence HCPs can have on a woman's decision to breastfeed, as well as whether a mother who occasionally takes alcohol should breastfeed her baby. It was however good to note that most respondents felt that it was safe for the baby and practicable for a mother to exclusively breastfeed for six months. This finding is comparable with that from baseline data of an intervention study among HCPs in Ibadan, Nigeria, where 90.3% felt that breast milk was sufficient for the baby in the first six months of life, and 86.5% felt that it was possible for mothers to exclusively breastfeed for six months.[97] It is hoped that the effect of social desirability bias is not largely responsible for the highly positive attitudes towards EBF, as the HCPs may well have said what was right without actually believing it. There would be need to carry out further studies to assess HCP attitudes, including observation during consultation with clients, and the use of mystery clients.

In the qualitative study (Chapter 5), there were a few complaints from community members and women respondents about negative attitudes of HCPs; emphasis on positive

attitude is important if optimum breastfeeding practices are to be encouraged at the grassroots.

4.5.4. Professional breastfeeding self-efficacy

The level of self-efficacy in this study was high, with three quarters of respondents feeling highly or completely confident about their ability to provide professional breastfeeding support. Self-efficacy refers to the level of a person's confidence in their ability to learn or perform a task or behaviour.[146,159,160] Previous studies have found that the confidence HCPs have in their ability to carry out specific breastfeeding support activities may affect how they receive training/retraining in breastfeeding support, and how they carry out work activities;[160,161] self-efficacy is thus an important construct in the design of needs-oriented educational programs.[160–162] The high-level of self-efficacy found in this study is an indicator of the likelihood that HCPs would readily receive retraining in breastfeeding support, and should be leveraged on in future intervention programs.

Studies have shown that professional self-efficacy can be promoted through role play, hands-on and interactive training formats, and in the provision of real-life clinical care, preferably with supportive supervision.[161–163] Thus, training of HCPs in breastfeeding support should incorporate these practical, interactive and real-life scenarios to be more effective.

Self-efficacy has been recognised as a predictor of motivation and job stress; high levels of self-efficacy have been found to elicit positive emotions and a 'can do' attitude in the worker, whilst low-self efficacy provokes negative emotions and poor coping mechanisms such as 'avoidance' of the required activity.[160–162] Previous research has shown that workers possessing a high level of self-efficacy are more likely to achieve work goals, as they perceive problems in the work environment positively; this in turn leads to a willingness to overcome the challenges to accomplish tasks.[162] This may be especially important in LMICs where health systems are often weak, and the work environment lacking in basic infrastructure and human resource. Further studies are warranted to assess the relationship between self-efficacy and work output among HCPs in such settings.

It has however been observed by some researchers that despite the usefulness of self-confidence as an assessment of the ability to carry out an activity, pressures such as social desirability may make some HCPs overrate themselves in their ability to carry out a particular breastfeeding activity.[164] On the other hand, some may in reality not be aware that they lack certain skills to adequately support breastfeeding.[165] In a study of Scottish midwives, 95% of respondents expressed confidence to teach a mother on positioning and attachment, even though the majority of them did not answer correctly to knowledge questions on the subject.[143] There is a need for further studies to investigate how self-efficacy is correlated with the HCPs knowledge and practice in this setting.

4.5.5. Breastfeeding experience, breastfeeding support practices and training opportunities

Approximately three-quarters of HCPs or their spouses (74%) had breastfed at least one child exclusively up to three months or longer. This may be important as they could serve as role models of exclusive breastfeeding to their clients or within their communities when opportunities arise; however, HCPs' personal breastfeeding experience was not significantly associated with their knowledge, attitudes, or self-efficacy in this study. More than 90% of respondents who had ever breastfed (or their spouses) had a positive experience. This is not unexpected in a society whose culture sees breastfeeding as the norm.

Most of the HCPs had been involved in counselling and support for breastfeeding in the past year, with slightly less saying they would routinely initiate a discussion on breastfeeding with mothers. This indicates that most respondents are aware of their breastfeeding support role, and demonstrates some level of opportunity for breastfeeding support activities. However, this may not necessarily translate into adequate support for breastfeeding. This study did not find out much about the environment within which breastfeeding counselling and support took place, and this is therefore an area for future research.

In the qualitative study (chapter 5), pregnant women and recent mothers were asked about the support obtained from the health care workers in some of the facilities where the HCPs in this survey practiced. Women respondents from the qualitative study indicated that they

were largely supported by HCPs, but there were complaints about the poor attitudes of some HCPs towards clients; a few respondents observed that some HCPs appeared to be overstretched at work or else carried out their supportive roles just going through the motions, rather than focusing on providing helpful support. The mothers also noted that the breastfeeding support activities were largely educational, with less one-on-one support; again, possibly largely due to inadequate staffing at the health facilities.

A third of all HCPs in the study had not received breastfeeding training in the last three years, and almost all (90%) of the respondents felt they required additional training in breastfeeding education and support. In the A&T Nigeria baseline survey, 40% of HCPs had received training on IYCF in the last two years;[99] nearly three-quarters (73.6%) of staff at the paediatric outpatient department of a teaching hospital in Lagos had ever received lactation management training, but less than two percent (1.6%) had been trained in the last one year.[96]

Sixty percent of the respondents in this study indicated willingness to be trained in the BFCI; a training needs survey of UK doctors found that the majority of participants were willing to receive future training, even though they rated themselves fairly in most skill areas assessed.[164] In another study, breastfeeding knowledge, attitudes, and self-efficacy of staff supporting mothers to breastfeed, as well as their management of breastfeeding problems, improved significantly after being trained on a mandatory BFI course;[142] there is need for regular training and updates of health staff so as to improve breastfeeding support to

communities. However, recommendations from a study of training needs of health workers from the UK posited the need for breastfeeding training courses to be adequately evaluated for effectiveness, and advocated a systematic approach to determining the training needs of practitioners;[166] there is also the need to draw on best practices in the design and delivery of training programs.[156,165]

4.5.6. Knowledge and association with characteristics

The study showed that male respondents had a lower mean knowledge score than females; breastfeeding is an activity that is gender-specific, at least in the cultural context of the Nigerian population, and this finding is therefore not unexpected. Among health care professions, the CHWs group had a significantly lower score than other HCPs. The cadres of CHWs included in this study (CHOs, CHEWs) receive standardized training outside the formal medical or nursing curricula,[167] and their health practices are guided by a set of algorithms known as 'standing orders'. However, the training entry qualifications into schools of health technology are not at par with those for medical and nursing programs in the universities; in addition, in the field it has been observed that CHWs often do not use the standing orders, which are supposed to guide their clinical practice, in managing patients. There is a need for evaluation of the knowledge, attitudes, and work output of CHWs with regards to breastfeeding support, to assess gaps, determine learning needs and the most suitable interventions to fill these gaps.

In this study, having more than 20 years of practice experience was found to be positively related with the knowledge of HCP respondents, as was working at the tertiary level of healthcare delivery; the tertiary centres have mostly doctors and nurses attending to mothers and newborns, with other types of HCPs more predominant at other tiers, especially at the primary level. The study by OlaOlorun et al among HCPs working in public PHC centres in Ibadan, Oyo State, found a positive relationship between years of practice and knowledge of respondents,[94] which could imply that their knowledge was reinforced over the years, either by additional training programs, or else by self-development. The current study, however, did not find any relationship between breastfeeding training and the knowledge of respondents: this may partly be explained by the fact that the training received by respondents was not standardised or categorised into type of training, duration, mode of delivery of content, baseline level of learners, among other important criteria. The knowledge of respondents also did not differ significantly by local government area of practice of HCP.

Although the personal breastfeeding experience of HCP respondents was not found to be associated with their knowledge, their perception of the breastfeeding experience was, as HCPs with a negative or indifferent perception of their personal breastfeeding experience had a significantly lower mean knowledge score. This may be useful for informing areas of emphasis in future training programs.

Despite the critical knowledge gaps observed in this study, there was no association found between having received breastfeeding training in the last 3 years and HCPs' mean

knowledge score. Some recent studies have identified the lack of adequately-trained HCPs as a barrier to scaling up optimal infant feeding practices.[27,155] Although Ingram et al observed statistically significant improvements in HCPs knowledge, attitudes and self-efficacy following a training program, and received positive feedback from the HCPs about its effects on their practice,[142] a recent systematic review of RCTs examining the effect of training programs on the breastfeeding knowledge and attitude of HCPs reported a paucity of evidence in the literature, both in quantity and quality.[92] This calls for further research in the design/development and implementation of education/training programs, to identify needed content, teaching methods, and other requirements for targeted programs to fill identified knowledge gaps, especially in countries with sub-optimal breastfeeding indices such as Nigeria.[92,155] It has also been posited that HCP knowledge and practices can and should be influenced at different levels and using multi-pronged interventions, especially in LMICs where HCPs are often in short supply and health systems are often weak. These would include training, supportive supervision, group problem-solving and other interactive modes of learning; system-level interventions such as continuous quality improvement and data-driven systems, improved HCP welfare packages and financial/non-financial incentives.[157,168] A systematic review of effectiveness of strategies to improve HCP performance in LMICs found that training combined with other strategies, such as supportive supervision and group problem-solving, was more effective than training alone.[157]

4.5.7. Attitude and relationship with characteristics

The CHWs had a significantly lower mean attitude score when compared to other HCPs; this is an area of concern, as being a major part of the primary healthcare workforce, they are closest to the communities. A study conducted amongst HCPs from public and private healthcare facilities in Keffi LGA, Nasarawa state of Nigeria,[93] found them to have a fairly positive attitude towards baby-friendly practices, though with deficiencies in some areas; 'auxiliaries' scored lower than nurses and doctors in some key areas such as the belief that water should not be given to babies less than six months. However, the Nasarawa study did not define or describe who the auxiliaries were, it cannot thus be ascertained if they are in any way comparable with the CHWs from this study.

This study found a significant, positive association between HCPs with more than 20 years' work experience and their mean attitude score. The mentoring of less experienced staff by those who are more experienced in the profession should be explored, although a systematic review on the effectiveness of HCP training strategies found greater effectiveness of one-on-one training by an external expert than peer- to peer or in-house training.[156] Peer-to-peer training is often deployed in Nigeria's health sector, and commonly one or two members of staff are nominated to attend a training program as 'Trainer of trainers', with the intention that they will 'step down' the training on return to their base; although this strategy is perceived to save costs, such training approaches should be well evaluated in context to determine their effectiveness. Unlike the findings from other studies such as that conducted among Scottish midwives, in which a significant association was observed between respondents' breastfeeding experience and their

breastfeeding attitude,[143] no significant difference was observed in this study between HCPs personal breastfeeding experience, or their perception of it, and mean attitude scores.

The positive association observed between HCPs' tier of health care provision and mean attitude score requires further investigation to ascertain its determinants, as there is paucity of data on HCPs' attitudes towards breastfeeding in the Nigerian literature, and less still comparing their attitudes between tiers of health care delivery. Respondents' training status in the last three years was not significantly associated with mean attitude score. As stated previously, the analyses in this study did not differentiate between types or levels of training approaches or packages; previous studies recommend that training needs must be properly assessed and matched to the most helpful training approaches and packages for optimum effectiveness.[164,166]

4.5.8. Professional self-efficacy and HCPs characteristics

Gender and ethnicity showed no significant association with HCPs mean self-efficacy scores. CHWs had a significantly lower mean self-efficacy score than nurses; as earlier stated, CHWs form a large proportion of the workforce within the communities, where the importance of breastfeeding support cannot be overemphasized. It underscores the need for targeted intervention programs to enable these categories of HCPs perform their roles in breastfeeding support more effectively. Also, considering that CHWs have lower entry-level qualifications, and are trained in a system often outside the medical/clinical school,

supportive supervision has been posited as a means of ensuring that the quality of the services they render is maintained, and needs-based interventions towards service improvement can be carried out in a timely manner.[158] Self-efficacy was significantly, positively related to years of practice; this is not unexpected, especially for HCPs who regularly provide breastfeeding support. A study among midwives and other breastfeeding support staff in England found that a longer experience of providing breastfeeding support was related to significantly higher self-efficacy.[166]

This study found that the breastfeeding experience of HCPs, and their perception of this experience, were not significantly associated with professional self-efficacy. This is not in tandem with the study of Ingram et al amongst health staff in Bristol UK,[142] which found a significant association between a positive perception of their breastfeeding experience and the self-efficacy scores. The significant association between practice location and self-efficacy was an interesting finding, as the reference LGA (Mushin), which had significantly higher knowledge scores than other practice locations, did not perform similarly in self-efficacy; rather, Ibeju-Lekki LGA had a significantly higher mean score than Mushin LGA. This study notes that breastfeeding training was not associated with respondents' self-efficacy; this is at variance with findings from a number of intervention studies which demonstrated that training can improve the self-efficacy of HCPs to provide breastfeeding counselling and support.[142,163,169]

4.5.9. Strengths and limitations

This study has explored the knowledge, attitudes, professional self-efficacy and breastfeeding support practices of HCPs in Lagos state, Nigeria. It has demonstrated the differences between types of health care workers and has highlighted areas that need interventions for improvement. It has also identified training needs, and areas for future research.

The study has a number of strengths. The response rate of HCPs who were selected by a multistage sampling process was 80%, which is considered high, especially for a busy occupational group. The minimum sample size of 200 was nearly doubled, and the sample was representative of rural and urban local government areas of Lagos State as well as different types of HCPs providing breastfeeding support at the three tiers of healthcare delivery in Nigeria.

The study however has some limitations. Being a questionnaire survey, the possibility of social desirability bias cannot be ruled out, as some HCPs may have given what they knew to be the 'correct' answers, while not practicing these in the real world. Also, despite an extensive literature review on the subject matter and the adaptation of a previously validated tool, a few areas of interest in breastfeeding were left out of the questionnaire. Though the instrument was pre-tested, a few questions were difficult to answer for a relatively large proportion of respondents, such as the question on personal breastfeeding experience, resulting in a higher level of non-response for such questions.

4.5.10. Conclusion

This study has shown that there is a moderately high level of knowledge, a fairly positive attitude, and very high self- efficacy of breastfeeding and breastfeeding support among HCPs working in public health facilities in Lagos state. Gaps were however identified in critical areas of their knowledge and attitudes towards breastfeeding, such as recommending a top up with formula to solve perceived milk insufficiency or poor weight gain, and thinking that added fluids wouldn't hinder milk supply in the newborn; these hinder their ability to support exclusive breastfeeding, and to solve common practical breastfeeding problems. The high level of self-efficacy elicited points to a possible over-rating of their abilities by the HCP respondents, which may be helped by a well-tailored training package which is targeted at identified gaps and inadequacies.

Male HCPs rendering breastfeeding support may need additional training, especially practical training that would boost their knowledge to support breastfeeding activities and solve breastfeeding management problems. Attention should also be paid to younger HCPs with less experience and exposure to breastfeeding.

Further evaluation of the impact of current training programs would be important for design, roll-out and implementation of future training packages, to ensure that they close the knowledge and attitude gaps among the various types of HCPs. It would be important to take a closer look at the various categories of CHWs, who are the main providers at the primary health care level, and closest to the community; they potentially reach a high proportion of pregnant and breastfeeding clients who may not have access to formal health

care services. It is therefore imperative that the gaps in knowledge, attitude and self-efficacy identified amongst CHWs be addressed, to further enhance breastfeeding support in the communities of Lagos state in the attempt to increase the critical practice of breastfeeding exclusivity.

CHAPTER 5: A QUALITATIVE STUDY OF INFLUENCES ON EXCLUSIVE BREASTFEEDING IN LAGOS STATE, NIGERIA

5.1 Background

5.1.1. Introduction

Chapter 4 investigated the knowledge, attitudes, and self-efficacy for providing breastfeeding support among health care professionals (HCPs) working in Lagos state, Nigeria. This chapter explores the perspectives and experiences of women (pregnant women and recent mothers), significant others (husbands, grandmothers), and other community stakeholders in the breastfeeding arena.

As discussed in Chapter 1 (see section 1.9.2.), a rapid review of the literature on behavioural influences of breastfeeding (barriers and facilitators) in Nigeria identified some facilitators and several barriers to exclusive breastfeeding and other recommended infant feeding practices.

As a recap, commonly identified behavioural influences from the review of literature which served as enablers of exclusive breastfeeding and other recommended infant feeding practices included knowledge of the benefits of EBF/BF,[79,81] and support from family, community, and/or workplace.[79,80] Less commonly cited enablers were early breastfeeding initiation,[75] intention to exclusively breastfeed,[82] and maternal determination.[80] Influences identified as barriers to exclusivity and other recommended infant feeding practices included perception of the need to give baby water in the first six months,[80–84] perceived breastmilk insufficiency,[68,75–78,80,83,84] mother's return to work,[76–78,80,81,84] problems with maternal health/nutrition/lactation,[75–78,80,84] negative family/community pressures,[80,81,83] delivery by caesarean-section or outside of a health facility,[70,79] and other negative cultural

practices/beliefs.[75,81,83,84] In addition, concerns about sagging breasts,[80,84] and difficulty transiting to complementary feeds,[80] were less commonly mentioned barriers.

5.1.2. Need for a study on behavioural influences of breastfeeding practices

The review of previous studies on breastfeeding influences in Nigeria (see section 1.9.2) shows that most of the quantitative studies were descriptive, with participants drawn largely from hospital settings and often sampled by convenience. Qualitative studies that investigate breastfeeding facilitators and barriers are fewer in literature, especially from South-West Nigeria; most were largely descriptive/narrative and lacked a theoretical framework. Although a few studies provide some information about mothers' breastfeeding knowledge and practices in the study areas, they scarcely provide needed data about other drivers of breastfeeding behaviour, which are important for understanding 'what works' in the design of much-needed interventions to improve exclusive breastfeeding. The Alive & Thrive baseline qualitative study[84] provides detailed information about social norms and perceptions of EBF and other infant feeding practices in Lagos and Kaduna states; however, the report had not been published at the time this study was conceptualised. Their baseline study was followed by a number of interventions to improve IYCF practices in the study communities, using a well-designed implementation framework by A&T. However, theory-informed qualitative research in the Nigerian literature on breastfeeding is scant. This study is focused on determining the behavioural influences on exclusive breastfeeding and other infant feeding practices in selected

communities of Lagos state, through the application of a comprehensive theoretical framework.

5.2 Aim and objectives

5.2.1. Aim

This qualitative study aimed to investigate the influences of breastfeeding practices in selected communities of Lagos state, Nigeria, using the Capability-Opportunity-Motivation Behaviour (COM-B) theoretical framework.

5.2.2. Study objectives:

1. To identify the behavioural influences (facilitators and barriers) of exclusive breastfeeding and other recommended infant feeding practices among pregnant women/recent mothers within the study communities.
2. To elicit the perceptions of key community members on behavioural influences of exclusive breastfeeding and other recommended infant feeding practices in their communities.
3. To map the findings from women respondents and key community members onto the COM-B framework.

5.3 Methods

5.3.1. Theoretical framework

A theory of behaviour change represents knowledge accumulated over time on the understanding of human behaviour, likely influences of the behaviour of interest, and

knowledge of the mediators and moderators of change.[170] Interventions directed towards behaviour change are more likely to be effective when underpinned by an appropriate behaviour change theory. This study used the COM-B model for understanding behaviour as its underpinning theoretical framework.[171] The COM-B framework is a comprehensive behaviour change theory that emphasizes not just the capability or the motivation to carry out a behaviour, but also gives due consideration to social factors and the context in which the behaviour takes place.[170–172]



Fig 5.1: The COM-B Model
(Reproduced from: Michie, S., van Stralen, M.M. & West, R. The behaviour change wheel: A new method for characterizing and designing behaviour change interventions. Implementation Sci 2011; **6**, 42. https://doi.org/10.1186/1748-5908-6-42, under the terms of the Creative Commons License (http://creativecommons.org/licenses/by/2.0)

As seen in Figure 5.1, the model posits that behaviour change occurs because of the possession of the requisite *capability* to perform the behaviour, *motivation* to do the required action, and the *opportunity* to carry it out. This is because knowledge and intention to perform an action by themselves are not always enough to bridge the 'knowledge-action' gap in human behaviour. The model also posits that an intervention would likely affect one or more domains within the COM-B system.[171] Table 5.1 shows the COM-B domains with examples.

Table 5.1: COM-B domains with examples‡‡‡

COMPONENT/DOMAIN	SUB-COMPONENT/ SUB-DOMAIN	EXAMPLES
Capability	Physical	Skills, strength, stamina; e.g. necessary skills & physical abilities to perform the behaviour of interest
	Psychological	Knowledge, confidence, memory; e.g. required knowledge and mental capacity
Opportunity	Social	Opportunity afforded by social factors, e.g. social norms, cultural factors, interpersonal influences
	Environmental/physical	Opportunity afforded by the environment - resources, time, physical environment; e.g breastfeeding support, creches
Motivation	Automatic	Automatic brain processes, impulses, desires, addiction, inhibitions, habits, emotional responses e.g. fears
	Reflective	Reflective brain processes, beliefs, intentions, plans, evaluations; e.g. conscious decision-making

‡‡‡ Table adapted from Michie et al, 2011[171] (Michie, S., van Stralen, M.M. & West, R. The behaviour change wheel: A new method for characterising and designing behaviour change interventions. Implementation Sci 2011; **6**, 42). https://doi.org/10.1186/1748-5908-6-42, under the terms of the Creative Commons License (http://creativecommons.org/licenses/by/2.0.)

The COM-B model is gaining popularity as a theoretical framework because being based on the synthesis of models and theories, it is comprehensive and widely applicable, enables consistent research methods and reporting, and has become increasingly applied in research. It is also part of the wider Behaviour Change Wheel approach, which maps behavioural influences onto behaviour change techniques that are more likely to be effective, facilitating the development of targeted interventions.[171]

The COM-B framework has been in use for just over a decade, and within this period has been applied to breastfeeding research, mostly in high income settings, focused on understanding infant feeding beliefs and intentions, drivers of infant feeding practices, and development of peer support.[173–176] Three of such studies employed qualitative methods, and one was a mixed methods study, with participants including pregnant women, recent mothers, significant others, health professionals, and peer supporters. Three studies applied COM-B at analysis stage by mapping their results onto the COM-B framework,[174–176] while one applied the COM-B model at design stage.[173] Table 5.2 summarises characteristics of the aforementioned studies.

5.3.2. Selection of study communities

The study communities for the qualitative study were selected using elements of convenience and purposive sampling. Of the six LGAs used for the quantitative survey of HCPs presented in Chapter 4, two LGAs (Mainland and Surulere) were selected based on a prior work-based relationship with the communities.

Table 5.2: Summary of characteristics of breastfeeding studies using the COM-B model

AUTHOR, DATE	TOPIC/MAIN IDEA	STUDY DESIGN	STUDY POPULATION/LOCATION	HOW WAS COM-B APPLIED?	DATA ANALYSIS
Russell et al, 2016[173]	Infant feeding beliefs and behaviours of mothers with low education	Qualitative - semi-structured interviews	Mothers of infants 2 - 11 months with low education (no university degree), 2 regions of Australia	Interview guide was developed to address COM-B components; target behaviours were informed by literature	Thematic analysis
Phillips et al, 2018[175]	Development of breastfeeding peer support intervention informed by motivational interviewing	Qualitative interviews; FGDs	Health professionals, service providers (interviews). Mothers, fathers, peer supporters (FGD). South Wales, UK	Applied at analysis stage: potentially modifiable sources of BF behaviour identified in study were mapped against elements of COM-B model	Thematic analysis
Grant et al, 2019[174]	To gain an understanding of their pregnancy experiences in relation to their health behaviour in pregnancy, including infant feeding intentions	Qualitative - in-depth interviews (participant-led discussions)	Women <30 weeks pregnant, resident in deprived areas of study area and on welfare	Participant-led discussions were used to elicit experiences in pregnancy in relation to health behaviours, and these were then mapped onto the COM-B model	Thematic analysis- deductive and inductive
Thomson and Crossland, 2019[176]	Exploration of provision of infant feeding peer support using the BCW	Mixed methods - quantitative survey; qualitative study with group and individual interviews	Women receiving breastfeeding support at various stages (ANC, postpartum, in the community/breastfeeding groups); Health professionals (hospital/community), and peer support group providers	Quantitative and qualitative data were re-analysed and mapped onto the three layers of the BCW, including the COM-B framework	For qualitative data, modified framework approach was used on a deductive basis

Within each of the two LGAs, a primary health care centre that was included in the quantitative survey was identified, and its catchment area included as the study area.

For Mainland LGA, the catchment area served by Iwaya PHC centre was selected; this included two administrative wards, Aderupoko and Salami-Baiyewunmi wards (also known as Iwaya community). For Surulere LGA, Ejire PHC centre was selected with its catchment area, consisting of Ogunsami-Karounwi ward, also known as Ejire community.

5.3.3. Background of selected study communities

5.3.3.1. Lagos state

Lagos state is the smallest Nigerian state in terms of land mass, and the largest in population, estimated at more than 20 million in 2015.[133] It also has the highest urban population in the country, accounting for more than 25% of urban inhabitants, stemming largely from rural-urban migration.[133,177–179] Due to the rapid population growth being experienced in Lagos metropolis and the state in general without commensurate infrastructural development,[178] it has a high proportion of peri-urban areas lacking adequate amenities such as electricity supply and potable water, and poor state of infrastructure such as roads and housing.[133] Rapid urbanization has been found to exert other influences on the physical and social environments, including social roles, demography, work and living patters, and health-seeking behaviour.[177]

5.3.3.2. Study communities

Iwaya community

Iwaya is a residential and commercial community located in the Southeastern part of Yaba local council development area, within Mainland LGA of Lagos State. It comprises two administrative wards, namely Aderupoko and Salami-Baiyewumi, which constitute the catchment area for Iwaya PHC centre. The predominant ethnic groups are Yoruba and Egun; a cluster of its residents migrated from neighbouring Benin Republic. Common occupations include trading, fishing, and artisan vocations. Some parts of the community are plagued by flooding and waterlogging, due to its riverine nature.[180,181]

Ejire community

Ejire community, consisting of Ogunsami-Karounwi ward within Itire-Ikate local council development area, is a high-density locale within Surulere LGA of Lagos state, but poorly served by basic amenities.[181,182] The community is served by Ejire PHC centre. Major occupations are trading and artisan vocations. Yoruba is the predominant ethnic group, with other ethnic groups such as Ibos in smaller proportions. This community lies on lowland, and a large canal runs through it, making Ejire susceptible to perennial flooding.[183]

5.3.4. Participant selection

5.3.4.1. Pregnant women/recent mothers

Participants were sampled purposively (criterion-based)[184] by the research team in conjunction with community leaders/mobilizers, and members of the health team at the

PHC centre, based on factors that influence infant feeding practices, including age, education level, occupation, religion, parity, and socio-economic status.

