Development of Nurse-led health educational programme to improve home Management of Childhood Diarrhoea (HMCD) among mothers in Ogun State, Nigeria

by

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I proclaim that this thesis is my own work and that all the sources cited have been recognised and acknowledged using comprehensive list of references.

This thesis has also been subjected to reliable software testing to check its originality.

I further confirm that this thesis has never been submitted at any institution of higher learning elsewhere before, including submission to Unisa for any degree purposes

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ABSTRACT

Diarrhoea remains one of the major public health concerns among children under the age of five years. Several studies, especially in developing countries, including the study setting, have reported the poor home management of childhood diarrhoea (HMCD) among mothers with under-five children. Recommended HMCD include administering Oral Rehydration Solution (ORS), zinc supplements and maintaining continuous feeding. Providing health education tailored to the needs of rural population will help in improving their home management practices of childhood diarrhoea.

The purpose of the study was to develop a nurse-led health educational programme aimed at improving home management of childhood diarrhoea among mothers in Ibogun community, Ogun State, Nigeria. The study is quantitative in nature and utilised a quasi-experimental one group study design method. A total of 134 mothers with under-five children participated, selected using multistage sampling technique.

This study was in three phases, the first phase involved collection of baseline data on mothers' knowledge, attitude and practice of home management of childhood diarrhoea. The second phase consisted of conducting a nurse-led health educational intervention using a well-developed and validated health educational programme. At the last phase, the researcher collected the post-intervention data. Data were obtained using a questionnaire and an observational checklist. The questionnaire demonstrated strong content validity and excellent reliability based on test-retest analysis using Pearson correlation, with more than 90% of the items showing perfect correlations ($r = 1.000$). The observational checklist also showed strong content validity, with all items were yielding statistically significant Intraclass Correlation Coefficient (ICC) values.

Data collected were coded, entered and cleaned using Statistical Package for Social Sciences (SPSS), Version 29.0. Analysis was conducted using descriptive and inferential statistics at a 0.05 significant level. All ethical principles guiding research involving human participants were followed all through the research process.

The study findings revealed poor knowledge, negative attitude, and poor home management of childhood diarrhoea among the mother's pre-intervention. The nurse-led intervention significantly improved mothers' knowledge, attitude and practice of HMCD. This highlights the effectiveness of the programme and the importance of the nurse-led health education, the researcher thus recommends that this programme should be adopted by all stakeholders in improving home management of childhood diarrhoea among mothers in the state and nation at large.

Key concepts

Attitude; diarrhoea; health education; home management; knowledge; mothers; nurse-led; practice; under-five children.

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DEDICATION

I dedicate this thesis to God the Father, God the Son and God the Holy Spirit, for the strength and wisdom bestowed on me to undertake this study.

I also dedicate it to my late father, Evangelist Joseph Olutunmbi Olaobaju, whose care, influence and value for education have continued to motivate and guide me even in his absence.

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LIST OF ABBREVIATIONS

AJOL	African Journals Online
ANOVA	Analysis of Variance
CINAHL	Cumulative Index to Nursing and Allied Health Literature
CREC	College Research Committee
EBF	Exclusive Breastfeeding
EMBASE	Excerpta Medica Database
HINARI	Health InterNetwork Access to Research Initiative
HMCD	Home Management of Childhood Diarrhoea
IMCI	Integrated Management of Childhood Illnesses
ICC	Intraclass Correlation Coefficient Analysis
I-CVI	
IQ	Interquartile Range
IRB	Institution's Ethical Review Board
IVF	Intravenous Fluid
JSTOR	Journal Storage
KAP	Knowledge, Attitude, Practice
LGA	Local Government Area
LMICs	Low- and Middle-income countries
MDG	Millenium Development Goals
MEDLINE	Medical Literature Analysis and Retrieval System Online
N	Sample Size
np	no pagination
ORS	Oral Rehydration Solution
SC-VI	
SD	Standard Deviation
SE	Standard Error
SDG	Sustainable Development Goals
SPSS	Statistical Package for the Social Sciences
SSS	Salt Sugar Solution
UNICEF	United Nations International Children’s Emergency Fund
UNISA	University of South Africa
WHO	World Health Organization

Likert Scale Response

SA	Strongly Agree

A	Agree
U	Undecided
D	Disagree
SD	Strongly Disagree

Study Time Points

T0	Baseline Measurement
T1	First Follow-up Measurement (Time 1)
T2	Second