Qualitative interviews were undertaken with women from various groups:-

A. Pregnant women (primipara/multipara)
B. Mothers with infants aged <1 year, with a range of breastfeeding experiences including:
    i. EBF for up to 6 months
    ii. EBF for shorter periods (e.g. <1 month, 1-2 months, 3-4 months)
    iii. Mothers who did not exclusively breastfeed.

A minimum of 12 interviews were planned, to ensure maximum diversity of participants. A total of 22 interviews were carried out with recent mothers or pregnant women.

5.3.4.2. Key informants in the community

Qualitative interviews were conducted with:

A. Community health workers (CHWs), who provide a link between the formal health system and the community.
B. Traditional Birth Attendants (TBAs)
C. Other community leaders, including traditional rulers, religious leaders, women's group leaders, market women leaders, etc.

These were considered influential individuals in the community with a breadth of understanding of infant feeding practices and influences. They were identified and

approached for an interview with the help of health care workers at the PHC centre, community mobilizers, members of the Ward Development Committee (WDC) (Iwaya) and Community Development Committee (CDC)/Community Development Association (CDA) (Ejire).

A total of 6 –12 interviews were planned, and 8 were conducted.

5.3.4.3. Community members for focus group discussions

Focus group discussions (FGDs) were conducted with community members from the following groups:

A. Older women (mothers, mothers-in-law, grandmothers)
B. Husbands of pregnant women/recent mothers within the community
C. CDA/CDC/WDC members

Selection of participants was purposive. The CDA/CDC /WDC members helped in identifying homes with older women and husbands of recent mothers, who were then approached and invited to participate. Members of the CDA/CDC/WDC were enlisted as potential participants in their focus group and invited to participate.

A total of six focus groups were conducted, one per category per community.

5.3.5. Setting of data collection

Data were collected in various settings for the different types of interviews. However, the dynamics of the two communities differed slightly.

- In Iwaya, most interviews were conducted within the PHC centre environs, as the community members actively used the PHC centre for health and development activities and felt comfortable in that environment. Some participants' homes were difficult to access due to the flood-prone terrain of the lowland community, and most participants were invited from their homes to be interviewed at the PHC centre.
- In Ejire, interviews took place in a few different settings that participants felt comfortable in, including the PHC centre, a health outreach post, a church which served as the meeting place of the CDA, and the homes of some participants.
- In each of the interview settings, a quiet area or room, away from the scrutiny of health staff, family, and community members, was identified for interviewing the participants. There were however a few occasions when there were distractions within the environment, e.g. a child crying while the mother was being interviewed, or a dog barking ferociously, but these were few and far between.

5.3.6. Data collection tools and techniques

Interview and focus group data were collected between October 2018 and June 2019.

5.3.6.1. Qualitative interviews of recent mothers and key informants

Interviews were conducted using a semi-structured, narrative approach, with appropriate probes from an open-ended question interview guide. This method was employed to obtain a rich description of and provide deeper insight into the facilitators and barriers of EBF in the study communities; it was assumed that a one-to-one approach would enable

respondents to be sincere and give information on their actual thoughts, feelings and actions about the topic.[127,185,186]

Each interview was conducted by a facilitator and a note-taker. Most of the interviews were facilitated by TFO, but a handful were facilitated by two public health physicians trained for this purpose. Note-takers consisted of three final-year medical students, and three resident doctors in community medicine; facilitators and note-takers were trained for half a day in the classroom on their respective roles, followed by a practical session in the field. They were checked on at intervals whilst carrying out their duties on the field; immediately after the interviews their notes were checked for any inconsistencies which were quickly rectified where possible.

Interviews were conducted in English language and/or the native Yoruba language, in three stages: (i) After an introduction, the facilitator introduced the topic, aims, and the interview process to the participant. Written informed consent was sought, and socio-demographic data obtained (ii) The interview commenced with an icebreaker question and continued with a narrative being requested from the participant. This was punctuated by probes from the interview guide by the facilitator, and clarifications where needed. (iii) Each interview concluded with final thoughts from the participant and a word of appreciation from the facilitator.[187] Interviews with pregnant women and recent mothers lasted between 15 and 40 minutes, while key-informant interviews ran for 25 to 65 minutes.

5.3.6.2. Focus Group Discussions

Each focus group discussion was held at a mutually agreed venue and time. The discussion started by explaining the purpose of the study to participants; written informed consent was then obtained. Initials or codes were used to identify participants for the purpose of the discussion. Study objectives were addressed using the discussion guide to prompt areas of focus. Discussions lasted for between 60 and 90 minutes, and questions were open-ended to encourage frank discussion and exploration. Discussions were conducted in English language; however, some questions were translated into Yoruba verbally during discussions, to facilitate a vibrant discussion. Focus groups were considered an appropriate method of data collection among the intended respondents, as this method would facilitate a richer, community-oriented perspective on the social norms surrounding breastfeeding and exclusivity; also, in view of the fairly low literacy level within the study communities, the focus groups would help to draw out information from the respondents and provide a healthy debate on important topics.[127,186]

Each focus group/qualitative interview was facilitated by TFO or other trained facilitator who served as moderator and accompanied by a note taker; audio recordings were made of each session. Reflexive notes were also made by the researcher after data collection, during data cleaning and analysis.

5.3.6.3. Interview guides

The interview guides were adapted from a formative study guide which informed intervention development in a breastfeeding trial in Kenya, which explored respondents' knowledge, attitudes, breastfeeding and complementary feeding practices, established local contexts and norms contributing to optimum IYCF practices.[188]

The guide for the qualitative interviews covered the following issues:

A. Women's narratives of their recent birth and their feeding story with appropriate probes, to elucidate knowledge of and attitude towards recommended infant feeding practices.

B. Exploring reasons for planning/adoption of feeding practices.

C. Elucidating and exploring factors that may hinder or facilitate adoption of recommended infant feeding practices in the community.

The key informant interview guide focused on their perceptions/knowledge of infant feeding practices and benefits of breastfeeding/EBF; community perceptions of and support for BF/EBF, and sociocultural and other influences of exclusive breastfeeding.

The guide for the focus groups was similar to that for the key informant interview but probed deeper into social roles for breastfeeding support and how these can be harnessed.

Further details of topics covered in the interview and FGD guides can be found in Appendices 6.1–6.4.

5.3.7. Data analysis

Thematic analysis is a commonly used method of qualitative data analysis in which themes are the unit of analysis; it seeks to identify, analyse, and report common themes within the data obtained.[127] A theme refers to a patterned meaning across a dataset that captures something important about the data in relation to the research question. It is commonly used in qualitative research because it is flexible for use with a wide range of research questions and paradigms.[127]

The Framework Method for qualitative data management and analysis [189] is one of several methods for conducting a thematic analysis. It is a systematic method which provides a structured way of comparisons within and across groups and was selected for this study because of its suitability for the thematic analysis of semi-structured interview transcripts. Moreso, it is well suited to the deductive approach to analysis employed using the COM-B model. It entails the following steps: data transcription, familiarisation, and coding; development and application of an analytical framework; charting and interpretation of the data.[189]

5.3.7.1. Transcription of audio recordings and familiarization with interview

Audio recordings of the interviews were transcribed manually by TFO and eight data assistants who were available at different time periods during the study. Although it was planned that all interviews would be in English, some interviewees were not able to express

themselves fully, and instead spoke mostly in the Yoruba language. This necessitated the transcription of some recordings by a local professional transcription service. Quotes translated from Yoruba into English are preceded by **{Y}** in the results. One interview was excluded because the participant was reluctant to continue after giving consent. Transcripts were uploaded to NVivo version 12 Plus, where each was then coded by TFO.

5.3.7.2. Coding of transcripts and development of Working Analytical Framework

Five transcripts (approximately 10%) were manually inductively open coded by TFO and BT (PhD supervisor) before they were uploaded to NVivo. A working analytical framework was developed from the initial codes and applied to the entire dataset; this framework was reviewed as coding proceeded and the number of codes expanded. The working analytical framework organised codes into categories according to the COM-B framework, and codes that did not fit well within the COM-B were added in as additional categories. Thus, the approach was both deductive and inductive,[190] as the themes were driven largely by the underpinning theory (COM-B), with additional themes added inductively.

5.3.7.3. Charting data into the framework matrix

A framework matrix of the coded dataset was created in NVivo using the categories already identified from the COM-B framework; was then exported into Microsoft Excel. The raw data were charted by summarising the data in each category into the matrix for each transcript. This dataset was quite difficult to handle as a single file in NVivo due to the large

volume of data, and was later split into the different categories of participants for better manageability.

5.3.7.4. Data interpretation

Interpretation was carried out by writing descriptive and analytical summaries for each domain of the COM-B framework and other coded data looking at the wider context; the framework matrix was used to compare data within and across COM-B domains, between participants, and study areas. The COM-B domains were the overarching themes; a number of sub-themes emanated from the data.

5.4 Results

5.4.1 Participants and characteristics

An overview of all the participants involved in the qualitative studies is contained in Table 5.3. A total of 75 participants were interviewed in 36 contacts.

Table 5.3: Overview of participants in qualitative study

Type of interview	**Participant**	**N**
Semi-structured interviews		
	Pregnant women	9
	Recent mothers	13
Key informant interviews		
	Community health worker	4
	Traditional birth attendant	2
	Community leader	2
Focus group discussions		
	Ward Development Committee (WDC) members	20
	Husbands/men resident within target communities	15
	Older women resident within target communities	10
	Total number of participants	**75**

Of the 22 interviews with pregnant women and mothers of infants included in this study, 13 were with recent mothers, and nine were with women who were pregnant as at the time of their respective interviews. Their ages ranged from 18 to 39 years, with the majority aged between 20 – 29 years (12, 54.5%). All were married, and nearly two-thirds had either one or two children (15, 68.1%). The majority were of the Yoruba ethnic group (15, 68.1%), and half of all respondents practiced Islam (11, 50.0%). The educational level of

respondents ranged from no formal to tertiary education, with the majority having completed secondary level of education (10, 45.5%). Various types of business enterprise formed the predominant occupation (15, 68.1%). The characteristics of women respondents are summarised in Table 5.4.

Table 5.4: Characteristics of women interview participants

Characteristic	Class	Freq (N=22)	%
Age group	<20	1	4.6
	20 – 29	12	54.5
	30 – 39	9	40.9
Education	No formal	1	4.6
	Primary	1	4.6
	Secondary – part	2	9.1
	Secondary – completed	10	45.4
	Tertiary	6	27.2
	Unassigned	2	9.1
Marital status	Married	22	100
Status at enrolment	Pregnant woman	9	40.9
	Recent mother	13	59.1
Age of index child (n = 13)	< 1 month	2	15.4
	1 - 3 months	2	15.4
	4 - 6 months	1	7.7
	7 - 9 months	6	46.1
	10 - 12 months	2	15.4
Number of children	0	2	9.1
	1	8	36.4
	2	7	31.8
	3	1	4.6
	4	3	13.6
	5	1	4.6
Ethnic group	Yoruba	16	72.7
	Ibo	1	4.6
	Hausa	2	9.1
	Other (South South)	3	13.6
Religion	Christianity	8	36.4

	Islam	11	50.0
	Unassigned	3	13.6
Occupation	Housewife	1	4.6
	Petty trader	5	22.7
	Manual worker (unskilled)	1	4.6
	Small business	5	22.7
	Medium business enterprise	5	22.7
	Marketer	1	4.6
	Health worker - lab technologist, nurse	3	13.6
	Professional – lawyer	1	4.6

5.4.2. Delivery characteristics and breastfeeding practices of recent mothers

Delivery characteristics and breastfeeding practices of recent mothers (n=13) are described in Table 5.5. Most deliveries (9, 69.2%) took place in a hospital; almost one third of them (4, 30.8%) were by caesarean section. The ages of infants ranged between three days and 12 months, with five below six months of age.

Four mothers (30.8%) reported initiating breastfeeding within an hour of birth; nine reported breastfeeding their babies exclusively, although four had received water and one received infant formula in the first few days after birth. Six infants received some form of complementary foods at six months. All except one of the 13 mothers were still breastfeeding at the time they were interviewed.

Table 5.5: Delivery characteristics and breastfeeding practices of recent mothers

Delivery Characteristic	Class/variable	Freq N=13	%
Place of delivery			
	Hospital	9	69.2
	Traditional birth attendant	3	23.1
	Home	1	7.7
Type of hospital (n = 9)			
	General hospital (public, secondary level)	4	44.4
	Primary Health Care centre (public, primary level)	1	11.1
	Private hospital	3	33.4
	No information	1	11.1
Type of delivery			
	Vaginal delivery	7	53.8
	Caesarean section	4	30.8
	No information	2	15.4
Breastfeeding characteristic			
Exclusive breastfeeding			
	Exclusively breastfed[1]	9	69.2
	Exclusively breastfed up till 6 months	4	30.8
	Exclusively breastfed less than 6 months[2]	5	38.5
	Not exclusively breastfed	4	30.8
	Breastmilk and water	1	7.7
	Breastmilk and other fluids	1	7.7
	Breastmilk and pap	1	7.7
	Water only[3]	1	7.7
Breastfeeding initiation			
	≤1 hour	4	30.8
	1 hour – 24 hours	4	30.8
	> 24 hours	5	38.5
Complementary feeding amongst infants above 6 months of age (n=8)			
	Commenced at 6 months	6	75.0
	Commenced at 7 – 8 months	2	25.0
Complementary feeding amongst infants less than 6 months of age (n-5)			
	Yet to introduce complementary foods	3	60.0
	Fluids/foods other than water introduced	1	20.0
	Water only given	1	20.0

[1] Four of these infants received water and one received infant formula in the first few days after birth, either due to delay in lactation or operative delivery, before continuing with exclusive breastfeeding.

[2] Three of these infants were less than six months old at the time of the interview.

[3] Infant was 3 days old at the time of interview, and breastfeeding was yet to be initiated.

5.4.3. Characteristics of key informants and FG participants

Three FGDs were conducted in each of the two study locations: one with members of the WDC/CDA, one with older women, and one with men in the community.

Almost all participants in the FGDs/key informant interviews (KII) were at least 30 years old, with just over one quarter (26.4%) being 60 years or older. They were predominantly male (62.5%), married (79.2%), Yoruba (74.7%) and Christian (64.1%). Almost half (45.4)% of all respondents were involved in a small or medium business enterprise, and another 23% engaged in petty trading. Although information on education was not obtained from FGD participants in one study area (Iwaya), more than half (58.1%) of those captured had attained at least some secondary education (see Table 5.6)

Table 5.6: Characteristics of key informants and focus group participants

Characteristic	**Categories**	**Frequency (n=53)**	**%**
Age	20-29	2	3.8
	30-39	11	20.8
	40-49	12	22.6
	50-59	10	18.9
	60+	14	26.4
	Unassigned	4	7.5
Gender			
	Male	33	62.3
	Female	20	37.7
Marital Status			
	Single	4	7.5

	Married	42	79.2
	Widowed/separated/divorced	7	13.2
Ethnicity			
	Yoruba	38	71.7
	Ibo/Delta Ibo	6	11.3
	Hausa/Nupe	3	5.7
	Edo/Ijaw	3	5.7
	Other (Egun, Togolese, unassigned)	3	5.7
Religion			
	Christianity	34	64.1
	Islam	17	32.1
	Unassigned	2	3.8
Occupation			
	Small/medium scale business/trader	20	37.7
	Artisan (bricklayer, painter, carpenter, etc)	9	17.0
	Community Health Worker (CHO, CHEW)/ WDC member/Community Volunteer	7	13.2
	Islamic/Christian cleric	5	9.4
	Retiree	4	7.5
	Community Leader/Chief	2	3.8
	Traditional Birth Attendant	2	3.8
	Professional	1	1.9
	Other (Housewife, unassigned)	3	5.7
Education (n=31)			
	Nil/Primary	7	22.6
	Secondary part/completed	11	35.5
	Tertiary/post-secondary	7	22.6
	Unassigned	6	19.3

5.4.4. Influences on infant feeding practices.

This section describes the various behavioural influences on infant feeding practices - facilitators (or enablers) and barriers - experienced by pregnant women and recent mothers in the selected communities, and from the viewpoint of other stakeholders in the community. Where patterns were identified within the findings, such as variation in accounts for different groups of respondents or contexts, they are presented within each theme, though this was the exception rather than the rule. Table 5.7 summarises the themes and sub-themes for each domain of COM-B.

Logically, one can posit that infant feeding/breastfeeding begins with the internal motivation of the mother or carer. The COM-B model stipulates that capability and opportunity modulate the relationship between motivation and behaviour,[172] and similar to the style adopted by some other studies that used the COM-B framework,[173] the influences under Motivation are examined first in this chapter.

All quotes are written in English; quotes translated from Yoruba are preceded by {Y}.

Table 5.7: Study themes and subthemes

Theme (COM-B Domain)	Sub-theme	Description/example
Motivation: reflective	Plans and beliefs: benefits of breastfeeding, exclusive breastfeeding, expressed breastmilk, infant formula, types and timing of complementary foods, total duration of breastfeeding	e.g. attitudes about breastmilk and water, attitude towards colostrum, attitude towards expressed breastmilk
	Beliefs and plans in the face of opposition	e.g. decision to continue EBF despite opposition from significant other
	Influence of past experiences on feeding practices	e.g. difficulties with feeding previous child
	Beliefs: child feeding preferences	e.g. some children reject breastmilk very early
	Attitude & belief about physical or psychological impact of breastfeeding	effect of breastfeeding on mother, e.g. breast flatten, physically or emotionally drained
	Intrinsic motivation	e.g. personal decision
Motivation: automatic	Emotional responses, habits, fears and concerns	E.g. pride of having a healthy infant, frustration with feeding challenges
Capability: physical	Physical capability – mode of delivery, mother and newborn health	e.g. health concerns in mum or baby, lactation issues
Capability: psychological	Knowledge – breastfeeding initiation and colostrum, prelacteal feeds, expressed breastmilk, benefits of breastfeeding, complementary feeding, total breastfeeding duration, facilitators and inhibitors of breastmilk flow	e.g. knowledge of how to express breast milk, when to introduce complementary foods
Opportunity: Social	• Government • Community health structures • Non-governmental organizations • Media • Family, friends, wider community	• Expected role(s) of government, government support • Role of Ward Health Committee, Community Development Association, Community Development Committee • Role of NGOs • Role in breastfeeding information, breastfeeding support • Other examples of feeding, e.g. own mother, sibling, in-law, neighbour

	• Local norms, societal expectations • Ethnic/faith/cultural community or influences • Other social influences	• What people do; what's 'normal' or 'good', within family and in community e.g. traditions at naming ceremonies; ways of feeding infants • e.g. cultural and religious peculiarities around EBF practices • e.g. perception of breast image/sagging
Opportunity: physical/environmental	Health Care Professionals, traditional birth attendants	Breastfeeding information, breastfeeding support
	Economic & work-related factors	e.g. Work (and whether baby can go to work), childcare, financial status/poverty
	Business - formula/baby food manufacturers (BMS)	e.g. formula types, availability, preferences
	Environmental influences	e.g. urban/rural differences, what services/support is accessible locally

5.4.5. Motivation

In the COM-B framework by Michie et al, motivation is defined as the brain processes responsible for energizing and directing behaviour, and not merely goals and conscious decision-making. This can be further divided into reflective motivation, which refers to conscious, analytical decision-making and goal-setting, and automatic motivation, which includes unconscious habits, impulses, and emotional responses.[171,173] The boundaries between the two are however often blurred.

In this section, women-reported reflective and automatic influences on feeding behaviour will be discussed, including feeding plans and beliefs, and will be explored in the following order: exclusive breastfeeding, expressing breastmilk, infant formula, breastfeeding facilitators and inhibitors, duration of breastfeeding, and complementary foods. The impact of planning and past feeding experiences on feeding practices will then be discussed.

5.4.5.1. Plans and beliefs: exclusive breastfeeding,

Most pregnant women and recent mothers indicated that they planned to breastfeed their babies exclusively.

> *"The plan I have for my baby when born…exclusive, that is, six months without water or anything"* (Interview_013_pregnant woman)

A few respondents were quite intentional about exclusive breastfeeding, and made detailed plans:

> *"…I always do this exclusive breastfeeding. …as soon as I enter the seventh month I start preparing my breast. I will make sure that I have even started lactating before getting into labour, so I won't have issue with giving birth and my baby will have to be fed with other food for maybe two, three days before I start lactating"* (Interview_08_pregnant woman).

Some other respondents planned to breastfeed exclusively, but with no defined duration:

> *"Yes, I planned exclusive breastfeeding…but I don't know...I didn't put a time…"* (Interview _02_recent_mother).

Some respondents had exclusively breastfed a previous baby and were eager to continue:

> *"I've been planning to do exclusive breastfeeding, which is what I've been doing for all my children*." (Interview_01_recent mother).

Others planned to exclusively breastfeed the current infant, having not done so with previous children, because they had become convinced of its benefits:

> *"I will breastfeed him for complete six months without giving him water and I have never done so before. The exclusive is very, very okay and I could see the difference." (Interview_018_recent mother)*

In some cases, participants expressed the need for God's help to be able to follow the guideline of breastfeeding exclusively for the total wellbeing of the infant:

> *"The information being given from the hospital is that we should be breastfeeding like six months without giving water, so I pray…that God should give me helping hand in following the instruction they are giving us in the hospital…"* (IDI_014_recent mother)

Some who had planned to exclusively breastfeed their babies revealed that they would also give water, in other words feeding was not exclusive. Reasons given included the belief that breast milk is food, and infants need water to help the food go down, just like adults; or that the child might be thirsty if not given water:

> *"If you eat and there's no water, the food would not digest so I would surely add water to it."* (IDI_04_pregnant woman).

It is important to note that in the Nigerian context, as in the quote above, infant formula milk and breastmilk are considered as 'food' and are often referred to as such in the interview quotes.

More of the respondents felt that water could be given alongside breast milk in the first six months of life while practicing 'exclusive breastfeeding', compared with those who said water should be withheld. Respondents who knew that water should be withheld during exclusive breastfeeding tended to have attained tertiary level of education, run a small/medium business enterprise, and not be from the Yoruba tribe.

5.4.5.2. Plans and beliefs: expressing breastmilk.

Few respondents reported plans to express milk, but in one case, it was planned because the mother believed that it would help her to exclusively breastfeed before introducing formula:

> *"I have a plan…I will be extracting breast since the baby is just two months so that s/he will be able to complete the first three months, after then, I will introduce the infant baby food (formula milk) …because I will have to go back to work."* (IDI_03_pregnant woman).

Perceptions of expressed breastmilk were predominantly negative; most held the view it was no longer fresh or could be contaminated. Some felt that it was wrong for a mother to leave her baby while she was still breastfeeding.

> *"Breastmilk directly from the breast is okay. Me putting it in a container and leaving it for some while, it can even contain germs or something …I can't do it. I don't even have plans for it."* (IDI_04_pregnant woman).

Women with a negative perception of expression tended to practice Islam and run a business; those who had a positive perception were more likely to be Christians and be in skilled or professional occupations.

5.4.5.3. Plans and beliefs: prelacteal feeds and medicines.

Some mothers planned to give water in addition to breastmilk, even before six months, which they felt would aid in digestion:

> *"Me I used to give my baby water o. Assuming now, let's say like me now if I eat I will drink water. So if the baby suck breast, at least she must drink water now."* (IDI_09_pregnant woman).

Fluids other than breast milk and prescribed medicines were introduced by some mothers which they thought would prevent or treat perceived or existent health conditions in the infant, ranging from herbs for tummy problems and body rash, to multivitamins, paracetamol, and in some cases, antibiotics. For example, a mother gave herbal medicine to her infant for rash; he was bathed with it, and given to drink thrice a week:

> "…*for rashes; he had rashes all over his body"* (IDI_018_recent mother).

One mother gave her infant 'prayer water' in the hope of preventing some illnesses**:**

> *{Y} "When I gave the breast[milk] I was giving her prayer water that makes children not to have that thing (convulsions). It is not ZamZam water*[§§§]*. It is from the priest…* (IDI_06_recent mother)

Perception of herbal concoctions was however mostly negative, due to concerns about composition and dosage:

[§§§] Sacred/holy water from Mecca (the city of Islamic pilgrimage) which has also been found to have proven health benefits by some scientists.

"…there is no measure… you don't really know the contents…all those things too they have side effects, so that's the reason why I don't really support herbal mixture." (IDI_03_pregnant woman).

5.4.5.4. Plans: infant formula

A few respondents planned to start their babies on or supplement with infant formula between 2 – 3 months; this was mostly influenced by the need to return to work/business:

"Hmm, I will just give her breast for 2 months, because I used to work...for 2 months with only breast. Then after that breast I'll be giving her baby food [formula milk], for six months. After that six months she'll be eating...anything, anything" (IDI_023_recent mother)

5.4.5.5. Plans and beliefs: complementary foods.

Most participants indicated that they planned to introduce some form of complementary foods at six months:

"… I will introduce other foods after six months but I will still keep breastfeeding them to make sure they are strong enough…" (IDI_08_pregnant woman).

Only a few mothers planned to introduce complementary foods before six months. A recent mother of one child, who planned to give pap in addition to breast milk before six months of age, delayed giving it following the advice of her neighbours.

> *{Y} "I thought that when I deliver, I would be giving her pap…but they (neighbours) said I should not give her because she is too small…What I planned is that when I deliver I will be giving her pap, and I did not tell it to another soul…I thought I would give her breast and give her pap"* (IDI_06_recent first-time mother).

The most common complementary food mentioned was pap, prepared in various consistencies; others included infant formula, cereals, semolina pudding, and soya milk. The majority of participants also planned to give local staples eaten at home, including popular 'swallows' such as Amala, Eba, and Semovita, with soups such as Ewedu; soft-boiled beans, often in pottage form; oily fish such as Titus, mashed potato or plantain, and eggs (see Table 5.8). Time of introduction ranged from six months to one year, with most planning to introduce very soft foods at about six months.

> *"I will start with 'Semo'. Yes, But I won't make it like the one adults eat, it will just be in form of pap, then I will give with infant milk…"* (IDI_03_pregnant woman).

> *"They said we can introduce beans. That we'd wash it before we cook it, we add Titus (fish), onions, a little pepper...Pap, we can give them pap and*

all these cold pap - that's 'Eko',[****] with vegetable, such as that."

(IDI_04_pregnant woman).

TABLE 5.8 Common local staples used for complementary feeding in Lagos State, Nigeria

Food item/ common name	Local name(s)/ examples	Description
Pap	Ogi, eko, agidi, koko	Gruel made from milled maize, guinea corn or sorghum, and in different consistencies from watery to soft to hard
Oily fish/crayfish	Titus fish	Added to soups or given after steaming; rich source of Omega fatty acids
Soya milk	Soyabean milk	Extract from plant-based soyabean
Swallows	Eba, amala, semo/ semolina/ semovita, etc	Starchy foods that accompany soups, which are swallowed in small balls after dipping into the soup
Soups	Ewedu, vegetable	Soups eaten alongside 'swallows', often made from vegetables, a tomato mix, and a protein source such as meat or fish
Beans	Steamed beans, beans pottage, ewa agoyin	Brown beans, cooked till soft with or without hull, or with a tomato sauce
Mashed staples	Plantains, potatoes, yams, rice	These are often boiled, mashed, and sometimes fortified with nutritious additives such as oily fish, crayfish, groundnut, vegetables
Boiled eggs		Boiled and given alone or with other foods as a rich source of protein
Fruits	Orange, banana	Usually given squeezed, mashed, or pulverised
Nuts	Groundnut, Beniseed	Usually added to other foods after grinding; a plant-based protein
Noodles	Instant noodles (e.g. Indomie), spaghetti	Easily available and commonly given in some homes, but poor source of nutrients

[****] *a solid form of pap*

Some respondents were unsure of what foods they would give as complementary foods, instead they planned to seek additional information from the HCP/clinic to make a decision:

> *"Ehn, if my baby reach six month now, I will come back for…I will come to clinic to come and take advice what am I going to give the baby"* (IDI_010_recent mother)

The belief that a woman who was not eating well could not breastfeed successfully due to insufficient milk was prevalent amongst mothers and key informants, and this became a cogent reason for them to introduce complementary foods earlier than six months of age.

> *"Ehn, maybe the mother did not have enough food or maybe did not eat well…then there will not be milk in that breast now…Hmmm. You know that it's the food that we eat that brings milk."* (IDI_012_pregnant woman).

5.4.5.6. Plans and beliefs: duration of breastfeeding.

When asked for how long they planned to breastfeed their babies overall, the responses ranged from between 12 months to more than 3 years, with the majority of respondents intending to discontinue breastfeeding between 12 and 18 months. The planned total duration of breastfeeding was seen to be influenced by several factors, but principally by the need of the mother to return to work (discussed later in social opportunity).

5.4.5.7. Experiences and emotional responses to infant feeding practices

Although not much information was elicited directly from mother on the feelings and emotional responses to EBF (automatic motivation), there were a few cases where such feelings were expressed, which were predominantly negative; these are discussed in this section.

Several respondents expressed difficulty, or a sense of frustration as regards one or more aspects of the feeding journey. A recent mother described her breastfeeding journey as challenging, because the son ate a lot and fed frequently:

> *Ah, it is not easy o. Even the six months sef, I see hell…The man (baby) can eat very well…He used to suck well…every time. I don`t use to sleep; suck, suck*... (IDI_020_RM)

A first-time mother felt pressured because her baby was not growing according to the expectations of her in-laws:

> *"Satisfied? No... because she's my first, and my parents and parents-in-law think that she's supposed to be a lot bigger than this…Because of that, there was this pressure to always…breastfeed her; like, I'm not giving her enough…"*

This respondent described exclusive breastfeeding as 'demanding':

> *"Demanding…Erm…, a lot of pressure. Pressure from people around…"*

She also found it frustrating to express her breastmilk because she felt so much pressure:

"…I was trying to express the milk, I think I was under stress, I practically didn't sleep that night, but it was frustrating expressing because it was not dropping." (IDI_02_RM)

Introduction of complementary foods was also a challenge for some mothers, with some infants perceived as being uncooperative. A few mothers felt frustrated (automatic motivation) that the child appeared to have gotten used to breastmilk, which served as negative motivation for subsequent feeding choices:

"The challenge is that…my baby is not eating unless I force him because I didn`t introduce the [complementary] food on time…I was thinking that ah if I have other baby, I will not do this exclusive again…it is giving me headache, because the baby don't want to eat" (IDI_020_RM)

A CHW mentioned that some mothers were impatient and sometimes unwilling to follow information given to them to help facilitate breastmilk flow.

"We tell them [mothers] that okay… feed your child with your breast milk at least for thirty minutes each…some of them are impatient to wait that minutes… most mothers would say they want to go to work, they don't have the time…(KII_05_CHW)

There were, however, some examples of positive emotional motivation expressed during the interviews about the feeding of their infants. Some mothers stated that they felt 'happy' or 'satisfied' with the growth of their child:

"Yes, I'm happy, very happy with her growth; she is growing well…" (IDI_01_RM)

Another mother claimed that although breastfeeding was initially stressful, with time it became a pleasurable experience:

"Ah, at first it (feeding journey) was a bit stressful because I was not used to the system, but with time I began to enjoy it" (IDI_017_RM)

Accounts from community members described under opportunity in Section 5.4.7.1. - Social attitudes towards breasts - may also highlight automatic motivators linked to women's feelings about breastfeeding. For example, elders described how some young women feel shy about breastfeeding in public. Some women may also have a negative emotional response or fear of becoming unattractive to their husbands/spouses if they hold the perception that breastfeeding 'flattens' their breasts, as described by elders.

5.4.6. Capability

According to Michie et al, capability refers to the physical and psychological capacity to carry out an activity, including a person's knowledge and skills that relate to the concerned activity.[171]

5.4.6.1. Physical Capability

This refers to the physical capacity to carry out specific infant feeding activities. There was a wide range of experiences amongst the participants with regards to their health and physical capability to breastfeed. These were related to the mother's health and mode of delivery, and the health of the infant, among others.

Physical capability: mothers' health

A wide range of health problems were listed by recent mothers as having affected their ability to breastfeed: mode of delivery, especially operative delivery; issues with lactation, raised blood pressure, bleeding (post-partum haemorrhage), and uterine cramps while breastfeeding. One mother's narrative paints a vivid picture of cramping during breastfeeding, which she felt was due to worm infestation:

> *"They call it worm. That worm with the baby, they used to play. So, if I want to give her breast, I will feel the thing, so I will just…(stop) to make the pain go down..."* (IDI_023, recent mother).

Some CHWs reported nipple problems as a barrier, particularly for first time mothers:

> *"Well it use to happen to mothers that...the baby is their first child…They will be complaining that their breast [milk] is not coming out…"* (KII_06_CHW)

While some mothers persevered with exclusive breastfeeding in the face of health challenges, others expressed that they would resort to giving the baby other foods if they felt too unwell:

> *"…my BP was...yes, it went up; so then I couldn't produce so much as I planned...During then, I still do exclusive…"* (IDI_01_recent mother),

One mother reported having post-partum depression, which she felt made breastfeeding more challenging.

Physical capability: newborn health

Health issues in the newborn were also identified as having a negative impact, including tongue tie, infections (sepsis), and diarrhoea. For one mother, infection hindered the ability of her baby to suck:

> *"…we later discovered she had an infection…I attempted…she put her mouth to the breast, but she wasn't able to suck"* (IDI_02_recent mother).

A first-time mother who delivered at home was able to overcome the same problem by expressing:

> *{Y} "When I saw that baby was not drinking it, she could not suck, so I pressed it (breastmilk) out into a feeder, I gave her, then she drank…I continued giving her…she sucked, and then it flowed.* (IDI_06_recent mother)

5.4.6.2. Psychological Capability

The domain of psychological capability refers to an individual's psychological capacity to engage in the activity concerned. It is about their knowledge, confidence, memory; e.g. required knowledge and mental capacity.[171,191]

This section reports the knowledge and perception of pregnant women/recent mothers about infant feeding practices: breastfeeding initiation, exclusive breastfeeding and colostrum, benefits of breastfeeding, timing and types of complementary feeding, and total duration of breastfeeding, among others. Data often includes evidence of gaps in knowledge, or misinformation. There is however a strong overlap, and these issues could either fall under the domains of 'knowledge' (capability), 'misinformation' (opportunity), or 'beliefs' (motivation), depending on the context and interpretation.

Infant feeding knowledge: breastfeeding initiation and colostrum

There was some uncertainty about the ideal timing for breastfeeding initiation, though there was a common perception that not all mothers would lactate immediately. Rather than put baby to breast to initiate the flow, most waited for the milk to start flowing before putting the baby to breast.

> *"…this is my first time and some people do say maybe two or three days after they delivered, that was when the breast milk will come…actually I*

don't know, maybe my own case would be like that or not." (IDI_04_pregnant woman).

Most participants were aware of colostrum being the first milk or being different from the regular milk. However, the perception varied, with the majority stating that it was beneficial for the baby, while some felt it was not, with others unsure. Reasons for negative perceptions included that it was dirty, sour, or unfit for baby to take. No patterns were established between those with positive and negative perceptions about colostrum.

"The doctor said it (colostrum) is very good, it's part of the things that would boost out his (baby's) organs..." (IDI_017_recent mother).

"I don`t like the colour…I feel it is dirty because of the nipple... I don`t know about it but I don`t like the colour." (IDI_019_recent mother)

Knowledge: benefits of breastfeeding and exclusive breastfeeding

Mothers knew of many benefits of breastfeeding, including strong healthy babies, promotion of brain development, weight gain and growth, disease prevention, low cost, family planning, and improvement in baby wellbeing.

"…it (exclusive breastfeeding) is very good, cheap... as in there is no telling of 'Okay, I want to buy baby milk today oh!'...the baby will be healthy…there would be no sickness, when the baby now teeth there will be no problem. It is very good in any way." (IDI_013_pregnant woman)

When asked about the appropriate food for their babies, most mothers/mothers-to-be indicated good understanding of the advice to exclusively breastfeed for six months.

> *"…the time I gave birth to the second born when I took her to the clinic, they said we should not give baby water and food till 6 months; I now followed the instruction"* (IDI_05_recent mother)

Most mothers knew that exclusive breastfeeding was best for baby:

> *"You know breast milk is the best... breast milk is even good for the baby's brain; it makes it develop properly…"* (IDI_03_pregnant woman).

There were however some mothers who erroneously thought that exclusive breastfeeding normally included water:

> *"I think it's the normal thing; they told us in clinic that it's six months we have to breastfeed our baby without anything, only water and breast"* (IDI_015_recent mother)

Knowledge: expressed breastmilk

Most respondents were aware of expressing breastmilk, although perceptions were mostly negative. A female participant from one of the focus groups who had a positive attitude towards breastmilk expression, however had some level of misinformation about its storage:

> *"It's very hygienic…like some working mothers when they want to go work they put the breastmilk inside the feeder and put it inside the fridge not*

inside freezer, but when they put it inside fridge it will remain fresh and it can stay for one week…" (FGD4_07)

Knowledge: timing and types of complementary foods

Most mothers had received the information that the right time to introduce complementary foods was at six months of age:

"According to our nurses here, they said for the first six months, you have to give the baby breast…So after six months, so you can give her anything." (IDI_09_pregnant woman)

There were other mothers/mothers-to-be, however, who felt that some foods could be introduced earlier than six months (a description of some commonly used complementary foods in Lagos, Nigeria can be found in Table 5.8):

"They say that semo[††††] *too is good for baby, like three months, six months…they will now do it like ogi (pap)…it's good."* (IDI_012_pregnant woman)

On the other hand, a few women thought that the child could continue breast milk alone beyond six months and were not too sure of the exact timing for complementary food introduction.

[††††] *a type of 'swallow'*

"I can breastfeed the baby up till let me just say nine months very well, before you give him or her any other food…We can start that from seven months" (IDI_022_pregnant woman).

Participants had varying perceptions about infant formula; some expressed their reservations about its use in early infancy, especially if the mother had the capacity to breastfeed.

"If the mother is okay I don't think there's anything that would delay the mother not to breastfeed the baby, so I don't think you should give baby infant formula from birth…You know some people they prefer the milk; the milk make their baby big...they want a big baby, and...it's not most big baby that are healthy…And it's not by giving them formula that makes your baby healthy" (IDI_016_recent mother)

One participant mentioned that she was taught that infant formula was best to give infants as a complementary food:

"…Some people used to give their baby ogi [pap], some people use to do semo, …but that baby food [infant formula] is the best that me I know…they've already taught us that that baby food is the best" (IDI_012_pregnant woman).

Some participants would introduce other complementary feeds at six months, rather than infant formula:

"It [infant formula] is good too, but me I can't give my baby, because I've already planned giving my baby breastfeeding for six months, then after six months, I'd just give him or her food that would just add to the strength and the growth of my baby. Not all these formula" (IDI_04_recent mother)

Knowledge: total breastfeeding duration

Most women respondents felt it was ideal to discontinue breastfeeding between the ages of 12 to 18 months, by which time complementary feeding and some level of independence would have been established.

"A year and two months. When the baby has started walking…I feel they are strong then…" (IDI_08_pregnant woman)

Some felt that breastmilk was not important after a certain age or milestone, or did not provide nourishment after a certain age:

"…I do hear people saying 'Ahh, she is not gaining anything from this breastmilk!'…Yes, when a baby is up to a year and six months that the baby will not see anything good in it like when she was a baby…she would just be sucking my own nourishing part…" (IDI_016_recent mother)

5.4.7. Opportunity

Opportunity is defined as all the factors that lie outside an individual that make a particular behaviour possible or prompt/facilitate it.[171] It can be sub-divided into physical and social

components. The physical (environmental) component of this domain pertains to the opportunity afforded by the environment for the behaviour of concern, and includes resources, time, and the physical environment, such as the availability of information and breastfeeding support services, creches, etc.[171,175,191] Social opportunity refers to external factors resulting from the prevalent socio-cultural environment, which influences the thinking and mindset of the people; these include interpersonal influences, social norms, ethnic and religious influences.[171]

Although in the COM-B framework Michie et al have further subdivided the opportunity component into physical and social opportunity, Thomson et al in their breastfeeding study[176] found the separation less useful and treated opportunity as a whole. This blurring of boundaries between the subsets of opportunity was also observed in the data I collected; therefore, findings are presented for opportunity as a whole, except where the distinction is noteworthy.

5.4.7.1. Cultural, ethnic and faith influences on infant feeding

A strong cultural ethos prevailed in the communities studied, and was perceived to influence breastfeeding, as expressed by many participants. Some thought these influences were largely religious, whilst others felt they were mainly cultural; another opinion was that the major issue preventing the adoption of optimal infant feeding practices was not culture, but ignorance.

{Y} "For some, it is culture and for some, there is an inner will or personal decision, and this makes them to still act in that way." (FGD1_CommLdrs_002)

{Y} "It is not cultural; it is ignorance, about not knowing the right thing to do…" (FGD1_CommLdrs_007)

Local norms and social expectations

In this section, the norms and social expectations of the people and the communities they reside in or come from are described. A social norm (or local norm, cultural norm, social expectation) is generally regarded as an unwritten rule that governs acceptable behaviour in a community or society.[192]

Several social norms/expectations surrounding infant feeding practices were identified by study participants. The study communities were situated in Yorubaland, thus, most of the cultural norms expressed here pertain to the Yorubas; a few cultural norms of other ethnic groups encountered in this study are discussed briefly also.

Cultural acceptability of breastfeeding

The practice of breastfeeding was said to be widely acceptable in the study communities; respondents stated that most women would breastfeed their child at some point, except where there were issues with lactation, or ill-health in the mother or baby.

{Y} "There is no one that will not give breastmilk. God forbid bad thing…If the mother is not sick, there is no place where the child will not be breastfed" (FGD2_OlderWomen_03).

Some members of the wider community described what they perceived as benefits of breastfeeding:

"The way I view it is that breastfeeding makes the children looks healthier and it makes the mother to look prettier and it also saves the fathers pocket" (FGD4_07, male CDA member).

However, some suggested that a few mothers did not conform to the cultural norm of breastfeeding, mainly due to some pressures of modern life, such as the need to return to work, the desire to keep a good figure, or to even show off:

"…our mothers will say we mothers of nowadays don't breastfeed our baby again, they do shakara [pose/make themselves attractive]" (IDI_08_pregnant woman).

Older women in one of the discussions observed that some young ladies were not interested in breastfeeding their children, and rather wanted their freedom, or were simply lazy to breastfeed:

{Y} "They are lazy, lazy. They are following men!" (FGD6_01).

Practices relating to breastfeeding initiation:

The practice of 'washing' the breasts before initiating breastfeeding was mentioned by several respondents; for some it was important and non-negotiable. It was conducted in different ways, by different people, and with different solvents including water, spirit, and herbal concoctions. Reasons for this practice included to help breastmilk flow, as well as to keep the breasts clean so the baby would accept the breastmilk.

> *"…There are some breasts like that, that do not bring out water [milk]. You know in Yoruba land, they will say that they want to go and wash the breast to bring out water…those people that use to sell agbo [herbal concoction], know what to do to make the breast to come…"* (IDI_012_pregnant woman)

The need to clean their breasts before commencing breastfeeding sometimes resulted in significant delays to breastfeeding initiation.

Some participants mentioned traditional ways deployed to promote lactation:

> *"What I know in our native land, if the breast[milk] is not coming out [flowing], simple; you buy palm wine and give the person, then it will start to come out"* (FGD4_01_male community leader)

Practices relating to Colostrum:

Focus group participants revealed various perceptions of what influences the giving of colostrum to newborns, which was seen by some as more of a cultural rather than religious issue:

> *"…that issue of colostrum I don't think it is religious. {Y} it is traditional…we have known it to be like this from time."*

Based on the cultural undertones, they claimed some still discard colostrum:

> *{Y} "they wash it[colostrum] away"* (FGD1_001).

Their perception was predominantly negative, as most would not advise/support women to give colostrum to their baby, although a few respondents knew of its benefits:

> *"I don't think they (other women) reject it; me myself I don't reject it because we have been taught in the hospital, so the first milk that come out is very important for the baby, and nutritious; we must not miss it."* (FGD_04_07_female community member)

On reasons why colostrum is perceived negatively, a participant from the Ibo tribe gave some insight:

> *"…that first…milk some will say that it's not the same thing, some of them is bitter, that when you give a child, the child might die …some will press it out even before they start breastfeeding the child."* (FGD1_CommLdrs_012).

This indicates that some feel the milk is unsuitable for the infant and may cause harm, although respondents attested to a changing trend in the community with increasing knowledge:

> *"…now everything has changed...doctors even everywhere they're advising that first breastmilk is very very good."* (FGD1_CommLdrs_012)

Some discarded the colostrum in a special way, *viz*:

> *"…they pour the first breastmilk into the ashes so that the milk will quickly become white"* (FGD6_06_older woman).

A CHW attested to the support given to mothers at her centre to give colostrum to their babies:

> *"…we believe in that first milk that will come out of the baby…to be a kind of nutrient that is so important for the baby's body. So we might help the mother to carry the baby and put…baby to the breast*" (KII_06_CHW)

This health worker however noted that some TBAs still advised their clients not to give colostrum, because they felt it could be harmful.

Breastfeeding practices and exclusivity

This section reports the breastfeeding practices prevalent in the study communities. There was overlap with what has been reported from women participants in previous sections,

though new information was also provided. There were social norms that supported exclusivity, whilst others discouraged it. Several respondents experienced pressure from significant others not to exclusively breastfeed their babies.

The pressure to introduce water earlier than six months was prevalent, and mostly supported by the thought that breast milk would not be enough, the baby would be thirsty, or the baby or mother needed strength:

> *"In our olden days, hmmm...our mummies they used to say that giving a baby breast...is not okay because the baby may not talk that she's thirsty and the water inside the breast (breastmilk) would not contain (fill) them, so if they should give them water they will be okay and they will sleep very well."* (IDI_014_pregnant woman).

The perception that exclusivity could be physically taxing on the mother, or that infants would not be able to adapt to eating adult foods if not introduced very early, were other reasons not to breastfeed exclusively for six months:

> *{Y} "Some people said so, that I should be giving my baby real food, because when it is time for her to eat, s/he won't accept the food again…"* (IDI_07_recent mother).

Some ethnic groups were said to have strong cultural beliefs that tended to promote non-exclusive breastfeeding, such as the Egun:

"...they do give breastmilk, but…they have their kind of feeds, they have their herbs, they have this and that that they take, so…" (FGD1_CommLdrs_005).

Respondents from Ilaje, a subset of the Yoruba ethnic group spoke about the cultural practice of giving water to newborns, similar to that of the Egun culture:

{Y} *"In our place...I am from Ilaje (waterside community) ...when a child is born, as they bathe the child, they give water; when they give the water and do every other thing they will do for the child, s/he will sleep. It is when s/he wakes up that the mother will breastfeed; so, in my place we prefer to give water"* (FGD2_OlderWomen_03).

A participant from an FGD with older women gave insight into why water was so commonly given to newborns amongst the Hausa community:

{Y}["They have told us to give our babies breastmilk only, no water. It is a good thing, it makes babies grow well, but most of us Hausas do not accept this. They say that if the babies do not drink water, how will the breastmilk be enough for them? …Some say that if they don't give water, maybe the child would die before six months, and if that happens how will they explain to God? (FGD2_OlderWomen_01).

The general opinion about those of Ibo ethnicity was that they tended to breastfeed their babies exclusively:

"Okay for my culture (Ibo), the exclusive...I will say that they encourage it too…" (IDI_08_pregnant woman).

Local practices and prelacteal feeds:

Traditional mixtures and medical practices e.g., herbal concoctions, bodily incisions; were reportedly administered for the perceived health and safety of the child. Some mentioned water being given commonly as a prelacteal feed:

{Y} "…they will first of all give the baby water to drink for about one week. This happens because if the mothers' breast milk does not flow in time, they feel that they should give water so that there will be something in the baby's tummy (FGD1_CommLdrs_011).

Other prelacteal feeds were identified, some being more prevalent in certain parts of the country:

"…it (honey) is common here, and then…date fruit...I think some Yorubas do it too, but it is more common from the North (of Nigeria)" (FGD1_CommLdrs_001).

Some were given routinely, while others were given ceremonially. A CHW listed substances administered during naming ceremonies including palm oil, pepper, and anointing oil. Prayer water was given to some infants to prevent illness.

Expressed breast milk:

Expressing breast milk was reportedly not common, and seen as alien to most participating ethnic groups.

> "*That one [expressing] is not common…for as long as I've been here, I've not seen one that is expressing breast milk for their (babies)...*" (FGD1_009, CHW).

For the few who had come across breastmilk expression, it was usually women in managerial or professional occupations:

> *"…[Y] It is not common, though some do it. Maybe those working with banks, or those working for the government…]* (FGD1_CommLdrs_002)

In most of the focus groups, there were arguments for and against the expression of breast milk, with negative sentiments predominating. Just as with the women respondents, there was concern about milk getting sour or contaminated.

> *"…My fear is this, the milk could be polluted…when the mother brings the milk out very fresh, where does she put it, who keeps it, where is it kept? …So, I personally will not support"* (FGD4_CommLdrs_05)

Some of those who supported breast milk expression had seen successful examples of those who had expressed in the past.

> *"You may not support it but it is good because the baby will not cry until the mother comes back and it will not sour. I have seen examples…where*

they did such a thing, and nothing happen(ed) to the milk" (FGD4_CommLdrs_01)

Use of infant formula:

Infant formula was reported to be losing popularity. One of the stated reasons was that most brands were not affordable for many, and some preferred to give pap with regular powdered milk added, to save money:

> *"Actually, about that infant formula, some that can use it are using it; it is too expensive…N1800*[‡‡‡‡]*, N2500 (laughs); within three days the baby has finished the food so it's only few people that can afford it (that) are buying it…"* (FGD1_CommLdrs_008).

Formula was mentioned as important in some settings, seen sometimes as a status symbol, or used for supplementation:

> *"Ehn like some mothers now…they will say 'ah the baby is eating very much' and they will go and buy food (infant formula) for the baby."* (IDI_09_pregnant woman)

[‡‡‡‡] N stands for Naira, the local currency in Nigeria

Introduction of complementary feeds:

Early introduction of complementary foods was linked to beliefs about the benefits, such as that it makes the baby 'strong', breast milk alone was not enough, or to ensure the baby becomes independent from the mother. These beliefs were reported to be particularly prevalent among some groups, such as the Egun, Ilajes, and Kwales:

> *"Where I come from (Kwale, Delta State), they believe that after three months, you should start feeding that baby with either light pap or baby food and you must give the baby water from birth…"* (IDI_019_recent mother).

One of the reasons given for the early introduction in the Egun[§§§§] community was to free the mother to return to trade/work:

> *[Y] "…they quickly introduce (other foods) ...because they also want to quickly return to their hustle once the child is satisfied…* (FGD1_CommLdrs_00*).

While Ibo communities were perceived to be more likely to breastfeed exclusively, it was suggested that culturally, complementary foods were introduced early on:

> *"In my culture...we feed this pap...they do it very light for new babies…"* (FGD1_CommLdrs_012).

[§§§§] The Eguns are an ethnic group predominant in the Western part of Lagos state and extending into the neighbouring Benin Republic. Most of their settlements in Lagos state are riverine, and one of their major occupations is fishing.

Mothers with poor nutrition were often encouraged to give other foods, due to the belief that her breastmilk would not be adequate:

> *"…Some of them will say, 'me that I didn't eat well, I'm hungry, how will I breastfeed a baby…I can't'. Some of them will even say that they are feeling dizzy."* (KII_06, CHW)

Some other beliefs were mentioned by a few respondents as negatively impacting on breastfeeding duration, including the woman getting pregnant again, or in a deviant case, having had sex:

> "*…that one cause(d) my wife not to give that baby breastfeeding, because the breast have already been contaminated by me meeting (sleeping with) her"* (FGD5_02, male community member).

Influence of faith on infant feeding practices

In this study there were few direct references to God in their considerations for infant feeding. However, some participants stated that the Islamic faith gave guidance on the importance of breastfeeding, and a long duration of breastfeeding:

> *"…Islam says, 'If you breastfeed a child, the child will have a soft heart of mercy for you'…It's because I am also getting deeper in Islam that I began to know the importance of breastfeeding for two years, because none of my other children has ever been breastfed for that long before."* (IDI_018_recent mother).

A community leader made a similar assertion:

> *"We Moslem believe we should be able to breastfeed your child for about two years plus"* (KII_08_CommLdr).

There was no direct reference to the Bible considering infant feeding choices. However, a few participants indicated that their local church encouraged exclusive breastfeeding:

> *"I just want to follow what they said…in our church too…they say we should not be giving her water and food till six months, and it will help the baby"* (IDI_05_recent mother)

Social attitudes towards breasts

Community leaders and other key informants suggested a shift in perceptions and behaviour, with an increasing number of mothers and their spouses concerned about a perceived negative effect of breastfeeding on their breasts.

> *"…do I say that especially ladies are becoming aware...that awareness started recently...that when you do that your breast will become flat (laughter). I don't think people in the city will want that; you see your wife, everything flat…(general laughter)!"* (FGD4_CommLdrs_05)

A few participants felt that some mothers were shy of breastfeeding in public places:

> *"…the young ladies now, at times they find it very difficult to breastfeed that child because they are feeling shy, which is not proper"* (FGD4_CommLdrs_03)

Conversely, some respondents (particularly older women) suggested that the younger generation were less inhibited, and unduly exposed themselves to the public, while not caring about proper infant feeding. They linked this behaviour to some level of irresponsibility on the part of the women, which in turn impacted negatively on the care of the infant.

> {Y} *"…she doesn't want to breastfeed the child, so she would just express the milk out…She wants her freedom!* (FGD06_03_older women)

5.4.7.2. Information and support for breastfeeding

Breastfeeding information: Health Care Professionals

The health care facility was by far the most common source of information, with the majority citing it as the preferred place to access information about breastfeeding. Some women stated that they were given information at the health facility that promoted exclusive breastfeeding for the first six months.

Some women attributed their decision to breastfeed exclusively to the information received from the health facility:

> *"This is my first child, so when we came to antenatal, they told us that…exclusive breastfeeding for six months is the best; and I did six months exclusive before he started eating."* (IDI_020_recent mother)

Both public and private hospitals were cited as providing information that supported breastfeeding, though in one case a first-time mother did not recall receiving any information on infant feeding from the private hospital where she received antenatal care.

Most mothers were happy with the information received from health facilities:

> *"When I go to immunization…I like them, they do teach us things…on how to feed your baby, the food to give and the ones not to give. So if I need to know anything, when I go there, when they start teaching, they will still tell us to ask questions, so I do ask…I love that place."* (IDI_019_recent mother)

A few of the respondents suggested that some HCPs were not convinced about the information they passed across, and sometimes covertly gave contrary advice:

> *"Most of our nurses, they use to say that…when you give birth, give only breast; but if you used to [know] them very well…they give water. When you give your baby breast finish, you use water to step the breast (milk) down."* (IDI_011_pregnant woman).

Support for different stages of the feeding journey

Health care workers, particularly doctors and nurses, were reportedly quite involved in providing support at different stages of the feeding journey:

> *"At first nothing came out, but they (HCPs) said I should continue to give him (breastmilk) like that, so I continued…"* (IDI_018_recent mother).

Some HCPs encouraged active lactation initiation, but were quick to give water when the mother did not produce much milk:

> "*Yes, the nurse told me I should just put the breast in her mouth, that she will suck, but I did same and...it was coming as drop…later, the nurse came, to press the...breast…the something was not that much, so she said I should give her water"* (IDI_01_recent mother).

Operative delivery was an area where respondents experienced varying support from health staff, with the majority having breastfeeding initiation delayed; the opinion that the baby could not be breastfed immediately due to the surgical intervention was elicited from some mothers and health care workers. Even though this mother said she had started lactating from the day she delivered, the HCPs placed the infant on formula for the duration of her hospital admission:

> *"…when I gave birth to her it was through C/S (caesarean section), you know I would not be able to feed her immediately, so when she was in baby's ward I think they were…feeding her with [named formula brand] …for like five days…(but) the very first day I gave birth the milk started flowing…the breast is flowing naturally"* (IDI_016_recent mother).

One mother however had a different experience, as the health workers helped to express her milk for her baby:

{Y} "*I had an operation, caesarean section, so after the surgery…After some time they asked me to express breastmilk into a cup, which I did, then they took it to the room where my baby was"* (IDI_07_recent mother).

The support provided by the HCP, coupled with the disposition of the mother, impacted on breastfeeding practices after a surgical delivery.

Many women reported that they received HCP support for exclusive breastfeeding and appropriate complementary feeding, mainly through the provision of information. Some respondents said they adopted exclusive breastfeeding without water, or did not give prelacteal feeds, because of information received from the HCP/clinic:

"They said inside that breast milk there is water there, so no need of giving water again…" (IDI_019_recent mother).

Only one woman commented on the attitude of hospital staff towards feeding bottles, which is in line with the Baby Friendly Hospital Initiative to make the environment less conducive for formula feeding:

"…In the health centres/clinics, they [nurses] don't even want to see (feeding) bottles…" (IDI_02_recent mother)

Some women however did not feel they received necessary support or encountered HCPs whose practices did not promote exclusive breastfeeding/early initiation. This was more common amongst first-time mothers:

> *"I didn't get the best treatment during antenatal. I remember going to the hospital; I got there and asked, 'what am I supposed to do?' Especially for first-time mothers, it can be very...if the people in the antenatal had prepared me for all that, and now...I heard that you could even prepare to lactate?"* (IDI_02_recent mother)

Shortage of staff in some centres meant that HCPs were sometimes unable to give optimal support.

> *"Sometimes, because of the number of people that are attending antenatal, they will just do everything 'pa-pa-pa' [quickly]…you know they will want to kind of make everything snappy...It is not as if that they are not willing but…they have to be time-conscious…"* (IDI_03_pregnant woman)

One HCP respondent, a nurse, suggested that some of her colleagues felt that exclusive breastfeeding made no difference and was not practicable, especially for working mothers using expressed milk:

> *"…some of them will still tell you even as a nurse that…'all those things are just new inventions, and there's no difference…we are just starving them for nothing and you don't know whether during those period you*

left them in the crèche with the expressed milk, the caregivers give them water or anything that nobody will tell you'" (IDI_08_pregnant woman)

A few respondents reported antibiotics being prescribed for their baby after delivery, even though the baby was not ill:

"...when the baby is born…the doctor…they wrote it for me that I should buy it and give my baby…For five days. Ampiclox, yes." (IDI_013_pregnant woman).

Some community leaders however felt that routine antibiotic prescribing after birth was less prevalent than in the past.

Among women who made remarks about HCP attitudes in providing support for breastfeeding, almost equal numbers perceived them as either negative or positive. Professionals were more likely to perceive HCP attitude towards providing breastfeeding support as negative, compared with business owners and petty traders, who reported attitudes as positive.

Community Health Structures

WDC members were active in one of the study communities and stated that their activities had increased patronage of the community members at the PHC centre, increased their trust in the health system, and improved their knowledge about breastfeeding and other issues:

"…the feeding pattern...for the past two years or so now it has changed, unlike before people believe that if they give their child pap, and then they won't breastfeed more than 2-3 times a day." (FGD1_08, WDC Member)

"…there is difference in the breastfeeding, there has been improvement… They are all coming to the health centre now, and they are being taught how to attach and position the child…so now they attach the child better to the breast" (FGD1_07, WDC Member)

A few mothers mentioned that WDC members provided breastfeeding support:

"Hmm…we have some people that does that. They are called Ward Health Committee[*****]*, so they do encourage mothers to do exclusive…"* (IDI_01_recent mother).

Traditional Birth Attendants (TBA) and Home Birthing Practices

All three women respondents who delivered at a TBA's facility, and one who delivered at home, also accessed care at the health facility, either for antenatal or postnatal care and child welfare services.

One respondent reported little or no support for breastfeeding initiation or exclusivity by the TBA after delivery:

[*****] Synonymous with Ward Development Committee (WDC)

"When I delivered him finish, so…they bathe the baby, they do everything for her…My baby is second seat, I stay on first bed…my mummy carry her. When she was crying sef no way to...I was just looking at her...because my breast[milk] is not coming out…They gave her only water" (IDI_023_recent mother).

The baby received only water up to the third day of life, when the interview was conducted; the need to 'wash' mother's breasts, and other procedures for baby, hindered early initiation.

Another mother delivered by a TBA did not initiate breastfeeding till the second day, when milk began to flow:

"I delivered…I did not give her breast that moment…the next day my breast started bringing out water" (IDI_05_recent mother)

One respondent said her baby was put to breast soon after birth, and was not given any prelacteal feeds by the TBA:

{Y}"…about 30 minutes after delivery"] (IDI_015_recent mother)

This shows that mothers received varying support from TBAs at delivery for breastfeeding initiation and exclusivity; however, mother's knowledge of and motivation to exclusively breastfeed appeared to influence practices such as the giving of prelacteal feeds.

Focus group respondents gave additional insight into TBA feeding practices, including use of herbs and avoidance of colostrum:

> *"…some give herbs, concoction…they encourage them to give them herbs instead of all these drugs, that they want to flush the child's system...Some even tell them that that colostrum...that it is not good, it is an infection…"* (FGD1_009, Female WDC Member).

However, one of the TBAs interviewed stated that they advise mothers to give the first milk to their newborns:

> *{Y} "They give it to their babies…Immediately they put to bed, once the child cries and the mother is okay, I say 'come on, carry your child and breastfeed him/her'…. The first milk is very important…"* (KII_03, TBA)

Another TBA emphasized breastfeeding, although she was equivocal about her opinion on adding water. She claimed that her clients know that they must give their baby breast milk, and do not question her authority:

> {Y*} "I tell all those who deliver in this place that they should breastfeed; if they don't, I will quarrel with them, they know me for that…* (KII_07_TBA).

Both TBAs expressed that washing of the breasts was an important activity prior to breastfeeding initiation.

Those who delivered with a TBA appeared more likely to trust the instruction of a family member, in-law, or religious organization; when compared with those who delivered at a health facility, who were more likely to trust the counsel of the health staff/hospital.

The media

A handful of respondents cited the internet as a place where they obtained information on infant feeding practices. However, they felt that one should be careful, due to misinformation and information overload:

> *"It (the internet) has been helpful, but I just do it with caution, like I don't take everything hook, line and sinker. They tell you, even after their write-ups they tell you that still go to your paediatrician..."* (IDI_02_recent mother)

Television was only mentioned as a source by one respondent, and no women cited the radio, or print media such as newspapers and books.

5.4.7.3. Family and friends (information, support, social role/power) and role of wider culture

Husbands

The husband was most frequently named by respondents as being supportive, by almost three-quarters of women. This included supporting the advice not to give water before six months.

"…he supported me. He was even the one that encouraged me at a time I say I am tired of doing it (exclusive breastfeeding); he say me I have started it that I must finish it." (IDI_020_recent mother)

Economic benefits of breastfeeding were mentioned as one reason for the husband's support of exclusive breastfeeding:

"Ah, [my husband] highly supported…it is economical!" (IDI_01_recent mother).

A few respondents received active support in ways such as help with house chores, though others complained of lack of support in this area. Some mothers reported receiving financial support.

"…Maybe I'm cooking now, baby is crying, he'll tell me to stop cooking, he'll continue with the work and I would go and attend the baby. He's my helper now..." (IDI_011_pregnant woman)

Occasionally, husbands' support was perceived negatively, for example where a woman planned to introduce infant formula and return to work, contrary to her husband's wishes:

"…he said 'No'; that I will have to do exclusive breastfeeding till like six months.'" (IDI_03_pregnant woman).

The need for financial independence was so important to this mother that she spurned her husband's support for exclusive breastfeeding.

Others encouraged their wives to continue breastfeeding even after the introduction of complementary feeds:

> *"…my husband…He encourages me…Even to feed her with my breast till two years"* (IDI_016_recent mother).

Male FGD participants described their ideal spousal breastfeeding support, which included showing concern for wife's wellbeing and helping with household chores:

> {Y} *"We husbands should also help in the house; help to carry the bucket when she is going to bathe, you assist her so she is relieved"* (FGD3_Men_05).

Some FGD participants however posited that there were husbands unwilling to support their breastfeeding wives financially, or with chores; and some were absentee fathers.

> *"…most city men these days, they don't like assisting their wives…"* (FGD4_CommLdrs_04).

Other family members – mothers, mothers-in-law, sisters, and other female relatives

Mothers and mothers-in-law were seen as a source of support by up to a third of women. From the focus groups, it was apparent that both mother and mother-in-law were very influential in feeding choices, particularly the mother-in-law. They were often perceived as imposing their own ideas/methods on the care of their grandchild. The custom where the maternal or paternal grandmother comes to stay for a few months was common across communities:

{Y} "Her mother-in-law must be there, for about two to three months…that's how we do in the Nupe tribe. (KII_01_CommLdr, Male).

Some gave support in the form of advice and encouragement, others by hands-on care of the baby:

"They support by...giving their own experience to the woman because they have been there before…till they go they will be the one that will be baffing [bathing] the baby" (FGD5_Men_07).

Mother or mother-in-law reportedly encouraged continued breastfeeding in some cases, and a few respondents claimed to have their mother's support in whatever decision they took about their baby's welfare. Some mothers-in-law supported choice; one supported her daughter-in-law's plans not to breastfeed exclusively and to return to work, even against the husband's desire:

"…it was my mother-in-law that intervened and she asked him to allow me to go [to work], if not for my mother-in-law, I would have had to stay (home) till 6 months" (IDI_03_pregnant woman).

On the other hand, a few respondents felt there was excessive pressure from female relatives to breastfeed, even when it was not convenient:

"Yeah…for every cry...for whoever was around, they just go 'ah, just breastfeed, breastfeed her, breastfeed her'…" (IDI_02_recent mother).

Sisters and other older relatives were also mentioned as information sources, especially those that had children themselves. They were trusted because of their experience, and respondents expressed satisfaction with their support:

> *"…my elder sister. Far away…phone calls every minute, and then she was in the hospital some of the time… Because she (my sister) has three kids…so I just feel, okay, first-hand information..."* (IDI_02_recent mother).

The presence of support helped one respondent to continue breastfeeding despite her admission to hospital:

> {Y*} "…Though I was sick, but while I was in the hospital they (sisters) used to bring my baby to me."]* (IDI_07_recent mother).

While there were accounts of negative influences from aunties and other female relatives, the majority of family barriers to exclusive breastfeeding related to mothers-in-law:

> *"[My mother-in-law] disagreed with exclusive breastfeeding, because my first child, she insisted that I should give water…I tried to explain to her but she insisted while the baby is on her hands, I have to give that one water…"* (IDI_01_recent mother).

In some cases, women 'pretended' to carry out the mother-in-law's wishes to avoid conflict; others went against their personal desires and plans for baby to avoid conflict within the family:

"If you don't do it [what the mother-in-law says], your husband will come, trouble will start in the house. So, most mothers, it's not that they want to go with what their mother-in-law said, it is practical…" (FGD1CommLders_005, Female).

A culture where the in-laws are held in high esteem and not to be questioned was highlighted:

"…... our culture demands respect…: so, it is very difficult for the husband to restrict either the mother or the siblings not to interfere…" (FGD3Men_03).

There were divergent views from older women about their role, with some supportive of mothers' decisions:

{Y} "…What the mother of the baby says is what we follow…we only came to help…we cannot say we are the mother-in-law…she is the owner of the baby and whatever she feels like is what we will do." (FGD2_OlderWomen_03).

Others expected to have more control:

{Y} *"I am the one to take care of the baby; she is going to her own work, so she…cannot say this is what she wants; she must take my instructions, she has gone to her own work (FGD2_OlderWomen_04)*

Wider community (neighbours, community members/groups, others)

Some participants expressed that their infant feeding practices were positively influenced by other community members, such as clients, boss, or neighbour:

> *"…I work[ed] with one woman before…the woman…breastfeed the baby very well, then I now see…that ah ah, the baby is okay…so I now say that okay, if me too have baby, I will breastfeed my baby very very well because my baby will be okay, because the brain too will be sharp then the body too will be okay."* (IDI_010_recent mother)

Activities of the WDC and church community were occasionally mentioned as positive and supportive influences.

The influence was also sometimes negative, promoting or reinforcing sub-optimal practices:

> *"Like the compound I stayed, they discouraged me from doing exclusive…but me I did not mind them, I was just doing my own…They were accusing me that…I am lean, so tattered…that it is because I don`t have money to buy my baby`s milk that is why I am doing exclusive..."* (IDI_020_recent mother).

A CHW had this to say about some of her clients:

> *"Yes, some of them they will say, 'ah, my neighbour said that when I was giving my baby breast…I use to give water and nothing happened.' They*

believe that since nothing happened to that neighbour's child, nothing can happen to theirs…" (KII_06_CHW).

There were women who felt pressured to breastfeed their babies in public.

"Sometimes when you are in a public bus the mothers will be shouting on you that the baby is crying, what are (you) hiding for your breast; breastfeed the baby!" (IDI_08_pregnant woman).

This was corroborated by a CHW from a slightly different perspective:

"We see mothers breastfeeding in the bus, so I don't think there's any, there's any barrier to that when it comes to social support...Even if we have any baby in the bus crying, people will say 'breastfeed your baby now', so that one too {chuckles}". (KII_05_CHW)

5.4.7.4. Employment/vocation/economic factors and influence on infant feeding practices

This section explores issues pertaining to respondents' means of livelihood, such as whether (or not) a baby can go with mother to work, issues with childcare, work policies on maternity leave, and financial status/poverty as driving factors for early resumption of work after delivery.

Type of work/vocation and influence on infant feeding practices

The pressures of work, earning a living, or running a business, were often cited by women as influencing feeding decisions. All but one of these women were engaged in business enterprises; the exception was a housewife.

Half of all women who discussed work issues during their interview cited the need for a source of income as a negative influence on feeding.

> *"…a year and one month, I stop them breast…Because once them start waka [walking], I don stop them breast be that…it is because of my business."* (IDI_05_recent mother)

Negative influences were reported by health care professionals with short duration of maternity leave and long work hours, petty traders/other business owners who needed to be out and about, and those involved in manual labour or marketing jobs, who were required to move from place to place or exert physical strength while working. They were more likely to be separated from their infant in the course of work, although most respondents did not describe their childcare arrangements.

Influence of work/vocation on different stages of the feeding journey

Duration of exclusive breastfeeding:

Long and/or inflexible working hours were reported to impact upon the duration of exclusive breastfeeding. A nurse spoke of the impact of early resumption from maternity leave and shift work, resulting in separation from the infant for long periods:

"For my first baby I planned for the six months (exclusive) and it worked out for me, but when I had the second baby…I had to start night duty as early as 12 weeks so I couldn't continue with the exclusive…" (IDI_08_pregnant woman, Nurse).

Community leaders from the focus groups had similar views about how the need for some to return to work influenced breastfeeding practices:

"…working class mother…three months then she started work, coming back around 5pm. From morning till 5pm, the baby is not breastfed alright. So automatically the fourth month the baby on its own stopped taking breast milk…" (FGD4_05)

Introduction of infant formula and complementary foods:

Due to the need to return to their work or business, some respondents decided to or had already introduced formula or complementary foods before six months. Community leaders and other key informant accounts suggested that although premature complementary feeding was now less common, it was still occurring, especially within some indigenous ethnic groups employed in migrant occupations, such as fishing.

{Y} "*…they quickly introduce [other foods] ...they do this because they also want to quickly return to their hustle, once the child is full* (FGD1_00*).

Total breastfeeding duration:

Women's need to return to work/livelihood was seen to influence the decision of when to discontinue breastfeeding:

> *"…I'm planning to breastfeed my baby for a year. I can now stop it by then…because I'm a trader, I would need to work. That's it."* (IDI_04_pregnant woman)

Quite a few mothers felt that they needed to give the baby 'time', which translated to taking some time off work to stay at home in order to feed and care for the baby. The duration of time taken, however, varied:

> *"I always give time for my baby. Like now, if I want to start working…maybe at least for three months, I will stay at home. So, after three months…I will breastfeed her now because I have my own shop."* (IDI_09_pregnant woman)

Spousal support played a role in some cases, where husbands suggested or even insisted that the wife stay at home to attend to the baby:

> *"I was not tired of giving him [breastmilk] because my husband allows me…He said he wanted me to take care of his baby first, so up to a year plus before I start anything [work]…"* (IDI_017_recent mother).

Type of childcare and influence on infant feeding practices

Most women who discussed childcare had their babies cared for in proximity. Some worked from home; others owned the business and could take the baby along.

"…if my baby need breast, I will leave my work and breastfeed my baby...I'm working in my house. Yes, my baby is with me" (IDI_010_recent mother).

A key informant stated that some women with small businesses took their infants with them to work, and were not shy of breastfeeding in public:

"Traders they carry their children along and they can breastfeed at any day at any time;… you will see their breast out like that, they don't care. So they don't leave their children…"(KII_02_CHW)

5.4.7.5. Roles and influences of other stakeholders in infant feeding practices

Government

Government at various levels, i.e., Federal, State, and Local Government, influence infant feeding practices. The key issues raised included a need for more government support. Participants suggested that government could legislate and ensure that women have longer maternity leave, to provide opportunity for women to breastfeed exclusively and for longer periods.

Community members brought up the state government's maternity leave policy for six months, which they felt should have greater coverage to more children per couple, and to the private sector:

"…I will advise government, pleading to them…if they can tell all the NGO…all the government workers at least to have a law binding all these our mothers, our wives that at least they must get up to six months holiday…so that they can easily take care of the baby…" (FGD5_02_Men)

Non-governmental organizations

These include international NGOs, civil society, faith-based and other community-based organizations. Some NGOs had been involved in capacity building of CHWs and community volunteers, which brought positive changes in breastfeeding practices, as attested to by some respondents. An NGO recently engaged in one of the study areas was said to have trained their WDC members, which improved their knowledge and confidence:

{Y} "We must thank JICA very much who taught us many things and has made us well equipped for answering questions from the community…When we started to go into the community we saw that 95% of them say they didn't give the first milk to their child but throw it away, so we made sure we went back and tell them the benefits of the colostrum and now the mothers know well about colostrum, that what they were throwing away was actually for the benefit of the baby. (FGD1_CommLdrs_007, Male)

5.5. Discussion

5.5.1. Participants and characteristics

A diverse sample of women respondents (pregnant women, recent mothers), key informants and other community members, were recruited into the study to obtain their perspectives on influences of infant feeding practices. Most recent mothers in this study had exclusively breastfed their infants for varying durations. However, almost half of these had other fluids introduced by the attending HCPs, due either to challenges with lactation or operative delivery. Breastfeeding initiation was delayed in about two-thirds of mothers participating in this study; reasons proffered by participants for the delay were mostly related to having had a caesarean section, or HCP/TBA-related factors such as lack of support to put baby to breast and separation from mother after birth.

5.5.2. Exclusive breastfeeding and early breastfeeding initiation

5.5.2.1. Motivation

The erroneous belief amongst most mothers that their baby needed added water was an important barrier to exclusivity in this study, even though most of them had heard about exclusive breastfeeding and had been told that breastmilk contained enough water for the baby up till six months. Similarly, the maternal perception of breastmilk insufficiency was cited as a reason to discontinue EBF by many mothers. These beliefs were established as EBF barriers in other studies from Nigeria[75,81,83,84] and systematic reviews.[76–78] A systematic review of EBF facilitators and barriers in sub-Saharan Africa that included 20 studies[78] found that the perception of breastmilk insufficiency was reported as a critical barrier to EBF in

12 studies; this often resulted in feelings of frustration in the mothers.[78] A lot more than merely passing across information is needed to persuade mothers about the sufficiency of breastmilk for newborns, and this is an important area for further research, if EBF rates are to improve significantly.

Other sources of negative motivation to EBF identified included perception of child not wanting breastmilk, and an example of automatic motivation - previous negative personal exclusive breastfeeding experience, or that of a close person, although these were not commonly mentioned. Some emotions expressed by women respondents in this study because of a negative EBF experience included stress, pressure, frustration, impatience, anxiety, and exasperation. A negative breastfeeding experience does not only serve as a source of emotional (automatic) motivation but may in turn influence analytical decision-making (reflective motivation) in a close person or in feeding decisions of a subsequent child.

Accounts from elders also suggested that some women were shy of breastfeeding in public places, while others avoided breastfeeding in order to prevent their breasts from losing shape, thereby becoming unattractive; these highlight other possible emotional automatic motivators in terms of how breastfeeding makes women feel about themselves, although these were not described by women participants. An elder (grandmother) in a study conducted in a part of SouthWest Nigeria[80] and NGO workers in a baseline qualitative study in Lagos and Kaduna States[84] brought up the concern for flabby breasts which some breastfeeding mothers perceived as undesirable to their husbands/spouses. It could be

that this perception elicits a negative emotional motivation to breastfeeding in some mothers, but they are not able to voice it out, possibly due to cultural perceptions and inhibitions. This is an area that requires more local research using more appropriate survey techniques to elicit the sensitive data.

A dominant facilitator of EBF identified in this study was a strong desire (motivation) to breastfeed, often stemming from knowledge of its benefits, or from reflective learning; some mothers expressed joy at the prospect or experience of breastfeeding their infants in this study, an example of automatic motivation. These factors were identified as positively influencing exclusivity in a baseline qualitative study of EBF facilitators and barriers and a systematic review of quantitative and qualitative studies from developing countries.[76,84]

Motivation for early breastfeeding initiation was often lacking, with many mothers having the belief that they would not lactate soon after birth, and others desiring to perform traditional practices such as washing of the breasts, before putting the baby to breast. Due to its appearance or small quantity, some mothers still perceived colostrum as being dirty and unfit for the newborn, a further example of automatic motivation; this perception was identified in other studies conducted in Southwest[75,84] and Northern Nigeria.[83,84] Systematic reviews of breastfeeding barriers and facilitators found a positive significant association between early breastfeeding initiation and continued EBF practice, and between feeding colostrum and continued EBF practice;[76,77] this suggests that improving early initiation rates and colostrum use amongst mothers may help improve exclusive breastfeeding rates.

Most mothers in this study felt that expressing breastmilk was unnecessary, since they were not in formal employment; however, most of them discontinued breastfeeding and exclusive breastfeeding earlier than recommended for reasons such as work or vocation. Prenatal education and antenatal counselling could possibly help change the perception of such mothers about expressing breastmilk and help them see how the practice could benefit them.

Although the use of herbal concoctions and holy water was negatively perceived by most mothers, some still gave to their babies for personal or religious reasons; in the qualitative study conducted in Katsina state, Nigeria, the practice was more prevalent as most participants gave prelacteal feeds such as cow's milk, dates, holy (Islamic) water, herbal concoction, and honey.[83]

5.5.2.2. Capability

Most women respondents in my study had completed secondary level of education or higher, similar to other survey data from Lagos State which found two-thirds (68%) of women to have attained at least a secondary level of education.[59] In spite of this, there was quite a high level of misinformation about the issue of exclusive breastfeeding and water, as some mothers thought that exclusive breastfeeding did not preclude giving water to the baby; it could be that mothers were genuinely misinformed by the health worker or other information source, or this could be a way of some women doing what they want whilst appearing to do what is desirable. A study conducted in Eastern Nigeria,[81] and a systematic

review on the definition of EBF,[193] also found that some mothers thought that the practice of EBF permitted giving baby added water, so long as no solid food was given.

Many mothers were uncertain about how soon they would lactate after delivery, and some expressed frustration with their infant not being satisfied with breastmilk. Women need to have the confidence that they can produce enough breastmilk, and the psychological and physical capability to adopt practices that facilitate breastmilk flow, such as proper positioning and attachment;[27] one systematic review emphasizes the need for antenatal breastfeeding counselling to improve mothers' understanding of the lactation process and address maternal behaviours that enhance milk supply, as well as education on and support of proper breastfeeding techniques.[76] Some reviews identified that mothers who felt they could produce enough breastmilk to satisfy their babies were more likely to practice EBF.[76,77] Knowledge of the benefits of exclusive breastfeeding, early breastfeeding initiation and feeding colostrum were commonly mentioned as facilitators of EBF in this study, which is in tandem with other research findings.[76,78,79,81,84] A systematic review found that even in the face of opposition, knowledge of the benefits of EBF increased their likelihood to EBF.[78]

Lack of physical capability to initiate or continue breastfeeding because of mother's ill-health or a caesarean section resulted in varying outcomes in this study, depending mainly on the available support from family, community, and health workers (opportunity). Some other studies however showed that maternal ill-health,[76] or having a caesarean section,[77,79,194] were risk factors for discontinuing EBF. The findings from my study show

that with capability and support, an instrumental delivery or maternal/infant ill-health need not preclude EBF in the infant.

Most mothers in this study expressed their disapproval of the use of prelacteal feeds such as herbal concoctions, due to their lack of knowledge of the contents and appropriate dosing; this is an interesting finding which may help promote EBF, as other studies have observed a negative association between prelacteal feeding and exclusivity.[82]

5.5.2.3. Opportunity

Pressure on the mother to return early to work, especially amongst daily/low wage earners, coupled with poor workplace support, and poor family support, were important barriers to exclusivity in this study. Previous studies have found maternal return to work outside the home as a strong predictor of cessation of exclusive breastfeeding, and state the importance of a more supportive workplace environment and policies in promoting optimum infant feeding practices.[68,76–78,81] Pressure from significant others not to breastfeed exclusively has been documented as a barrier in previous studies[76–78,81], and only a few highly-motivated mothers in this study were able to continue EBF in the face of stiff opposition. Although there were divergent views amongst significant others and community members about exclusive breastfeeding, sustained health education programs by HCPs and community volunteers were said by FGD participants to have improved communities' perspectives in recent years. This indicates that targeted interventions to improve breastfeeding knowledge may lead to improved family and community support for exclusive breastfeeding. An earlier systematic review found community-based

interventions consisting of BF education and/or support to have a larger effect on promoting EBF rates (RR=2.59, 95% CI 1.80, 3.73) than facility-based interventions.[106] Also, combined individual and group counselling was found to be more effective than either of them deployed alone. Another systematic review that focused on community-based interventions in LMICs showed that they created much-needed awareness among the community members and improved support for EBF and other IYCF practices.[195] A recently published review of reviews noted the growing evidence of the beneficial effect of community involvement through CHWs and family participation in breastfeeding promotion.[196]

The presence of adequate breastfeeding information and support from the HCP was commonly identified as a facilitator of EBF in this study. The healthcare provider at delivery and immediate post-partum period played a major role in the timing of breastmilk initiation; the HCP's knowledge and practices were brought to bear here. Similarly, mothers who had a caesarean section were highly dependent on the HCP to provide nutrition for their infant in the hours after birth, and this showed a variation in the practices of some of the steps of the BFHI, resulting in delayed initiation in some cases.

Similar to the findings from this study, some other studies reported about HCPs who provided information/inappropriate prescriptions that did not support exclusive breastfeeding, and some who gave fluids other than breastmilk when there were issues with lactation.[78] A lack of or poor support from HCPs for breastfeeding at the time of delivery is considered a form of disrespectful maternity care.[197] A previous study conducted

in Peru reported that mothers were much more likely to give infant formula during the first six months of life when recommended by an HCP, showing the level of influence that such a recommendation may have on the infant feeding practices of the mother.[198] It has been advocated that HCPs provide consistent, evidence-based information regarding recommended breastfeeding practices and in providing support, regardless of their cadre, work department, or time of interaction with the pregnant woman/breastfeeding mother.[199]

Capacity and attitudes of HCPs need to be strengthened, especially for support around the time of delivery, and attention paid to staffing issues, for optimal infant feeding outcomes. HCPs in a previous study conducted in SouthWest Nigeria decried the heavy workload resulting from staff shortages, which had in turn impacted on their ability to provide adequate breastfeeding support to their clients.[80] These are factors that would likely impact on the willingness and/or ability of HCPs to provide respectful maternity care to the client; some scholars have posited that disrespectful maternity care impacts negatively on breastfeeding practices.[197] Aspects of disrespectful care that have been found to impact negatively on breastfeeding practices include lack of privacy/confidentiality, not preserving a client's dignity, lack of information about breastfeeding issues, lack of access to family and community support during and after delivery, poor support from the physical environment, lack of motivated HCPs and overall, poor quality of care.[197,200]

The emphasis on certain cultural practices before the commencement of breastfeeding by women respondents and other community members posed cogent barriers to early

initiation. Several cultural practices have been identified among the Yoruba and other ethnic groups in Nigeria as barriers to optimum breastfeeding practices around the time of delivery. These include bathing of the mother and newborn, washing of mother's breasts/nipples, administration of water/other concoctions, rest for mother and newborn, prayers and other rituals[75,77,78,83] most of which were seen as prevalent by community members in this study. The support (or lack) of attending HCPs, and prevalent cultural views about colostrum – still largely negative, were the main influencers of the practice of giving colostrum in this study; some mothers had however begun to embrace it due to health information from HCPs. A qualitative study in a rural Yoruba community revealed that most women felt that colostrum should not be given but discarded before breastfeeding initiation; the study reported that their perception emanated from the thought that colostrum was milk that had stayed in the breast for the full duration of their pregnancy, and was thus stale and unfit for the baby.[75] This perception is similar to findings from other Nigerian cultures such as the Hausa-Fulani.[83] the study however reported that colostrum was traditionally only discarded for the first child, a female elder checked the breastmilk and applied herbs to the breasts before breastfeeding commenced in subsequent children.[83] The findings from my qualitative study show that breastfeeding education of mothers and community education hold promise for community-wide changes in attitudes towards colostrum.

The perception amongst some women respondents and most community members that poor nutrition would affect the quality and quantity of their breastmilk was yet another barrier to exclusive breastfeeding, as some would rather supplement the infant's diet with

low-quality complementary foods such as pap than breastfeed them exclusively due to this prevalent belief. Some studies have demonstrated that breastmilk composition is largely unaffected by maternal dietary intake;[201] others have suggested that some fatty acids and vitamins, which are important in infant neurological development, may be modulated by maternal diet.[202,203] Other studies have found maternal body composition to influence breast milk composition;[201] breastfeeding education should therefore focus on encouraging mothers to breastfeed irrespective of their nutritional status, while preconception care should emphasize appropriate pre-pregnancy nutrition. Unfortunately, preconception care services in Nigeria are not readily available, thus there may be need to disseminate preconception information through other channels such as secondary and tertiary institutions, CDAs and women's groups.

Mothers expressed concerns about the freshness of expressed breastmilk, stating that it could easily go sour. This is a genuine concern in a tropical country like Nigeria where electricity supply to power a refrigerator is sporadic; more so, the poor levels of infrastructure in the study communities implies that some basic amenities such as fridges may be lacking, making it difficult to preserve the expressed breastmilk. If EBF expression is to gain grounds in the study communities, the logistics of preserving expressed breast milk needs to be taken into consideration, using innovative and culturally acceptable solutions.

Similar to the women respondents, the perception about breastmilk expression amongst community members in this study was predominantly negative, reflective of the largely

negative cultural views of this practice from studies that revealed that it was considered a foreign practice and culturally unacceptable.[75] Well-tailored educational intervention programs are needed to change the mindset of communities about this practice, if the perceptions and practices are to change positively. Although prelacteal feeds were still given by some women respondents in this study, the practice was said by key informants to be less prevalent than in the past, due to education and health promotion activities of HCPs, CDAs and NGOs.

Although social perceptions about breasts were not discussed by mothers in this study, some community members in the FGDs saw it increasingly becoming a barrier to exclusive breastfeeding due to the influences of westernization on the current generation of mothers. Other studies have identified concerns for breast appearance as a barrier to EBF,[78] and one study reports the symbolism of the breast in Yoruba culture, being the source of nutrients, and a bond between mother and infant;[80] this should be targeted and leveraged on in future breastfeeding intervention programs.

5.5.3. Timing and types of complementary feeds, use of infant formula, and total breastfeeding duration.

5.5.3.1. Motivation

Most respondents planned to introduce complementary feeds from about six months. Similar to our findings, pap was the most common complementary food given to infants in a rural Yoruba community of Osun state.[75] Factors such as mother's poor nutritional state

and concerns about transition to adult diet motivated some participants to introduce complementary foods earlier than six months; this is in tandem with findings of similar studies and reviews from the region.[78,80] In a study conducted among mothers attending a postnatal clinic in South-West Nigeria, between 25 – 30% of respondents gave reasons for discontinuing breastfeeding to include baby not satisfied with breastmilk (29%), mother concerned about infant's addiction to breastmilk (26%), and perceived breastmilk insufficiency (24%).[80] Perception of insufficient breastmilk and inadequate food intake by mother were identified as reasons for mothers to introduce complementary feeds earlier than six months.[204] Concerted efforts at community education would be important to educate mothers on myths and wrong perceptions surrounding breastfeeding and help them make more informed decisions about how to feed their infants, as well as social interventions to empower women and alleviate extreme poverty, such as demonstrated by Flax et al in their community-based intervention.[107]

One example of automatic emotional motivation in relation to complementary feeding practices in this study was with reference to the timing and ease of introduction of complementary feeds. Some mothers expressed frustration at the difficulty experienced when trying to introduce complementary foods and ascribed it to the infant becoming 'addicted' to breastmilk. This is in tandem with findings from a mixed methods study in Southwest Nigeria, where the fear of the infant becoming addicted to breastmilk often led to the early introduction of complementary feeds.[80]

5.5.3.2. Capability

Most mothers in this study knew that six months was the appropriate age to begin introducing complementary foods, but this was often negatively influenced by opportunity (need for income and return to work, other forms of support). Most women required support not only to breastfeed exclusively, but also to transit to appropriate and timely complementary feeding.

5.5.3.3. Opportunity

The issue of return to work, coupled with long working hours and poor workplace support, impacted negatively on optimal feeding practices, resulting in early introduction of complementary foods, introduction of infant formula, and shortened duration of breastfeeding, in some cases. Previous studies among the Yorubas however indicated that prolonged breastfeeding was applauded,[80] and FGD participants from a rural Yoruba community expressed that infants should be breastfed for 2 years.[75]

Urbanization and westernization may have caused shifts in social roles and responsibilities, and with more women working outside the home, total duration of breastfeeding may be on the downward turn. The study population consisted largely of women who were self-employed, many of whom ran small businesses; but for the few who worked for private companies or the public service, there were complaints about lack of workplace support. The Lagos state government is one of few states in Nigeria that has approved a six-month maternity leave for its employees, and two weeks paternity leave was recently approved

for fathers. However, this applies only to the first two children, with subsequent pregnancies receiving fewer privileges. The vast majority are yet to be covered by this policy, as indicated by some respondents; these women are left to either resign from the job, or else return to work shortly after delivery.

Previous empirical studies and systematic reviews alike have shown that women who returned to work earlier than six months after birth often had to introduce complementary feeds before the recommended age of six months; these studies recommended improved workplace support for breastfeeding coupled with legislation/implementation of improved maternity leave policies as measures to support EBF to six months and promote appropriate and timely complementary feeding.[76–78,205]

Mothers and other community members perceived their communities to be supportive of breastfeeding in general, contrasting findings from the review of qualitative studies from sub-Saharan Africa.[78]

5.5.4. Strengths and limitations

The strengths and limitations of this aspect of the study will be discussed by assessing its trustworthiness or rigor. The criteria by Lincoln and Guba for assessing the trustworthiness of a study were adopted, namely credibility, dependability, confirmability, and transferability.[184,206–208] Some authors refer to them as the 'Four-Dimension Criteria'.[209]

5.5.4.1. Credibility

This is akin to internal validity in quantitative research, that is, confidence in the truth of the data and its interpretations.[206,207,209] Credibility was established in this study in several ways:

(i) Prolonged/persistent engagement with the study communities. The researcher (TFO) had previously worked in/with one of the communities, was familiar with the community structures, and had relationships with the community leadership; similar relationships were established in the second community during the data collection process; community entry, data collection, and debriefing took place over a period of one year, providing ample time for prolonged community engagement.

(ii) Interviewing process/techniques and investigators' authority. The researcher (TFO) had received formal instruction in qualitative research and had prior experience in qualitative data collection. She was closely supervised remotely by an experienced qualitative researcher faculty (BT). A topic guide was developed for the interviews and focus groups using relevant literature from an extensive review, which included probing questions to facilitate and focus the discussions. Practice interviews were carried out within the institution for familiarization with the tool, and improvement of interview skills. The first three interviews were reviewed by BT for depth and content, and a few modifications in interviewing style were made from the feedback obtained. The research assistants were trained by TFO locally prior to going to the field and conducting or assisting with interviews.

(iii) Triangulation. Participant triangulation: data were obtained from those directly involved in breastfeeding – pregnant women and recent mothers; other perspectives were

obtained from FGDs with significant others – mothers, husbands, and community leaders; and key informant interviews conducted with CHWs and community leaders. Researcher triangulation was also undertaken; ten percent of transcripts were coded and analysed by two researchers (BT and TFO).

(iv) Peer debriefing and supervisory meetings. Locally, TFO engaged regularly and had debriefing sessions with the research assistants and local supervisors, reflecting on the data collected and related experiences. Monthly supervisory meetings and additional data management meetings held with BT, KJ and CM to reflect on the data and review the working analytical framework in line with themes.

5.5.4.2. Dependability.

Dependability refers to the reliability of the research findings.[206,207,209] This was ensured by a rich description of the study protocol, after a thorough literature review. Also, an audit trail of the data collection and analysis process was maintained, and regular feedback given, during monthly supervisory meetings. Modifications to the protocol and to the coding system were done in agreement with the supervisors. As mentioned earlier, ten percent of the transcripts were double-coded, and inter-coder agreement assessed.

5.5.4.3. Confirmability

This is equivalent to objectivity in quantitative research, for example corroboration by other researchers.[207,209] Means for ensuring confirmability in this study included the keeping of a reflexive diary by the researcher to document the researchers' effect on the

data and minimise subjectivity; use of the audit trail by local and University of Birmingham supervisors to make independent conclusions about the data, and triangulation (as mentioned above). Reflexivity is described as a process of critical reflection on the findings generated through research, and the role of the researcher in this process.[127] It serves as a quality assurance mechanism in qualitative research.

5.5.4.4. Transferability

This ascertains the applicability of study findings to other groups or contexts.[206,207,209] The study sample was selected purposively by pre-determined criteria to represent diverse views about infant feeding. Data adequacy was assessed through the revision of codes obtained from the analysis during regular monthly meetings, data were seen as adequate when no new sub-themes developed from the data. A thick description of the research study and participants, as well as generous use of relevant quotes, also contribute to the transferability of the findings.

5.5.4.5. Use of theoretical framework

In addition to the ways in which trustworthiness was ensured in this study, the COM-B framework was used as the underpinning theoretical framework. This is a strength of the study, as it has provided a systematic means of examining the behavioural influences affecting exclusive breastfeeding, thereby bolstering the rigor and confidence in the findings. Being a comprehensive and widely applicable framework, its use will also facilitate comparisons between groups and across studies. It has helped in the understanding of the

motivating factors, the areas of capability (or lack of it), and the opportunity afforded by the sociocultural context and the environment, for exclusive breastfeeding and the other recommended infant feeding practices.

I did however experience some challenges in applying the COM-B model to the dataset, as it was hard to operationalise using real-life data. Some overlaps were identified between the domains, especially between physical and social opportunity, and reflective and automatic motivation; overlaps have also been identified by other studies.[176] Applying COM-B after the design of the study had its own problems, as experienced by other groups of researchers who did same;[210] which included fitting the previously-collected data into the framework.

5.5.4.6. Study limitations

Although the study was conducted in accordance with the criteria for trustworthiness, a few limitations were encountered. Though study protocol preparation followed a rigorous process as already outlined, the use of the COM-B framework was not identified as the conceptual framework for the qualitative study until after the preparation of the study instruments. This resulted in some gaps in the data when mapped onto the COM-B framework, which may have been more fully captured had this framework been incorporated earlier. Data saturation was not ascertained, due to the process of data analysis; however, the study recruited adequate numbers and diverse types of participants to capture the range of perspectives about exclusive breastfeeding influences. Though it was intended to have maximum diversity among interviewees, only a few recent mothers

who delivered with TBAs, and a handful of TBAs themselves, were available for interview; this limited the inferences made on TBA influences/support for exclusive breastfeeding.

Seeing that the topic of the study was about exclusive breastfeeding, respondents' responses may have been affected by social desirability bias, especially amongst the key informants who are providers of care and would likely want to be seen to be following recommended practices. This was minimised by not being judgemental during the interview, and not providing leading questions or statements about optimum BF practices. It was also observed that not much information was elicited in this study on the feelings and emotional responses to EBF (automatic motivation); the interview guide did not contain direct questions that probed emotions/feelings associated with breastfeeding, and this gap partly resulted from introducing the COM-B framework after the study instruments had been designed. The emotional responses elicited from respondents emanated from more general questions about their perception of the feeding journey and the rapport established with some of them during the interviews. These gaps would need to be addressed in future studies.

Interviews conducted in the local language of Yoruba were not pre-planned, as Lagos is a metropolis, largely urban, with most residents able to understand and speak English with some proficiency. However, on the field it was observed that even though the respondents could understand English, some of them were not able to express themselves well in English. For those respondents, they eventually spoke in Yoruba. Although efforts such as use of a local translator were made to preserve the original meanings of the interview

questions and their responses in the transcription, there may inadvertently have been the loss of some of the meaning intended by the respondents, as the transcripts were not back-translated by a professional interpreter. This was more likely to have occurred with the FGD transcripts, where there occasionally was more than one person speaking at a time, making it difficult to hear exactly what was said by the respondent in Yoruba.

The large dataset made the data difficult to handle within the matrix, and I had to split the data into a few parts for better manageability. Although I was still able to compare within and across participants within the sub-set, this made comparisons across the groups more difficult, and a few important comparisons may have been missed. This was however minimised as I reviewed the data analysis several times over alone and with my supervisors, to reduce the chance of missing a pattern or similarity within the dataset.

5.5.5. Conclusion

This study with a large sample of diverse participants has explored the facilitators and barriers to exclusive breastfeeding and other optimum infant feeding practices in two communities of Lagos state, Nigeria, using the COM-B theory. The belief that an infant cannot do without added water, the perception of breastmilk insufficiency, and maternal employment were important barriers; others included pressure from significant others not to breastfeed exclusively. Knowledge of EBF benefits, a strong desire to breastfeed exclusively, and a strong family and/or HCP support system were important EBF facilitators.

Concerted behaviour change programs need to be designed and instituted to improve the perceptions of community members about exclusive breastfeeding.

CHAPTER 6: OVERARCHING DISCUSSION, CONCLUSIONS, FUTURE RESEARCH PRIORITIES AND IMPLICATIONS FOR PRACTICE

6.1. OVERVIEW OF THIS CHAPTER

The final chapter of this thesis intends to pull together its component parts into a relatable and meaningful whole, with the aim of answering the research questions posed at the beginning of the thesis. The aims of the study are revisited, and I state how these have been addressed in the previous chapters. Using the findings from the systematic review, quantitative survey, and qualitative study, I go on to propose a candidate multicomponent intervention to improve EBF rates in Lagos State Nigeria. Overall limitations and strengths of the studies conducted are highlighted, and overarching conclusions are drawn; finally, recommendations from the findings are proffered as implications for policy and practice, and directions for future research.

6.2. Key findings from the thesis and contextualization in the body of literature

6.2.1. Aim 1:

To determine the effect of various interventions on breastfeeding exclusivity up until 6 months in LMICs with high breastfeeding initiation rates.

This aim was addressed by the conduct of a systematic review of various interventions on breastfeeding exclusivity up until 6 months, in LMICs with high breastfeeding initiation rates. The review included 67 studies from 30 LMICs, of which 44 were RCTs or c-RCTs. The review established that a wide range of different interventions, in different settings and by different types of providers significantly improved exclusive breastfeeding in LMICs with

high breastfeeding initiation. Overall, the delivery of any intervention to support breastfeeding (insufficient evidence for telephone support) improved EBF rates, by approximately twofold: this was robust to study type, and exclusive of studies with a high risk of bias. However, interventions that were delivered by both professionals and laypersons (RR=3.90), spanning the antenatal and postnatal periods (RR=2.40), and with an intensity of between four to eight contacts (RR=3.20) were found to have the greatest effects on increasing EBF rates.

These findings were in concordance with that from another systematic review of exclusive breastfeeding in LMICs by Sinha et al[211] with a primary outcome of EBF at 0 - 5 months. However, the review presented in Chapter 3 had its primary outcome as exclusive breastfeeding *up to six months,* rather than *under six months* (<1 month, and 1 – 5 months) in the Sinha study; the problem statement and hypothesis of this thesis laid emphasis on the endpoint of six months, even though this is not one of the breastfeeding indicators identified by WHO/UNICEF for a rapid situation analysis in population-level studies (EBF 6M). Even though included studies differed slightly between the two reviews, the outcomes were in a similar direction, and both reviews concluded that practically any intervention would improve exclusive breastfeeding rates in LMICs, with those carried out in a combination of settings being the most effective.[211]

6.2.2. Aim 2:

To determine the breastfeeding knowledge, attitudes, self-efficacy and support practices of health care professionals (HCPs) in public health facilities in Lagos state, Nigeria, with a focus on exclusive breastfeeding.

This was achieved by conducting a survey of HCPs working in public health facilities in Lagos state, Nigeria. The survey provided information on the knowledge, attitudes, professional self-efficacy, and breastfeeding support practices of different cadres of HCPs working in public health facilities in Lagos state, Nigeria.

Most of the previous studies looked at knowledge of the HCPs,[93–95,97–99] with fewer studies reporting on HCP attitudes towards breastfeeding,[93,94,97] and a single study reporting on competency in breastfeeding support.[93] No study was identified that reported on breastfeeding professional self-efficacy in Nigeria. The survey reported in Chapter 4 was conducted with a robust sample size of HCPs selected by multistage sampling, thus reducing the likelihood of bias. In addition, the study instrument was a previously validated questionnaire which was adapted to the Nigerian context; this provides a more complete assessment of knowledge than most of the earlier studies. The survey found overall HCP knowledge to be good but identified critical gaps that would be inimical to their practices in promoting exclusivity; 16% of respondents would recommend topping up with formula feeds as a means to solve perceived breastmilk insufficiency and/or poor infant weight gain. Knowledge was also found to be deficient in the management of breastfeeding problems.

Very few of the earlier studies assessed HCP attitudes. Ola-Olorun assessed HCP attitudes as positive,[94] Samuel found sub-optimal attitudes towards complementary feeding,[97] and Okolo found sub-optimal attitude towards critical aspects of exclusivity.[93] Similar to the findings of Ola-Olorun, the attitudes of HCPs were largely positive, but some gaps were identified by the survey, such as the role(s) HCPs should play in breastfeeding support. The survey elicited divergent views from the HCP respondents on whether a woman who occasionally drinks alcohol should breastfeed her baby, their expectation of sore nipples during breastfeeding, and on issues relating to formula feeding; about one-third of respondents felt that HCPs had little influence on a woman's breastfeeding decisions. It would be important to place more emphasis on breastfeeding education in the curricula of medical, nursing and CHW training programs, so they get acquainted early on in their career with the important roles they can play in breastfeeding support and influencing breastfeeding choices. Additional research would need to be carried out to complement the findings from this survey on HCP attitudes; this would be useful for informing the design of future HCP training programs.

No survey was identified that assessed the professional self-efficacy of health care professionals in any part of Nigeria; the level of self-efficacy found in this study was high. Self-efficacy is an important factor to consider in the performance of any set of skill-based activities, as it is a reflection of a person's perceived ability to carry out those activities, though not necessarily their actual ability.[146] Additional studies such as qualitative

observation and use of mystery clients amongst HCPs would therefore be required to benchmark their perception of ability against their actual level of skill.

6.2.3. Aim 3:

To identify the behavioural influences of breastfeeding practices in selected communities of Lagos state

A qualitative study that explored the facilitators and barriers to exclusive breastfeeding and other recommended infant feeding practices in two communities of Lagos state, Nigeria was carried out, and the findings mapped onto the COM-B framework, to fulfil this aim.

Maternal employment (opportunity) and a lack of knowledge/acceptance of what exclusive breastfeeding is (capability) were important barriers; others included pressure from significant others and other community members not to breastfeed exclusively (social opportunity). Maternal motivation to breastfeed was an important EBF facilitator (motivation). Concerted behaviour change programs need to be instituted to improve the perceptions of significant others and community members about exclusive breastfeeding.

6.3. New overlapping research findings since my Ph.D. research began.

As highlighted in Chapter 3, newer studies had been published after the completion of my systematic review of breastfeeding interventions, which showed additional evidence about what works to improve breastfeeding rates. There are also a few recent publications on

HCP knowledge and attitudes, which have been discussed in Chapter 4, and a few additional studies on breastfeeding influences, which have been discussed in Chapter 5. This section attempts to pull together these recent publications to set them in the context of the findings from my Ph.D. research.

6.3.1. Recent evidence on interventions to improve EBF rates in Nigeria

Section 3.3. discusses additional evidence on interventions to improve EBF rates in LMICs. The systematic review and meta-analysis by Kim et al in 2018[113] showed a nearly three-fold increase in the likelihood of EBF at six months (OR=2.77; 95% CI 1.81, 3.76). However, their review included both HICs and LMICs, and subgroup analysis did not include country income category.

Similar to my findings, Kim et al's review found that interventions that took place in both hospital and community were more effective than in a single context, and those spanning both the ante- and post-natal periods were more effective than either the ante- or post-natal period alone.[113] However, our findings were at variance concerning provider type, as they found interventions delivered by professionals (OR=3.26, 95% CI 1.89, 5.61) to be more effective than when delivered by lay persons (OR=2.81, 95% CI 1.45, 5.43). in addition, their review did not have a category in which interventions were delivered by a combination of professionals and laypersons; in my systematic review, this was the most effective category for the subgroup analysis by provider type among RCTs only (RR=3.90;

95% CI 1.25, 12.21), with a larger effect size for all study types (RR=5.44, 95% CI 1.93, 15.36).

Although my systematic review concluded that more evidence on the effect of mobile phone-based interventions and other forms of e-technology was needed in the Nigerian context, a few RCTs that sought to determine the effectiveness of mobile phone-based BF interventions have recently been conducted.[108,115] One such study was an RCT among recent mothers in Port Harcourt, Nigeria, that assessed the effectiveness of a mobile phone-based BF intervention.[115] Intervention participants received phone calls from the same paediatrician an average of eight times between birth and six months to discuss the benefits of EBF, and were at liberty to call the paediatrician for further support. Although the intervention showed higher rates and longer duration of EBF in the intervention group, the differences were not statistically significant.[115] Also, given that the intervention was delivered by a paediatrician, it is not likely to be widely implementable. A cRCT was conducted by Flax et al in Bauchi State, Nigeria,[108] consisting of three intervention components, one of which was the use of weekly and bi-monthly mobile phone-based BF messages (voice and SMS) to promote optimal BF practices among members of female microcredit schemes. Logistic regression was used to determine the association between participation in mobile phone activities in the small groups and BF outcome measures; however, the study did not determine differences in EBF rates between participants in intervention and control groups. The trial showed that participation in group cell phone activities one or more times a week led to higher odds of EBF up until six months (OR=5.6; 95% CI 1.6, 19.7) when compared with women in groups that did not participate in mobile

phone activities at all.[108] These results show that mobile phone-based interventions may have the potential to improve EBF rates, and should be further researched on a larger scale within the Nigerian context to provide evidence of what works.

Lebanon is an upper middle-income country (UMIC). However, as identified in a study on BF influences in Lebanon,[212] factors militating against high EBF rates in Lebanon are akin to those identified by my research in Lagos State, Nigeria, such as misconceptions about breastfeeding, lack of capacity for and low level of HCP support, lack of social support for EBF, among others.[212] A group of researchers in Lebanon carried out a multicomponent intervention spanning the hospital and home contexts; the intervention comprised of prenatal education, lactation support, and peer support. Although unadjusted EBF rates at six months were similar (IG=35.2%, CG=28.1%, p=0.16), when adjusted with multiple logistic regression for sociodemographic and breastfeeding characteristics, participants in the intervention groups were twice as likely as the controls to EBF up until six months (OR=2.02; 95% CI 1.20, 3.39). Those who received all three intervention components were six times more likely to EBF at six months compared to the control group (OR=6.63, 95% CI 3.03, 14.51).[212]

A multicomponent intervention by Alive & Thrive Nigeria among clients attending ten intervention and ten comparison private health facilities in Lagos, Nigeria, (n=1,200) deploying a quasi-experimental longitudinal study design, was found to increase EBF rates.[117] The multipronged intervention consisted of BFHI training for facility managers and staff, in-person BF counselling and support, electronic BF support in the form of WhatsApp

interactive support groups, dissemination of behaviour-change communication materials, text messages (by SMS or WhatsApp) and mass media messaging. EBF rates in the intervention group were significantly higher at six weeks (IG=83%, CG=76%, p =0.02) and 24 weeks (IG=66%, CG=52%; p<0.001); EIBF rates were however not different (IG=35%, CG=33%; p=0.65). Another intervention by Alive & Thrive Nigeria used 'Breastfeeding Guardians' (comprising of community influencers such as teachers, religious leaders, and CHWs) to provide BF counselling, support and home visits to pregnant women and recent mothers over a 12-month period.[116] In an uncontrolled pre-post study, the authors have reported some measure of improvement in EBF rates (pre-intervention=67%, post-intervention=84%), and in EIBF rates (pre-intervention=72%, post-intervention=93%), though tests of significance were not applied to the data. Unfortunately, results are only available in abstract form and additional details of the study were not found in the public domain.

6.3.2. Recent findings of HCP BF knowledge, attitudes, and practices in Nigeria

Since my research was carried out there has been little new research on HCP BF knowledge, attitudes, and practices in Nigeria. However, the Alive & Thrive Nigeria research included an HCP survey in Lagos and Kaduna states of Nigeria, which has been previously highlighted in Section 1.9.3.[99]

The A&T study recruited three groups of health care providers; for the HCP component they assessed HCPs from both public and private health facilities in the two states, with a

relatively small sample size for each state (Lagos = 88, Kaduna = 71; total = 159). Common objectives of the A&T and my study were the investigation of HCP breastfeeding knowledge, opportunities for BF counselling and training. Both studies found an overall high level of breastfeeding knowledge among HCPs, but also found some critical gaps that would be likely to affect their breastfeeding support practices negatively. While 16% of HCP respondents in my survey would advise mothers to give formula milk during EBF when mothers complained of milk insufficiency, in the A&T survey 16% of respondents from Kaduna and only 4% from Lagos gave a similar recommendation.[99]

The difference in rates between the two studies could be adduced to a number of reasons. Both were baseline surveys, among similar cadres of HCPs (doctors, nurses, midwives, CHWs, others). However, the sample of respondents from Lagos in the A&T study (n=88) was much smaller compared to my study (n=385), and the A&T study did not provide response rates for their survey to enable a comparison. The A&T study does not specify the exact locations of the HCP survey in Lagos state; possibly the geographical locations surveyed by the studies within Lagos state may have been different. Also, there could have been differences in the way the questions were worded, or the survey administration might have been different leading to possible social desirability bias. Nonetheless, this shows that the problem of supplementing with formula still exists among some HCPs in the state.

In terms of opportunities for providing counselling to clients, over ninety percent (93.8%) of HCPs in my survey stated that they had provided counselling on breastfeeding problems and/or taught mothers BF techniques within the last 12 months. Findings from the A&T

survey seemed to be at variance with the above, as the study found that within a six-month period, only between 37% - 43% of HCPs were involved in one-on-one or group counselling.[99] However, the difference in the time frame of assessment between the two studies (12 vs 6 months) makes comparison of the results difficult.

Almost two thirds (63.9%) of HCPs in my study had received some form of BF training in the last three years, as compared with the A&T study where only 40% of HCPs from both Lagos and Kaduna states[††††] had been trained in the last two years.[99] Although the duration of assessment differed between the two studies, this shows nonetheless that there are still opportunities for BF training among HCPs who provide BF counselling.

6.3.3. Recent findings on EBF barriers and facilitators among women, family, and community members

A recent study on breastfeeding influences (facilitators and barriers), published in the last few years during the period of my Ph.D. research. focused on Lagos and Kaduna States;[84] the data from Lagos will be discussed briefly with the findings from my qualitative study.

The study participants in the A&T study[84] were comparable with those in my qualitative study, viz; mothers, fathers, grandmothers, and other stakeholders in the community. In consonance with the findings from my study, most mothers in the A&T study knew that EBF meant giving only breastmilk to the baby, while a few mothers and a larger proportion

[††††] data not disaggregated by state

of other respondents felt that EBF did not bar giving the baby water. The A&T study also found that most mothers opined that EBF is beneficial to the baby, whilst some expressed that babies should not be denied water, consistent with the findings from my qualitative study.

A contrasting finding from the A&T study however was the expression that BF was not acceptable in the public, and as such BF mothers could not go out freely; women respondents in my study did not consider BF in public to be an issue as they felt the communities were largely supportive.

Facilitators of EBF identified in both studies included mother/other family members having knowledge of EBF benefits, and mothers with adequate BF support. The A&T study also identified mother eating and resting well, and mother expressing breastmilk, as facilitators; these were however not found as facilitators in my study. Having an intention and/or a strong motivation to BF were identified as facilitators in my study, but not listed in the A&T study.

BF barriers common to both studies included perception of BM insufficiency, belief (of mother or other family member) that infant needs water, and mother returning to work/short duration of maternity leave. In the A&T study, mothers not wanting their breasts to fall or to lose their shape was listed as a barrier,[84] while in my study it was mentioned only occasionally by husbands/community members, but not by mothers.

6.4. Use of the COM-B model to consider potential candidate intervention components for the promotion of exclusive breastfeeding.

In this section, I use the COM-B model and the Behaviour Change Wheel (BCW) of which the COM-B model is a composite part, to propose potential components of a future intervention for the improvement of exclusive breastfeeding rates in Lagos State, Nigeria. A modified version of the conceptual framework by Hector et al[53] described in Section 1.6., and found in Figure 6.1 below,[10] is used to describe the different levels at which behaviour change can be targeted (individual, community, organizational settings, and population/structural levels), and the interventions likely to be effective at each of these levels.

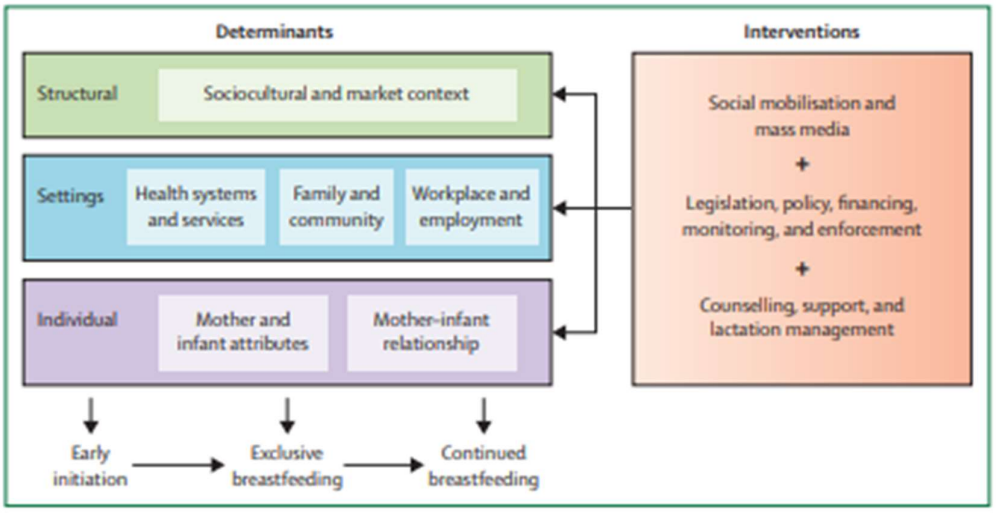


Fig 6.1: Conceptual model of the components of an enabling environment for breastfeeding and interventions likely to be effective.
(Reprinted from The Lancet 2016; 387:10017, Rollins NC, Bhandari N, Hajeeboy N, Horton S, Lutter CK, Martines JC, Piwoz EG, Richter LM, Victora CG. "Why Invest, and what it will take to improve breastfeeding practices?" Pg 492, Copyright 2023, with permission from Elsevier)[10]

The COM-B theoretical model is part of a larger framework for behaviour change known as the Behaviour Change Wheel (BCW),[171,191,214] and forms the nucleus or hub of the framework which is depicted in the shape of a wheel, as seen in Figure 2.[171,191,214,215] The middle layer of the BCW lists nine evidence-based intervention functions for behaviour change, namely Education, Persuasion, Incentivisation, Coercion, Training, Restriction, Environmental restructuring, Modelling, and Enablement[171,191,214,215] (see Figure 6.2).

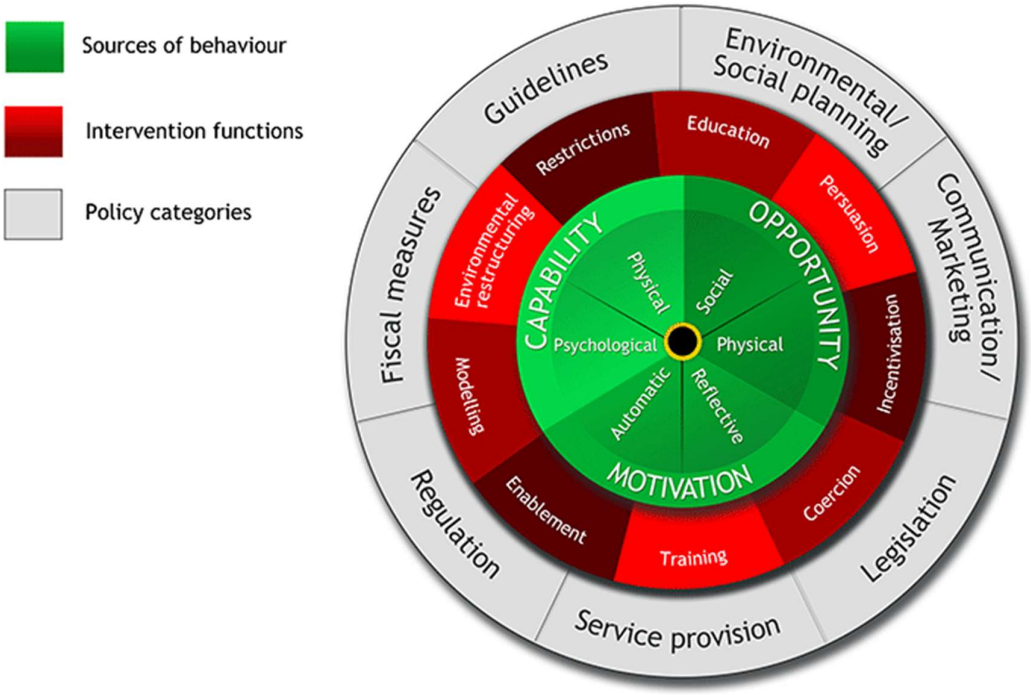


Figure 6.2: The Behaviour Change Wheel (Reproduced from: Michie, S., van Stralen, M.M. & West, R. The behaviour change wheel: A new method for characterising and designing behaviour change interventions. *Implementation Sci* 2011: **6**, 42. https://doi.org/10.1186/1748-5908-6-42 under the terms of the Creative Commons License (http://creativecommons.org/licenses/by/2.0))[171]

Having used the COM-B model in Chapter 5 to gain a better understanding of the influences affecting breastfeeding behaviour, the middle layer of the BCW was used to identify potential candidate intervention components. Intervention functions from the BCW that are more likely to be effective in changing the influences of breastfeeding behaviour

identified from the COM-B analysis of the data from the qualitative survey were selected; the findings from the systematic review and quantitative survey were also considered for appropriate intervention functions. The conceptual framework for enabling breastfeeding[10] was used to determine the levels at which the interventions should take place. Potential candidate intervention components identified from this process are listed in Table 6.1.

Table 6.1: Components of potential candidate intervention

COM-B Components	Identified areas of deficiency in the target behaviour	Relevant intervention functions	Candidate interventions
Psychological capability	Knowledge and skills gaps among HCPs in the management of BF problems Groups with higher likelihood of gaps: Male providers, CHWs, HCPs with less than 20 years of work experience, those with a negative perception of their personal BF experience	Education, training	• Improve knowledge and skills of HCPs in managing BF problems through BF training and supportive supervision
	Misinformation/disinformation of mothers and family members about BF: -need to add water -process of lactation and its facilitators -BF after a C/S -BM insufficiency -maternal nutritional status and effect on BM -colostrum -appearance of breasts -effect of early introduction of complementary feeds.	Education, modelling, enablement	• Provide information /counsel mothers and family members. Use of peer educators, role models to encourage and prolong EBF • Conduct facility- and community-based 'Baby Shows' to create awareness and model benefits of EBF • Educate and provide BF support using community influencers such as 'BF Guardians' • Mass media 'no water' campaigns
Physical capability	Illness in baby or mother	Enablement	• Prompt treatment of ill health

	After caesarean section	Education, enablement	• Educate mothers on how to BF after a C/S, and provide support for women who deliver by C/S
	Poor nutritional status of mothers	Education, enablement	• Educate girls and women of reproductive age (WRA) of benefits of healthy eating. Improve provision of pre-conception care and general wellbeing of WRA • Improve girlchild education to make women more employable and self-sufficient
Reflective motivation	Perceptions about baby: -newborn needs water -EBF allows water -colostrum not good for baby -baby becoming 'addicted' to BM	Education, persuasion, modelling	• Inform mothers and family members of benefits of not adding water through 'No Water' campaigns • Use images of EBF and non-EBF babies to persuade on EBF benefits • Use of role-models and peer educators
	Perceptions about mother/self: -insufficient BM -need to delay BF after a CS -Need to delay BF to perform traditional rites -BF may make breasts fall	Education, persuasion, modelling, environmental restructuring	• Provide mothers with information on lactation process and need to put baby to breast within birth hour

			• Prepare mothers psychologically to desire to BF immediately to promote lactation, even if they have a C/S • Modify traditional rites such that they do not interfere with EIBF/EBF, e.g. delay bathing, wash breasts before delivery, give prelacteals symbolically, etc • Use role models/BF Champions to demonstrate that BF does not impact negatively on breast shape
Automatic motivation	Perceived stress associated with EBF	Persuasion, modelling, environmental restructuring	• Use films/videos to illustrate that benefits of EBF far outweigh associated stress • Use of peer educators/role models/BF Champions to explore ways to reduce associated stress • Advocacy for improved work-based BF support, e.g. adequate paid maternity leave, provision of BF corners, etc • Community mobilization for greater family/community BF support
Physical opportunity	Poor HCP support for initiation and management of BF problems	Education, training, incentivisation,	• Reinforce HCPs knowledge of BF and upskill in management of BF

		enablement, environmental restructuring	problems through tailored training programs. • Devise a recognition/awards scheme for HCPs who best promote EBF. • Set up a 'Breastfeeding Club' within the clinic to provide BF support for women attending ANC/PNC • Reactivate and devolve community-based BF support groups. • Strengthen health systems
	Unsupportive workplace environment/policies	Education, persuasion, incentivisation, environmental restructuring	• Advocacy and sensitization programs for improved work-based BF support, e.g. adequate paid maternity leave, provision of BF corners, etc • Set up a state-wide recognition/rewards scheme for 'Baby-friendly workplaces'
Social opportunity	Poor family/community support	Education, persuasion, modelling	• Community mobilization for greater family/community BF support using existing meeting structures, use of role models/peer educators, role play, music, drama, etc

	Need to return to work whilst EBF/continued BF	Persuasion, modelling, incentivisation	• Community mobilization and education of men through men's socio-cultural and religious groups to promote spousal support. • Advocacy and sensitization programs for improved work-based BF support, e.g. adequate paid maternity leave, provision of BF corners, etc
	Husband/partner perception of breast changes due to EBF/continued BF	Education, persuasion, modelling	Educate men on physical changes that occur due to BF, and persuade using drama, videos, role play etc Use role models to show that women can EBF and still be attractive

The candidate interventions listed in Table 6.1. need to be selected and prioritised using evidence-based methods such as application of the APEASE criteria.[214,215] These should be considered by key stakeholders including policy makers, community leaders, HCPs, women and their significant others.

Candidate interventions deploying education, training, modelling, persuasion, incentivization of HCPs, and enablement through community-based support groups, may be most implementable, whereas some other interventions deploying environmental restructuring, incentives targeted at the workplace or community, and enablement through girl-child education or facility-based breastfeeding clubs, may be less easy to implement at scale as they require national policy making or large amounts of resource.

Drawing on the data from the systematic review, the survey and qualitative research, as well as wider literature, it appears that it is important to target individual, organizational/community, and population levels and to not only target pregnant women/recent mothers, but also families and communities and HCPs/facilities. Three components are recommended for consideration as part of the proposed intervention:

- 'No Water' Campaigns to reduce water in the first six months:- entailing community education and mobilization, engagement of mothers/significant others/community members.

- HCP capacity building through tailored training programs, supportive supervision, and behaviour change communication. Institution of recognition/awards scheme for high-performing HCPs and facilities in BF promotion/support.
- Lay support in the community, to complement the facility-based support from HCPs. This would involve the use of peer support, BF Champions/Guardians, and community-based support groups.

6.5. Strengths of the thesis

A strength of this thesis is that it has used three separate but interlinked studies to interrogate the overarching research question which was to explore candidate interventions, barriers and facilitators to exclusive breastfeeding up until 6 months in the context and setting of Lagos state, Nigeria.

The systematic review addressed what interventions work in LMICs to promote exclusive breastfeeding up until six months of age; previous reviews had either looked at interventions in both LMICs and HICs, or had looked at interventions focused on the whole period of exclusivity, i.e. 0 – 5 months or under six months of age. The fact that so many different interventions have been shown to be effective implies that there is an opportunity for identifying tailored interventions that are culturally acceptable and suited to the local context. Elements of the most suitable interventions for this purpose were addressed in the survey and extensive qualitative study.

The constituent studies in this thesis utilised robust research methods that were clearly outlined for reproducibility; large sample sizes were used to ensure validity and limit bias (quantitative), as well as provide different characteristics that may influence the outcomes of interest (qualitative).

This is the first study in published literature from Nigeria to use the COM-B model as its underpinning theoretical model; few studies on breastfeeding behaviour and practices in Nigeria have utilised an underpinning theory.

6.6. Limitations of the thesis

Although this thesis is one of the first studies to use the COM-B model to underpin breastfeeding research in Nigeria, it was not used in the quantitative study, as the survey tool which was chosen as the best one to use was not based on the COM-B model. Use of the COM-B theory in both studies could have allowed for more formal synthesis of the findings from each of the studies. Also, as described earlier, the COM-B model was hard to operationalise in some areas, and not much data was obtained on emotional automatic motivation due to the timing of application of the COM-B framework and the data collection methods used. Despite these limitations, it was still possible to use the Behaviour Change Wheel framework to propose candidate breastfeeding interventions tailored to the context of Lagos State, Nigeria.

For the systematic review, scoping literature search did not indicate much available literature. However, after embarking on the systematic review, it was found that there was more literature than initially thought from the scoping review, and the systematic review inclusion criteria/scope was wider/larger than could be managed within the time available for the review. This, along with other limitations arising from logistic challenges, resulted in the review taking much longer than planned, resulting in some modification of subsequent aspects of the thesis. With hindsight, the initial plan to include only trials in the review would have reduced the volume of studies screened and conserved time in the conduct of the review, whilst providing high-quality evidence for the meta-analysis; the results from all study types were similar to that obtained from RCTs only.

The COVID-19 pandemic and the attendant restrictions further limited the short time available to me as a split-site student to be onsite in the UK and take advantage of important support and resources. Coupled with other limitations, majorly logistics, the time spent on the Ph.D. program was much longer than planned. This had some knock-on effects, for example some new publications from Nigeria had been published which were not in the breastfeeding space at the time the Ph.D. research was conceptualised. However, despite this and other issues arising from the delay in my completion of the program, my research has made important contributions to knowledge in the breastfeeding landscape; these have been outlined in another section.

6.7. Implications of research findings for policy and practice

The findings of the systematic review presented in Chapter 3 point to the need for scaling up of effective national breastfeeding programs in LMICs, in line with previous studies.[216] Exclusive breastfeeding is critical in LMICs in relation to reducing neonatal, infant and child mortality. There is a need for interventions that best suit the resources, cultural context, and health service delivery system in Nigeria to be implemented at scale and sustained, in the bid to increase exclusive breastfeeding rates to coverage levels that would be effective in the reduction of infant and under-five mortality, towards the attainment of the SDGs by 2030.[63,217]

The 'zero water' campaign recently launched by Alive & Thrive Nigeria in conjunction with the Federal Ministry of Health, seeks to discourage the addition of water and other prelacteal feeds during exclusive breastfeeding. The findings from this body of research, and especially from the qualitative study, corroborate the fact that the addition of water to breastmilk in infants under six months of age is one of the major challenges faced in Lagos state in improving rates and duration of breastfeeding exclusivity. The HCP survey identified that a sizeable proportion of HCPs thought it was acceptable to supplement breastmilk with a formula feed in the event of poor weight gain (19%) or perceived breastmilk insufficiency (16%), or that added fluids would not hinder breastmilk flow (13%). Evidence-based interventions such as the 'Zero water' campaign need to be instituted and scaled up in Nigeria if the SDG targets of 2030 for breastfeeding are to be met.

In the same vein, although exclusive breastfeeding rates in Lagos state have been found to be higher than the national average,[61] they are still sub-optimal and can be further improved upon. In the light of the common practice of adding water to breastmilk especially when it is perceived that the baby is thirsty or when under pressure from significant others, there is a need to refine the assessment tools used for EBF. For example, 24-hour dietary recall alone may not identify those who had given pre-lacteal feeds at an earlier age. The use of at least two different indicators (e.g. EBF under six months, and EBF up until six months) and/or two different assessment methods (24-hour recall and historical method) would further help to give estimates that are closer to the true picture of exclusivity in our communities in Lagos state.

Drawing on the findings of the HCP survey and the qualitative study, health care services, especially at the primary health care level should be geared more towards the expansion of breastfeeding intervention programs, both in terms of coverage and impact, which should be monitored with measurable outcome indicators. As recommended from the findings of a systematic review and other empirical studies on the general effects of HCP training,[157,168] training and supportive supervision of HCPs should be carried out to build capacity, with more resources allocated to breastfeeding promotion and support programs. CHWs, who interface largely with women at the community level, and therefore have the potential for a high coverage of the population with breastfeeding support interventions, should be targeted for training and supportive supervision. Promising results have been observed in interventions deploying targeted training of attending staff,[218,219] although other research findings show that the need for supportive supervision of CHWs

increases the cost of their deployment and utilization.[158] Lay persons in the community such as Ward Development Committee members and other volunteers should be identified, harnessed, and trained to extend much-needed breastfeeding support services to the grassroots, especially to the large proportion of Nigerian women who do not deliver at a health facility, as has been done with positive results in other studies.[219,220]

Following on from the finding that maternal employment was a major barrier to exclusivity and long duration of breastfeeding in the qualitative study, there is a need for advocacy to be intensified and concerted for breastfeeding support in the workplace. This would include communicating the health and environmental benefits of recommended breastfeeding practices, the financial burden on the economy of not breastfeeding, urging the private sector and other levels of government to adopt the six month maternity leave and two weeks paternity leave instituted by the Lagos state government, and the provision of various forms of support to working mothers – creches/breastfeeding corners in workplaces, reduced/flexible working hours, remote working, among others.

Although the community leaders interviewed stated that their communities were largely supportive of the practice of breastfeeding, there were divergent views when it came to community support of exclusive breastfeeding, especially for the duration of six months. Improving the knowledge and attitude (psychological capability) of women and girls towards optimum infant feeding practices through sensitization and health education - whether or not they plan to have children soon - through women's community groups, religious groups, and other fora that focus on women, should be further explored. Similarly,

another barrier to exclusive breastfeeding identified in this study was perceived breastmilk insufficiency. Although not much research has been done in Nigeria to determine the proportion of perceived insufficiency that results from physiological problems, it is known that malnutrition is a major problem amongst women from this part of the world. Programs to improve female nutrition, starting from the girl-child, should be advocated for to promote the physical capability for breastfeeding when they do bear children.

6.8. Opportunities for future research

The systematic review conducted revealed areas where intervention studies were lacking in LMICs in general, and in Nigeria in particular. More research is needed to determine how EBF rates are affected by telephone-based interventions, interventions targeting significant others (father, mother-in-law), and interventions conducted solely in the community, workplace or policy contexts.

With the systematic review having provided evidence that almost all interventions were effective in improving rates of breastfeeding exclusivity, it would be important to determine the relative cost-effectiveness of interventions, as this would help in the choice of interventions by policy makers, health managers, planners, and funders, to implement and scale-up in this context.

More emphasis should be placed on the crucial issue of changing the common practice of giving water alongside breastmilk during the first six months of life, through the development of evidence-based interventions to address this issue. Using the findings

obtained from the qualitative study, theory-based intervention studies would be needed in the design of suitable interventions for this critical behaviour change, which if successful will impact positively on the rate of breastfeeding exclusivity, and in turn neonatal, infant, and child survival.

There is a need for the design and deployment of training programs that have been shown to be effective in improving the capacity of HCPs in the management of breastfeeding problems, as well as improvement in their attitudes and self-efficacy. To this end, evaluation studies of training programs from curriculum development to implementation and effectiveness should be undertaken.

6.9. Overarching conclusions

This doctoral thesis aimed to explore candidate interventions, barriers and facilitators to exclusive breastfeeding up until 6 months in the context and setting of Lagos state, Nigeria.

The systematic review concluded that a wide range of interventions deployed to support breastfeeding would increase exclusive breastfeeding rates by approximately twofold. Findings from the survey of HCPs in public health facilities in Lagos state showed critical gaps in their knowledge and attitudes, especially for managing breastfeeding problems and in their attitude towards the addition of water or formula feeds during the first six months of life; these are critical in relation to exclusive breastfeeding. Implementing interventions that address these issues is crucial, drawing on best evidence in delivering training that is

effective. The qualitative study identified facilitators of exclusive breastfeeding to include the knowledge of benefits of exclusive breastfeeding, personal determination of the mother to exclusively breastfeed, and the availability of a strong family/HCP support system. Identified barriers to exclusivity were the perceived need to add water in the first six months of life, perception of breastmilk insufficiency, the need for a mother to return to work, and lack of support for exclusive breastfeeding/pressure from significant others not to breastfeed, amongst others.

In the light of these findings and given that Nigeria is still a high burden country for infant and child morbidity and mortality, there is the urgent need for commitment from all stakeholders in the breastfeeding arena towards the development, funding, implementation, and sustenance of breastfeeding promotion programs, in a coordinated manner that would reset Nigeria on the path towards meeting the SDG targets in general, and specifically for SDG 3 on health, by 2030.

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APPENDICES

Appendix 1:

Protocol for systematic review - Prospero

UNIVERSITY of York
Centre for Reviews and Dissemination

NHS
National Institute for
Health Research

PROSPERO International prospective register of systematic reviews

Systematic review of interventions to improve breastfeeding exclusivity in low-and middle-income countries

Tolulope Olufunlayo, Kate Jolly, Neil Thomas, Christine MacArthur, Alero Roberts, Kofo Odeyemi

Citation

Tolulope Olufunlayo, Kate Jolly, Neil Thomas, Christine MacArthur, Alero Roberts, Kofo Odeyemi. Systematic review of interventions to improve breastfeeding exclusivity in low-and middle-income countries. PROSPERO 2016:CRD42016037029 Available from
http://www.crd.york.ac.uk/PROSPERO_REBRANDING/display_record.asp?ID=CRD42016037029

Review question(s)

To determine the effect of various interventions on breastfeeding exclusivity in low and middle income countries (LMICS) with a high initiation rate of breastfeeding.

Searches

This review intends to build on the earlier systematic review conducted by Sinha et al in 2014 on breastfeeding interventions, but with a restriction of the setting to LMICs with high initiation rate of breastfeeding. Thus, all studies included in the Sinha review which meet the inclusion criteria of this study will be included. The search will then be updated from between years 2014 – 2016 using the search strategy described as follows:

Published literature will be searched in the following electronic databases: PubMed, the Cochrane Library, and CAB database. The reference lists of articles identified from the review will be checked for relevant articles, and trials registers will be sought for any ongoing trial that relates to this review (such as clinicaltrials.gov, ICTRP from WHO). Relevant internet sites will also be searched. Grey literature would be sought from sources such as Conference Proceedings Citation Index (CPCI), Science Citation Index, Grey Literature Database, and through personal contact. No language restrictions will be applied in the initial search. Searches will commence from year 2014 till date. Papers prior to October 2014 will be identified from papers included in the systematic review conducted by Sinha et al [Sinha B, Chowdhury R, Sankar MJ, Martines J, Taneja S, Mazumder S, Rollins N, Bahl R and Bhandari N. Interventions to improve breastfeeding outcomes: A systematic review and meta-analysis. Acta Paediatrica. 2015;104(467):114-134.).

Types of study to be included

This review will include controlled experimental studies (randomized controlled trials, cluster randomized controlled trials, and non-randomized controlled trials). Also, observational studies having a concurrent comparator will be included

Condition or domain being studied

Exclusive breastfeeding for the first 6 months of life improves the growth, health and survival status of newborns. However, despite the evidence of its short- and long-term benefits, exclusive breastfeeding rates around the world are still far less than optimal. Globally, slightly less than 40% of all infants less than six months of age were exclusively breastfed in 2011. In spite of high initiation rates of breastfeeding prevalent in most low and middle-income countries, exclusive breastfeeding rates are well below the WHO benchmark of 90%. Underweight and suboptimal breastfeeding have been identified as underlying causes of 45% of deaths in children under five, and the majority of countries contributing to the greater share of maternal, new born and child morbidity and mortality – are in the low- and middle-income bracket.

Participants/ population

Target population for intervention are:

Pregnant women, or mothers of infants less than 6 months of age (at recruitment) in low- and middle-income

countries with a high initiation rate of breastfeeding

Intervention(s), exposure(s)
These will include interventions

(i) promoting exclusive breastfeeding,

(ii) delivered to/targeted at mothers in the antenatal or postnatal period (or both),

(iii) conducted in low and middle income countries with high initiation rates of breastfeeding; and (iv) including interventions spanning any of the following settings: Health systems and services, home and family environment, community setting, work environment, policy environment, and a combination of any of these settings.

Interventions should not be targeted specifically at sick babies or those with special needs

Comparator(s)/ control
The comparator group would comprise of standard or usual care, or no intervention at all.

Context
Setting must be located within a Low or Middle income country, and should have a high initiation rate of breastfeeding (>=80%)

Outcome(s)
Primary outcomes
The primary outcome for this study is the rate of exclusive breastfeeding (EBF) at specified points between day of birth and six months.

Secondary outcomes
Secondary outcomes of interest would be:

Initiation of breastfeeding within one hour of birth (early initiation of breastfeeding);

'Any breastfeeding' rates at specified points between day of birth and six months of age;

Rate of continued breastfeeding between 6 to 24 months (where reported)

Data extraction, (selection and coding)
Data extraction will be conducted independently by two authors who will review the abstracts selected from the search. An abstract will be selected for full review if one of the reviewers considers it potentially eligible. The full text articles of all selected abstracts will then be screened for eligibility, with a third reviewer resolving any disagreements.

Data extraction will be done using a proforma modified from the Cochrane data abstraction form, and then entered into a standardized database. Information to be extracted will include: study details including authors, year, aims and study design; population and setting; methods, including sampling, allocation to treatment groups, and power of the study; outcomes and methods of data analysis; results; and notes.

Risk of bias (quality) assessment
This will be carried out using the Cochrane risk of bias tool to assess each selected paper for potential sources of bias. These will include issues pertaining to: allocation, blinding of participants and personnel, blinding of outcome assessment, management of incomplete data, selective reporting, and other sources of bias. The Cochrane risk of bias tool for non-randomised studies of interventions (ACROBAT-NRSI) will be used to assess non-randomised studies included in the review. Two authors will independently assess the selected studies for risk of bias, and on this basis studies will be categorized into low risk, high risk, or unclear risk of bias; the assessment will be presented as a summary for each study and in graphical form.

Strategy for data synthesis
Included articles will be synthesized and reported both narratively and in tables to summarise the findings and the assessment of bias.

The study proposes to conduct a meta-analysis of the data overall and by relevant subgroups. Risk ratios with 95% confidence intervals will be used for dichotomous data, or will be calculated from other reported data where available. In the event of high heterogeneity, causes will be explored by doing sub-group analysis and meta-regression.

Analysis of subgroups or subsets
Subgroup analysis will be carried out based on participant, intervention and outcome characteristics such as intervention delivery settings (health systems and services, home and family, community, work environment, policy and combination of settings), nature of intervention, study size (less than 500, 500 to 1499, and greater than or equal to 1500), study design (RCT, quasi-experimental, observational), geographical location, rural versus urban setting, and quality of study (adequate versus inadequate).

Dissemination plans
Presentation of results within the University;

Presentation of results at conferences;

Publication of review upon completion in relevant journal(s);

Contact details for further information
Dr Olufunlayo

Institute of Applied Health Research,

The University of Birmingham,

Edgbaston, Birmingham

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Organisational affiliation of the review
Institute of Applied Health Research, University of Birmingham, Edgbaston, UK

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Review team
Dr Tolulope Olufunlayo, Institute of Applied Health Research, University of Birmingham, UK; Department of Community Health & Primary Care, College of Medicine, University of Lagos, Nigeria
Professor Kate Jolly, Institute of Applied Health research, University of Birmingham, UK
Dr Neil Thomas, Institute of Applied Health research, University of Birmingham, UK
Professor Christine MacArthur, Institute of Applied Health Research, University of Birmingham, UK
Dr Alero Roberts, Department of Community Health and Primary Care, College of Medicine, University of Lagos, Nigeria
Dr Kofo Odeyemi, Department of Community Health and Primary Care, College of Medicine, University of Lagos, Nigeria

Anticipated or actual start date
01 June 2016

Anticipated completion date
31 October 2016

Funding sources/sponsors
None.

Conflicts of interest
None known

Language
English

Country
England, Nigeria

Subject index terms status
Subject indexing assigned by CRD

Subject index terms
Breast Feeding; Health Promotion; Humans; Income

Stage of review
Ongoing

Date of registration in PROSPERO
05 July 2016

Date of publication of this revision
05 July 2016

Stage of review at time of this submission	Started	Completed
Preliminary searches	Yes	Yes
Piloting of the study selection process	Yes	No
Formal screening of search results against eligibility criteria	No	No
Data extraction	No	No
Risk of bias (quality) assessment	No	No
Data analysis	No	No

PROSPERO
International prospective register of systematic reviews
The information in this record has been provided by the named contact for this review. CRD has accepted this information in good faith and registered the review in PROSPERO. CRD bears no responsibility or liability for the content of this registration record, any associated files or external websites.

Appendix 2:

Ethical approval letters

Appendix 2.1. – University of Birmingham self- assessment form reply for systematic review

Appendix 2.2 – Lagos University Teaching Hospital (LUTH) Health Research Ethics Committee (HREC) approval

Appendix 2.3 - Lagos University Teaching Hospital (LUTH) Health Research Ethics Committee (HREC) approval extension

Appendix 2.4 – University of Birmingham letter of acceptance of LUTH HREC ethical approval

Appendix 2.1 - University of Birmingham self- assessment form reply for systematic review

Subject: Confirmation of self assessment form

Dear Kate Jolly,

Thank you for submitting a University Ethics Self Assessment Form (SAF) for your project entitled:

A systematic review of interventions to improve breastfeeding exclusivity rates in low- and middle-income countries

This was received and logged by the Research Support Group and has been assigned reference number **ERN_16-0640**. On the basis of the SAF you have submitted **no further ethical review is required.**

If you disagree with the assessment above (e.g. you have already submitted the required ethics applications, or your project falls under an existing ethical approval), or if the nature of your project changes during its course, please contact the Research Ethics Officer.

Please quote this reference number in any subsequent correspondence regarding any ethical review of this project, or to the Research Governance Officer in the event that the project is subject to review by the NHS National Research Ethics Service. You should also quote this reference number on a Request for Contract Services form if you require RSG to prepare or review any contracts arising from this project.

You may also quote this reference number to Research Finance staff as proof of ethical submission in respect of any grant or contract relating to this project.

Please note that the reference number relates to **this project ONLY**, and should not be transferred to any other project, nor should any further SAF be submitted for this project.

RSG Research Ethics Team

Appendix 2.2 – Lagos University Teaching Hospital (LUTH) Health Research Ethics Committee (HREC) approval



LAGOS UNIVERSITY TEACHING HOSPITAL
HEALTH RESEARCH ETHICS COMMITTEE

PRIVATE MAIL BAG 12003, LAGOS, NIGERIA
e-mail address: [redacted]

Chairman
PROF. N.U. OKUBADEJO
MB. ChB, FMCP

Administrative Secretary
D.J. AKPAN
B.Sc. (Hons) BUS. ADMIN,
MIHSAN

LUTH

Chief Medical Director:
PROF. CHRIS BODE
FMCS (NIG) FWACS

Chairman, Medical Advisory Committee
PROF. O.A. FASANMADE
MBBS, FWACP, FACE, FNSEM

LUTH HREC REGISTRATION NUMBER: NHREC: 19/12/2008a
Office Address: Room 107, 1st Floor, LUTH Administrative Block
Telephone: [redacted]

10th May, 2018

NOTICE OF EXPEDITED REVIEW AND APPROVAL

PROJECT TITLE: "FACILITATORS AND BARRIERS TO IMPROVING EXCLUSIVE BREASTFEEDING PRACTICES: DEVELOPMENT OF A COMMUNITY-BASED INTERVENTION WITHIN THE BABY FRIENDLY COMMUNITY INITIATIVE FRAMEWORK IN LAGOS STATE, NIGERIA".
HEALTH RESEARCH COMMITTEE ASSIGNED NO.: ADM/DCST/HREC/APP/2255
NAME OF PRINCIPAL INVESTIGATOR: DR. OLUFUNLAYO TOLULOPE FLORENCE
ADDRESS OF PRINCIPAL INVESTIGATOR: DEPT. OF COMMUNITY HEALTH AND PRIMARY CARE, LUTH.
DATE OF RECEIPT OF VALID APPLICATION: 30-04-18

This is to inform you that the research described in the submitted protocol, the consent forms, and all other related materials where relevant have been reviewed and given full approval by the Lagos University Teaching Hospital Health Research Ethics Committee (LUTHHREC).

This approval dates from 10-05-2018 to 10-05-2019. If there is delay in starting the research, please inform the HREC so that the dates of approval can be adjusted accordingly. Note that no participant accrual or activity related to this research may be conducted outside of this dates. All informed consent forms used in this study must carry the HREC assigned number and duration of HREC approval of the study. In multiyear research, endeavor to submit your annual report to the HREC early in order to obtain renewal of your approval and avoid disruption of your research.

The National code for Health Research Ethics requires you to comply with all institutional guidelines, rules and regulations and with the tenets of the code including ensuring that all adverse events are reported promptly to the HREC. No changes are permitted in the research without prior approval by the HREC except in circumstances outlined in the code. The HREC reserves the right to conduct compliance visits to your research site without previous notification.

[redacted]

Appendix 2.3 - Lagos University Teaching Hospital (LUTH) Health Research Ethics Committee (HREC) approval extension

LAGOS UNIVERSITY TEACHING HOSPITAL
HEALTH RESEARCH ETHICS COMMITTEE

PRIVATE MAIL BAG 12003, LAGOS, NIGERIA
e-mail address: [redacted]

Chairman
PROF. N.U. OKUBADEJO
MB. ChB, FMCP

Administrative Secretary
D.J. AKPAN
B.Sc. (Hons) BUS. ADMIN,
MIHSAN

Chief Medical Director:
PROF. CHRIS BODE
FMCS (NIG) FWACS

Chairman, Medical Advisory Committee
PROF. O.A. FASANMADE
MBBS, FWACP, FACE, FNSEM

LUTH HREC REGISTRATION NUMBER: NHREC: 19/12/2008a
Office Address: Room 107, 1st Floor, LUTH Administrative Block
Telephone: [redacted]

26th April, 2019

NOTICE OF EXTENSION OF RESEARCH APPROVAL DATE

PROJECT TITLE: "FACILITATORS AND BARRIERS TO IMPROVING EXCLUSIVE BREASTFEEDING PRACTICES: DEVELOPMENT OF A COMMUNITY-BASED INTERVENTION WITHIN THE BABY FRIENDLY COMMUNITY INITIATIVE FRAMEWORK IN LAGOS STATE, NIGERIA".
HEALTH RESEARCH COMMITTEE ASSIGNED NO.: ADM/DCST/HREC/APP/2255
NAME OF PRINCIPAL INVESTIGATOR: DR. OLUFUNLAYO TOLULOPE FLORENCE
ADDRESS OF PRINCIPAL INVESTIGATOR: DEPT. OF COMMUNITY HEALTH AND PRIMARY CARE, LUTH.
DATE OF RECEIPT OF VALID APPLICATION: 30-04-18
DATE OF RE-APPLICATION FOR EXTENSION OF RESEARCH APPROVAL DATE: 26-04-19

This is to inform you that the research described in the submitted protocol, the consent forms, and all other related materials where relevant have been reviewed and given full approval by the Lagos University Teaching Hospital Health Research Ethics Committee (LUTHHREC).

This approval dates from 26-04-2019 to 26-04-2020. If there is delay in starting the research, please inform the HREC so that the dates of approval can be adjusted accordingly. Note that no participant accrual or activity related to this research may be conducted outside of this dates. All informed consent forms used in this study must carry the HREC assigned number and duration of HREC approval of the study. In multiyear research, endeavor to submit your annual report to the HREC early in order to obtain renewal of your approval and avoid disruption of your research.

The National code for Health Research Ethics requires you to comply with all institutional guidelines, rules and regulations and with the tenets of the code including ensuring that all adverse events are reported promptly to the HREC. No changes are permitted in the research without prior approval by the HREC except in circumstances outlined in the code. The HREC reserves the right to conduct compliance visits to your research site without previous notification.

[redacted]

Appendix 2.4 – University of Birmingham letter of acceptance of LUTH HREC ethical approval

To: Kate Jolly (Institute of Applied Health Research)
Subject: RE: Facilitators and barriers to improving exclusive breastfeeding practices: development of a community-based intervention within the Baby-friendly Community Initiative framework in Lagos state, Nigeria

Dear Kate

The Chair of our STEM Ethics Committee has agreed that we can accept the approval from Lagos in lieu of further review/approval here.

Please note that any data which is sent to the UK must be treated in accordance with the University's data protection policy and the GDPR.

Any queries regarding the above, please don't hesitate to get in touch.

Kind regards

Research Ethics Officer
Research Support Group

C Block Dome

Aston Webb Building

University of Birmingham

Edgbaston B15 2TT

Appendix 3:

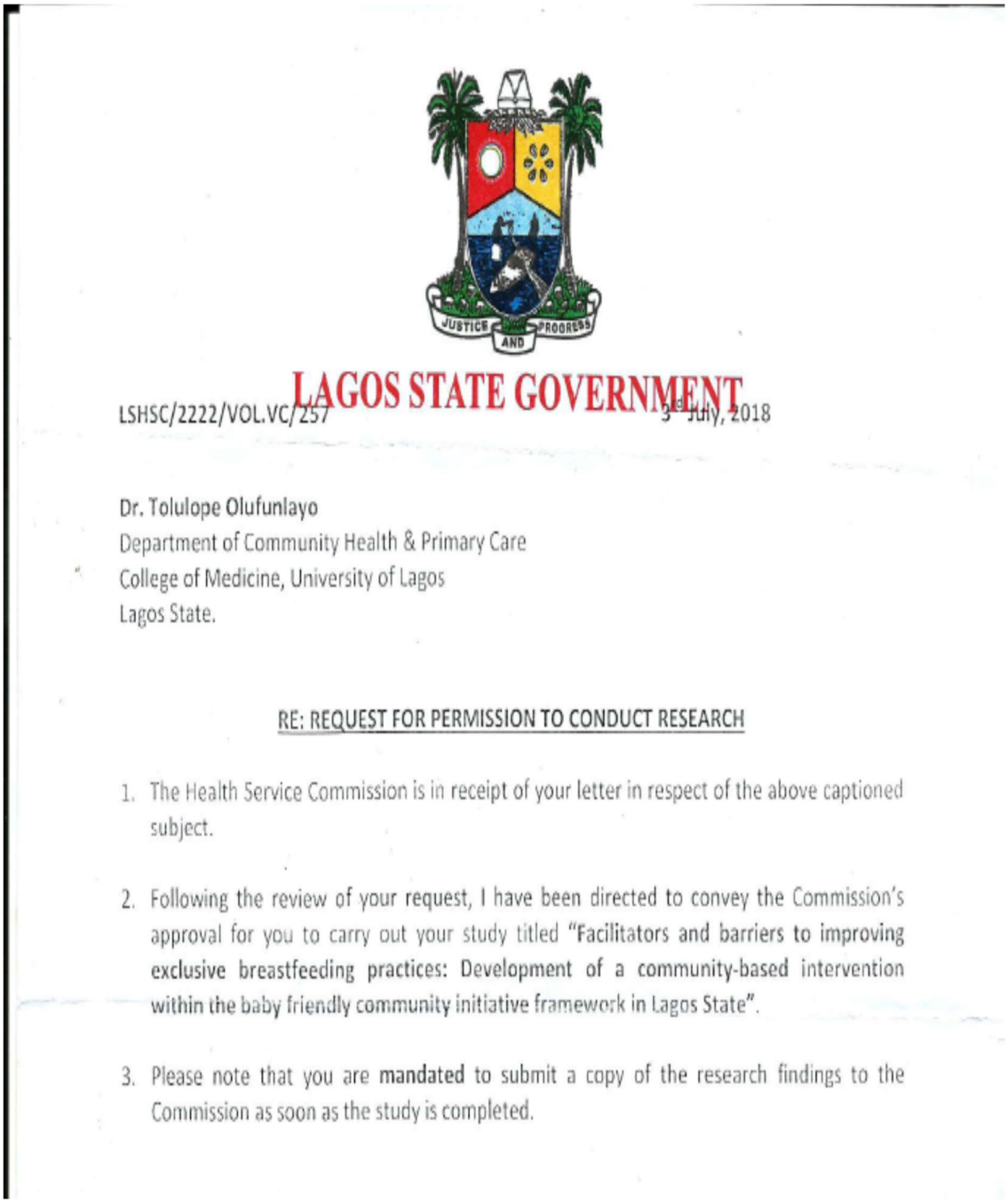
Letters of permission for data collection

Appendix 3.1 – Permission to conduct research from Lagos State Health Services Commission

Appendix 3.2 – Approval to conduct research from Lagos State Primary Health Care Board

Appendix 3.3 – Letter of introduction to Medical Officers of Health from Lagos State Primary Health Care Board

Appendix 3.1 – Letter of permission to conduct research from Lagos State Health Services Commission



LAGOS STATE GOVERNMENT

LSHSC/2222/VOL.VC/257 3rd July, 2018

Dr. Tolulope Olufunlayo
Department of Community Health & Primary Care
College of Medicine, University of Lagos
Lagos State.

RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH

1. The Health Service Commission is in receipt of your letter in respect of the above captioned subject.

2. Following the review of your request, I have been directed to convey the Commission's approval for you to carry out your study titled "Facilitators and barriers to improving exclusive breastfeeding practices: Development of a community-based intervention within the baby friendly community initiative framework in Lagos State".

3. Please note that you are **mandated** to submit a copy of the research findings to the Commission as soon as the study is completed.

Appendix 3.2 – Letter of approval to conduct research from Lagos State Primary Health Care Board

LAGOS STATE GOVERNMENT

LAGOS STATE
PRIMARY HEALTH CARE BOARD

LS/PHCB/MS/1128/VOL.III/028 30th June,2018

Dr. Tolulope Florence Olufunlayo,
Department of Community Health &Primary Care,
College of Medicine University of Lagos.
Lagos University Teaching Hospital.

APPROVAL TO CONDUCT A RESEARCH ON FACILITATORS AND BARRIERS TO IMPROVING EXCLUSIVE BREASTFEEDING PRACTICES:DEVELOPMENT OF A COMMUNITY -BASED INTERVENTION WITHIN THE BABY FRIENDLY COMMUNITY INITIATIVE FRAMEWORK IN LAGOS STATE,NIGERIA.

This is to acknowledge the receipt of your communiqué on the above subject and convey the **conditional approval** of the Lagos State Primary Health Care Board (LSPHCB) for the commencement of your research project.

2. Approval is also given for the project to be conducted at **Ibeju-lekki,Ikorodu,Lagos Mainland,Mushin,Ojo,Somolu,Surulere Primary Health Care Centers**

3. Approval is granted on the following terms and conditions:
   a. You will be subject to the rules and regulations as required by the PHCB and the PHCs where the questionnaires will be administered.
   b. Upon completion a copy of the research report must be submitted at the PHCB.

4. Upon arrival at the LGA/LCDA please report to the Office of the Medical Officer of Health (MOH) for further assistance.

5. Thank you.



Appendix 3.3 – Letter of introduction to Medical Officers of Health from Lagos State Primary Health Care Board

LAGOS STATE GOVERNMENT

LAGOS STATE
PRIMARY HEALTH CARE BOARD

LS/PHCB/MS/1128/VOL.III/029 30TH JUNE,2018.

The Medical Officer of Health

_____

_____

Attn: Officer-In-Charge

LETTER OF INTRODUCTION AND PERMISSION TO CONDUCT A RESEARCH STUDY ON FACILITATORS AND BARRIERS TO IMPROVING EXCLUSIVE BREASTFEEDING PRACTICES IN LAGOS STATE,NIGERIA.

Above subject refers.
This to convey the approval of the Lagos State Primary Health Care Board (PHCB) for the research project on **Facilitators and barriers to improving exclusive breastfeeding practices :development of a community based intervention within the baby friendly community initiative framework in Lagos state".**

2 Approval has been granted her to conduct research in the PHC of following LGA: **Ibeju-lekki,Ikorodu,Lagos Mainland,Mushin,ojo,Surulere,Somolu .**

3.It will involve the administration of questionnaires to **health workers whose job description involves taking care of pregnant and nursing mothers .**

4.Please, kindly accord the bearer all necessary assistance to facilitate this project.

5.Thank you.

Appendix 4:

Informed consent forms

Appendix 4.1 – Informed consent form for HCP Survey

Appendix 4.2 – Informed consent form for qualitative study

Appendix 4.1 – Informed consent form for HCP Survey

Facilitators and barriers to improving exclusive breastfeeding practices: development of a community-based intervention within the Baby-friendly Community Initiative framework in Lagos state, Nigeria

INFORMED CONSENT FOR HEALTH CARE WORKERS' (HCWs) SURVEY

This study seeks to determine the knowledge, attitudes, self-efficacy and breastfeeding support practices of health care workers in primary and secondary-level centres in Lagos state. This information will be used to assess facilitators and barriers to exclusive breastfeeding in Lagos state, and will be used in the development of a community-based intervention for infant feeding practices within the Baby-friendly Community Initiative. The study will also contribute to a doctoral degree.

Procedure of Research

If you are willing to participate, the procedure is a very simple and straight forward process which requires you providing some information; that is, a series of questions in a questionnaire would be given to you which we request that you answer as truthfully as possible.

Possible Risks, Discomforts and Inconveniences

The questionnaire should take approximately fifteen to thirty minutes to complete. It is anticipated that there is minimal risk to you being involved in answering the questions in this study.

Potential Benefits

I cannot guarantee that this study will be of benefit to you personally. However, it may provide additional information about exclusive breastfeeding and other recommended infant feeding practices, as information leaflets on infant feeding practices will be provided after the completion of data collection. The information you provide will however be very useful in the development of a program to help improve infant feeding practices within Lagos state.

Consequences of participant's decision to withdraw from research or orderly termination of participation

Your participation will be on one day only for approximately 30 minutes. You are free to withdraw from the study at anytime and your decision will be respected; your decision not to participate will not affect the project's relationship with your health facility in the future.

Modality of providing treatment and action(s) to be taken in case of injury or adverse effects

It is not anticipated that there will be either physical injury or any form of adverse effects from participation in this study.

Voluntariness

Your participation is entirely voluntary; your decision will not negatively affect the relationship of this project with your health facility/community.

Confidentiality

All the instruments used to collect information in this study will be given code numbers and no name will be recorded on the questionnaire. Thus the data cannot be linked to you in anyway. The results of this study will be presented at scientific or medical meetings and published in scientific journals. However, your identity cannot be disclosed because it will not be collected.

Participant's Responsibilities

As a participant, we expect you to provide honest and detailed responses to the questions, and to ask questions on any issue for which you need clarification.

Principal Researcher's Contact

Name: Dr. T. F. Olufunlayo

Address: Department of Community Health and Primary Care
College of Medicine University of Lagos/Lagos University Teaching Hospital

Idi-Araba, Lagos State

Telephone: xxxxxxxxxx

E-mail:

LUTH Health Research and Ethics Committee Contact

Room 107, Administrative Block

Lagos University Teaching Hospital

Idi-Araba, Lagos, Nigeria

HREC Approval Number and dates

Health Research Committee No: ADM/DCST/HREC/APP/2255; 10/05/18 – 10/05/19

Statement of Person Obtaining Informed Consent (Researcher)

I have fully explained the objectives and procedures involved in this study to the participant and have provided sufficient information to enable him/her take an informed decision.

Name: _____

Date: _____ Signature: _____

Statement of Person Giving Consent (Participant)

I have read the description of the research in a language that I fully understand. I have also talked it over with the researcher to my satisfaction and I understand that my participation is voluntary. I know enough about the purpose, methods and benefits of the research study to decide that I want to take part in it. I understand that I am free to discontinue my participation in this study at any time. I have received a copy of this consent form and additional information to keep for myself.

Name: _____

Date: _____ Signature: _____

Appendix 4.2 – Informed consent form for qualitative study

Facilitators and barriers to improving exclusive breastfeeding practices: development of a community-based intervention within the Baby-friendly Community Initiative framework in Lagos state, Nigeria

INFORMED CONSENT FOR QUALITATIVE INTERVIEW

Health Research Committee No ADM/DCST:/HREC/APP/2255

This is a study involving participants from selected study communities within Lagos state.

Purpose of Research

You are invited to participate in this study titled as stated above. Through your participation, we hope to determine and gain insight into the facilitators and barriers to improving exclusive breastfeeding practices within your communities. The information derived from this study will be used to design a culturally acceptable, community-based intervention to improve infant feeding practices in your community. The study will also contribute to a doctoral degree.

Procedure of Research

If you are willing to participate, the procedure is a very simple and straightforward process which requires you talking to a researcher in a face to face interview, or participating in a group discussion. The researcher will ask you about barriers and facilitators to exclusive breastfeeding among mothers and within your community. Kindly provide as much detail as possible.

Possible Risks, Discomforts and Inconveniences

Taking part in the interview will take between one to one and a half hours of your time. It is anticipated that there is minimal risk to you participating in this study.

Potential Benefits

I cannot guarantee that this study will be of benefit to you personally. However, it may help you to know more about the facilitators and barriers to exclusive breastfeeding in this community within Lagos state. It may also help change your perception towards the concept

of exclusive breastfeeding and other recommended infant feeding practices. You will be provided with light refreshment at the end of the interview.

Consequences of participant's decision to withdraw from research or orderly termination of participation

Your participation will be on one day only for not more than one hour. You are free to withdraw from the interview/discussion anytime and your decision will be respected; your decision not to participate will not affect the project's relationship with your community in the future. However, if you decide to withdraw after a group interview has commenced we will not be able to withdraw your contribution prior to you withdrawing.

Modality of providing treatment and action(s) to be taken in case of injury or adverse effects

It is not anticipated that there will be either physical injury or any form of adverse effects from participation in this interview/group discussion.

Voluntariness

Your participation in this study is entirely voluntary; your decision to participate, or not, will not prejudice you or negatively affect the relationship of this project with your community.

Confidentiality

The interview will be recorded and the reviewer will also take notes while the interview is on-going. All information collected during this study will be typed and coded. Personal identifiers will not be used in the data, in the thesis or any publication that will be produced. The recording will be destroyed as soon as the interview has been typed up and therefore it cannot be linked to you in anyway. Your name or any personal identifier will not be used in any publication or report from this study. The results of this research will be presented at scientific or medical meetings and published in scientific journals; however, your identity will not be disclosed because it cannot be linked to you.

Participant's Responsibilities

As a participant, we expect you to provide honest and detailed information to the interviewer, and to ask questions on any issue for which you need clarification.

Principal Researcher's Contact

Dr. T. F. Olufunlayo, Department of Community Health and Primary Care, College of Medicine University of Lagos/Lagos University Teaching Hospital
Telephone: xxxxxxxxxxx E-mail: [redacted]

LUTH Health Research and Ethics Committee Contact

Room 107, Administrative Block
Lagos University Teaching Hospital
Idi-Araba, Lagos, Nigeria

HREC Approval Number and dates

Health Research Committee No: ADM/DCST/HREC/APP/2255; 10/05/18 – 10/05/19

Statement of Person Obtaining Informed Consent (Researcher)

I have fully explained the objectives and procedures involved in this study to the participant and have provided sufficient information to enable him/her take an informed decision.

Name: _____

Date: _____ Signature: _____

Statement of Person Giving Consent (Participant)

I have read the description of the research in a language that I fully understand. I have also talked it over with the researcher to my satisfaction and I understand that my participation is voluntary. I know enough about the purpose, methods and benefits of the research study to decide that I want to take part in it. I understand that I am free to discontinue my participation in this study at any time. I have received a copy of this consent form and additional information to keep for myself.

Name: _____

Date: _____ Signature: _____

Appendix 5:

Survey instrument

Serial no: _____

Data collector: _____

BREASTFEEDING QUESTIONNAIRE FOR HEALTH CARE WORKERS

Facility:		**Date:**	
LGA: _____			

Please answer the questions as truthfully as possible. All information obtained using this questionnaire will be treated as strictly confidential.

Section A: Socio-demographic characteristics

1. Age (in years) .....
2. Sex ☐ Male ☐ Female
3. Marital status

   ☐ Single ☐ Currently married ☐ Divorced/separated/widowed

4. Ethnic group

   ☐ Yoruba ☐ Ibo ☐ Hausa

   ☐ Other (please specify) _____
5. Profession/occupation

   ☐ Medical doctor ☐ Nurse ☐ Community Health Officer (CHO)

   ☐ Midwife ☐ Community Health Extension Worker (CHEW)

   ☐ Nurse/midwife ☐ Other (Please specify) _____
6. Designation/ Rank (please indicate)

   _____
7. Current department

☐ ANC ☐ Maternity ☐ Postnatal clinic ☐ Paediatrics

☐ Child welfare/immunization ☐ Other (please specify) _____

8. Years of practice since graduation_____

Section B: Attitude towards breastfeeding

Please complete the following section by circling the number in the appropriate box

		Strongly disagree	Disagree	uncertain/ not applicable	Agree	Strongly agree
1.	Health professionals should actively encourage mothers seen in their practise to try breastfeeding	1	2	3	4	5
2.	Formula feeding is a good way of letting fathers care for the baby	1	2	3	4	5
3.	Breast milk is the ideal food for babies	1	2	3	4	5
4.	A mother who occasionally drinks alcohol should not breastfeed her baby	1	2	3	4	5
5.	Mothers intending to breastfeed should expect sore nipples as a normal part of breastfeeding	1	2	3	4	5
6.	Health professionals have little influence on a woman's decision to continue breastfeeding	1	2	3	4	5
7.	A breastfed baby is likely to have fewer infections than a formula fed baby	1	2	3	4	5
8.	Formula fed babies are more likely to be overfed than breastfed babies	1	2	3	4	5
9.	Breastfeeding is beneficial to a mother's health	1	2	3	4	5
10.	Breast milk alone can satisfy most babies for approximately the first six months of life	1	2	3	4	5
11.	Formula milk is more easily digested than breast milk	1	2	3	4	5
12.	Breastfeeding provides health benefits for infants that cannot be provided by formula	1	2	3	4	5
13.	It is practicable for mothers to breastfeed exclusively for six months	1	2	3	4	5

Section C: Knowledge of breastfeeding and breastfeeding management

Please complete the following section by circling the number in the appropriate box

		Strongly disagree	Disagree	uncertain/ not applicable	Agree	Strongly agree
1.	A woman who is exclusively breastfeeding is less likely to become pregnant three months after delivery than a woman who is formula feeding	1	2	3	4	5
2.	Giving other fluids alongside breast milk may hinder the establishment of a good milk supply in the newborn	1	2	3	4	5
3.	Giving pre-lacteal feeds (e.g. water, glucose water, herbal tea) to a healthy newborn before initiation of breastfeeding is acceptable	1	2	3	4	5
4.	Frequent breastfeeding in the early newborn period can help reduce jaundice	1	2	3	4	5
5.	Growth patterns of breastfed infants differ from those of formula fed infants	1	2	3	4	5
6.	If a breastfed infant is not gaining weight after a few weeks of birth, the mother should be encouraged to begin supplementing with formula	1	2	3	4	5
7.	A mother of an infant who feels she has insufficient breast milk should "top up" with a bottle of formula milk after each feed	1	2	3	4	5

For questions 8 – 12, please **CIRCLE the most appropriate response**

8. After birth, when do you advise that breastfeeding be initiated in a healthy newborn?

f) Within 30 minutes to one hour after delivery
g) After the baby has been weighed, bathed, and has rested
h) Within 24 hours following the delivery
i) When 'good' milk starts flowing, usually by 3rd day of life
j) When baby displays signs of hunger, e.g. rooting, crying, etc.

9. How frequently will you counsel a mother that her healthy newborn should be fed?

e) 8-12 times a day
f) Every hour
g) On demand, i.e. when baby displays feeding cues such as rooting, crying, etc.

h) Don't know
i) Other (please specify) _____

10. In counselling a pregnant woman or recent mother of a healthy, full term infant about feeding choices, which of the following best describes your advice to her?

g. Recommend exclusive breastfeeding up to six months, even if the mother is going back to work soon
h. Recommend exclusive breastfeeding up to when she will return to work, then supplement with formula
i. Recommend breastfeeding with allowance for water and/or other fluids
j. Recommend breastfeeding with formula supplementation
k. Recommend the use of prophylactic antibiotics in the newborn before commencing breastfeeding
l. Make no recommendation; the parents should decide based on their circumstances
m. Other (please specify) _____

11. If counselling a recent mother who is breastfeeding exclusively, when do you recommend the introduction of complementary foods - other foods apart from breast milk?

g. At 3-5 months
h. At 6 months
i. At 7 – 9 months
j. When the baby starts to reach for foods while mother/others are eating
k. When breast milk no longer satisfies
l. Other (please specify) _____

12. When you counsel a breastfeeding mother, for how long do you encourage her to continue breastfeeding?

f. Until baby is at least 12 months old
g. Until baby is at least 18 months old
h. Until baby is at least 24 months old
i. When the baby stops accepting breast milk
j. Other (please specify) _____

For questions 13 – 17, please **circle AS MANY OPTION(S) that apply**

13. If a woman develops mastitis, what do you usually advise her to do about breastfeeding? **(Circle ANY that apply)**

a. Continue to feed on both sides

b. Stop feeding on the affected side
c. Stop feeding altogether
d. Unsure / Don't know
e. Other (please specify) _____

14. If a mother complains of breast milk insufficiency which of the following options will help to resolve the problem:
(Circle ANY that apply)

a. Increase frequency of breast milk feedings
b. Top up each breastfeed with a bottle of formula
c. Seek expert assistance with positioning and attachment
d. Advise mother to drink more fluids
e. Unsure / Don't know
f. Other (please specify) _____

15. Which of the following symptoms could indicate POOR attachment at the breast:
(Circle ANY that apply)

a. Baby feeds very frequently and is unsettled
b. Mother has sore and cracked nipples
c. Mother reports repeated engorgement
d. Mother has mastitis
e. Unsure / Don't know
f. Other (please specify) _____

16. If a mother complains of sore nipples which of the following options will help to resolve the problem:
(Circle ANY that apply)

a. Stop feeding on the affected side
b. Check for symptoms of nipple thrush
c. Advise mother to apply breast milk to nipples
d. Seek expert assistance with positioning and attachment
e. Advise mother to apply lanolin to nipples
f. Unsure / don't know
g. Other (please specify) _____

17. The symptoms of nipple thrush can include:
(Circle ANY that apply)

a. Nipples are pink, sensitive and tender
b. Nipples are cracked

c. Shooting, burning pains in the breast
d. Breast is lumpy and red
e. White patches on nipple or breast
f. Unsure / don't know
g. Other (please specify) _____

Section D: Personal breastfeeding experience

1. Do you have any children? ☐ Yes ☐ No

2. If YES,

a) How many children do you have? _____

b) How many were breastfed at all?_____

c) How many were exclusively breastfed for at least three months? _____

d) How many were exclusively breastfed up to six months? _____

3. If you (or your partner) breastfed your child, please rate (indicate along the line below) how much you (or your partner) enjoyed the experience? (If more than one child was breastfed, please rate the most recent experience)

Hated it **Indifferent** **Loved it**

I_____I_____I

Section E: Health professional self-efficacy scale

We would like to know how confident you feel in doing certain activities. For each of the following questions, please choose the number that corresponds to how confidently you feel that you can do these tasks regularly at the present time.

Please circle one number for each of the following questions.

How confident are you that:

1. You can teach correct positioning and attachment at the breast?

Not at all confident 1 2 3 4 5 6 7 8 9 10 completely confident →

2. You can support women to breastfeed for as long as they would like to?

Not at all confident 1 2 3 4 5 6 7 8 9 10 completely confident →

3. You can identify breastfeeding problems?

Not at all confident 1 2 3 4 5 6 7 8 9 10 completely confident →

4. You can solve breastfeeding problems?

Not at all confident 1 2 3 4 5 6 7 8 9 10 completely confident

5. You can support women to breastfeed exclusively to 6 months?

Not at all confident 1 2 3 4 5 6 7 8 9 10 completely confident

SECTION F: TRAINING AND PRACTICE OPPORTUNITIES

1. Which of the following best describes the opportunities you have had to practice the skills necessary for effective breastfeeding support?

    a. I have counselled a mother about breastfeeding problems at least twice in the last 12 months
    b. I have taught a new mother about breastfeeding techniques at least twice in the last 12 months
    c. Both (a) and (b) above are applicable
    d. It has been more than 12 months since I counselled a mother about breastfeeding techniques or problems
    e. I have never counselled a mother about breastfeeding techniques or problems

2. If a pregnant woman or lactating mother comes to your clinic for any reason, would you initiate a discussion concerning breastfeeding with her?

    a. Yes, routinely
    b. Yes, occasionally
    c. Hardly ever
    d. No, I would not
    e. Unsure/don't know

3. Did you receive basic instruction on breastfeeding issues during your training as a health care worker (pre-service training)?
    a. Yes
    b. No
    c. Can't remember

4. Since you started work, what type of training have you received on breastfeeding?

    a. Training in form of lecture, seminar, etc; with little opportunity for hands-on/practical experience
    b. Instructional techniques that offer greater opportunities for active learning and in-depth coverage – role play, videotape, demonstration, practical, etc

c. Both (a) and (b) apply to me
d. Other (please specify) _____
e. No instruction whatsoever
f. Can't remember

5. How would you rate the level of clinical breastfeeding instruction you have received in relation to your ability and confidence to provide support to breastfeeding mothers?
   a. Adequate
   b. Inadequate
   c. Grossly inadequate
   d. No preparation to provide breastfeeding support
   e. Unable to assess/unsure

6. Have you attended a presentation, workshop, lecture or other form of training on breastfeeding management in the last three years?

   a. Yes
   b. No
   c. Cannot recall

7. Do you see the need for you to receive additional education/training on breastfeeding management?

   a. Yes
   b. No
   c. Not sure

If you work at PHC level, please answer the last two questions (Qu 8 & 9)

Health care workers at secondary or tertiary health facilities do not need to answer the last two questions.

The Baby-Friendly Community Initiative (BFCI) promotes optimal infant and young child feeding practices by setting up a number of community interventions supported by health care workers.

8. Would you be willing to receive training in this initiative?
   a. Yes
   b. No

c. Not sure

9. If trained in BFCI, how willing would you be to provide additional support to mothers within your target community on breastfeeding issues?
    a. Very willing
    b. Somewhat willing
    c. Not willing at all
    d. Not sure

If not sure or not willing to provide additional support, could you please specify your main concerns? _____

Thank you for taking the time to participate in this study!

Appendix 6:

Interview guides

Appendix 6.1 – Interview guide for pregnant women

Appendix 6.2 – Interview guide for recent mothers

Appendix 6.3 – Focus group discussion guide

Appendix 6.4 – Key informant interview guide

Appendix 6.1 – Interview guide for pregnant women

IN-DEPTH INTERVIEW GUIDE – PREGNANT WOMEN

Introduction and exchange of pleasantries

Ice breaker: ***Please tell me about your pregnancy and how it has been so far***

Main questions *(NB: the language level used in asking the questions may vary, depending on that of the respondents)*

- Have you made plans for how you will feed your baby when born? If yes, please tell me about your plan for feeding your baby? Why have you decided to feed your baby this way? (explore)
- After giving birth, when do you plan for your baby to first be given breast milk? Will you give any other liquids/foods before breast milk? What are your reasons? (explore)
- Are you planning to give your baby only breast milk, or will you also give baby formula milk or other drinks like water?
- If you plan to give only breast milk and nothing else, how long do you plan to do this for? For how long do you intend to breastfeed overall? (explore why)
- When do you plan to start introducing other foods into your baby's diet? What type of foods would you start this process with?

Prompts:

- View on use of infant formula, expressed breast milk, feeding infant with cup and spoon, feeding bottle, use of pacifier, etc.
- View on facilitators/inhibitors of breast milk flow in lactating mother – specific foods, drinks, lifestyle, etc.

Narrative: ***How does the family/ community/ culture feel that infants should be fed and why (community/cultural perceptions)?***

Prompts:

- How do other mothers in your community feed their babies? Why is this so? What do you think about this?
- What are the cultural views/perceptions on infant feeding practices?
- What are the source(s) of information on breastfeeding/your preferred sources?
- Who/what are the key influences in determining planned feeding choices; preferred person/place to approach for help if needed for feeding problems?

Appendix 6.2 – Interview guide for recent mothers

IN-DEPTH INTERVIEW GUIDE –

RECENT MOTHERS (<1YR)

Introduction and exchange of pleasantries

Ice breaker: Generally how do you think your baby is growing so far? Are you satisfied with his/her growth?

Main questions: *(NB: the language level used in asking the questions may vary, depending on that of the respondents)*

- What plans/expectations did you have for feeding your baby while pregnant?
- Since baby's birth, how have your plans for feeding baby compared with reality – what has actually happened and why? Have you been able to feed your baby as planned? What informed changes if any? Who/what influenced the changes?
- How soon after birth was breastfeeding initiated? Was breast milk your baby's first fluids, or did you give other fluids before you commenced breastfeeding? Why? (Explore)
- What has the feeding journey been like? How long do you expect to breastfeed for in total? Exclusively? (N.B. *Exclusive breastfeeding means that an infant receives only breast milk from his/her mother or a wet nurse, or expressed breast milk, and no other liquids or solids, not even water, with the exception of oral rehydration solution, drops or syrups consisting of vitamins, minerals supplements or medicines*)

Prompts:

- Personal view on feeding practices – colostrum, pre-lacteal feeds (water, other fluids), exclusive breastfeeding/duration, timing of introduction & type of complementary foods, total duration of breastfeeding
- View on use of infant formula, expressed breast milk, feeding infant with cup and spoon, feeding bottle
- View on facilitators/inhibitors of breast milk flow in lactating mother – specific foods, drinks, lifestyle, etc.

Narrative: How does the family/ community/ culture feel that infants should be fed and why (community/cultural perceptions)? What is your opinion about the community's views and practices in relation to infant feeding?

Prompts:

- Cultural views/perceptions on infant feeding practices
- Source(s) of information on breastfeeding and preferred sources
- Key influences in determining planned feeding choices; preferred person/place to approach for help if needed for feeding problems

Appendix 6.3 – Focus group discussion guide

Focus Group Discussion GUIDE

D. Older women (mothers, mothers-in-law, grandmothers)

E. Husbands of pregnant women/recent mothers

F. Members of Community Development Associations/Community Development Committees/Ward Development Committees (CDA/CDC/WDC) within study areas

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Introductions and exchange of pleasantries

Ice breaker: Are you happy with the way children in this community are growing?

(NB: the language level used in asking the questions may vary, depending on that of the respondents)

Discussion guide:

1. In your view, how do you think babies should be fed? Why do you think so?

2. How does the community/culture/religion dictate that infants should be fed and why? (community/cultural perceptions/religious beliefs)

3. What do you know to be the benefits of exclusive breastfeeding? Disadvantages?

NB: Exclusive breastfeeding means that an infant receives only breast milk from his or her mother or a wet nurse, or expressed breast milk, and no other liquids or solids, not even water, with the exception of oral rehydration solution, drops or syrups consisting of vitamins, minerals supplements or medicines

4. How does the community view the following practices: exclusive breastfeeding, giving of pre-lacteal feeds, feeding with colostrum, expression of breast milk, etc.

5. How does the community view formula feeding? How is it perceived? What are the benefits, disadvantages?

6. What role(s) does the mother play in infant feeding?

7. What role(s) do other family members (e.g. father, grandmother, mother-in-law, etc) play in infant feeding?

8. Does the media/advertising affect infant feeding practices? Do health care professionals affect infant feeding practices? If yes, in what way?

9. How do you think a woman's return to work/business may affect how she feeds her baby?

10. How acceptable is breastfeeding in your community? How about exclusive breastfeeding? How does the community support breastfeeding?

11. In what way(s) can your community be more supportive of breastfeeding mothers? How can the community help?

Areas to probe:

- Perceptions on exclusive/non-exclusive breastfeeding /no breastfeeding at all; anticipated duration); reasons for decisions made
- Personal& cultural views about feeding practices – colostrum, pre-lacteal feeds (water, other fluids), timing of initiation, exclusive breastfeeding/duration, timing of introduction & type of complementary foods, total duration of breastfeeding
- Customs surrounding birthing and the neonatal period – bathing of baby, naming ceremony, use of pre-lacteal feeds, antibiotics, health-seeking practices in neonatal period, etc. (Why are some children not breastfed immediately after birth in this community?)
- View on use of infant formula, expressed breast milk, feeding infant with cup and spoon, feeding bottle
- View on facilitators/inhibitors of breast milk flow in lactating mother – specific foods, drinks, lifestyle, etc.
- Source(s) of information on breastfeeding/preferred sources, and how best infant feeding messages can be targeted for effectiveness
- Key influencers in determining planned feeding choices/who to approach for help if needed for feeding problems – i.e. In this community, the most important person/institution in determining recommended infant feeding practices?
- Perceived roles of community members/structures useful for promoting optimal IYCF practices (visible and hidden community resources) – how can this community support optimal IYCF practices?

Appendix 6.4 – Key informant interview guide

KEY INFORMANT INTERVIEW GUIDE

D. Health care providers, with main focus on community health workers

E. Traditional Birth Attendants (TBAs)

F. Other community leaders, including traditional rulers, religious leaders, women's group leaders, market women leaders, etc.

(NB: the language level used in asking the questions may vary, depending on that of the respondents)

Introduction and exchange of pleasantries

Narrative: *How does the community/culture/religion dictate that infants should be fed and why (community/cultural perceptions)?*

Narrative: *In your view, how should babies be fed? Why do you think so?*

Narrative: *What do you know to be the benefits of exclusive breastfeeding? Disadvantages? What are the benefits of formula feeding? Disadvantages?*

Narrative: *In your role as a leader in this community/in the health care sector, what are the main influences shaping your attitude and practices towards infant feeding? What advice do you give pregnant women/recent mothers concerning their infant feeding choices?*

Narrative: *What are the main factors influencing infant feeding practices in your community? Why?*

Narrative: *How is breastfeeding perceived in your community? (Probe whether acceptable or not acceptable?) How does the community support breastfeeding? In what way(s) can your community be more supportive of breastfeeding mothers?*

Areas for probing:

- Perceptions on exclusive/non-exclusive breastfeeding /no breastfeeding at all; anticipated duration); reasons for decisions made
- Personal& cultural views on feeding practices – colostrum, pre-lacteal feeds (water, other fluids), timing of initiation, exclusive breastfeeding/duration, timing of introduction & type of complementary foods, total duration of breastfeeding

- Customs surrounding birthing and the neonatal period – bathing of baby, naming ceremony, use of pre-lacteal feeds, antibiotics, health-seeking practices in neonatal period, etc. (Why are some children not breastfed immediately after birth in this community?)
- View on use of infant formula, expressed breast milk, feeding infant with cup and spoon, feeding bottle
- View on facilitators/inhibitors of breast milk flow in lactating mother – specific foods, drinks, lifestyle, etc.
- Cultural views/perceptions on infant feeding practices
- Source(s) of information on breastfeeding/preferred sources, and how best infant feeding messages can be targeted for effectiveness
- Key influencers in determining planned feeding choices/who to approach for help if needed for feeding problems – i.e. In this community, the most important person/institution in determining recommended infant feeding practices?
- Perceived roles of community members/structures useful for promoting optimal IYCF practices (visible and hidden community resources) – how can this community support optimal IYCF practices?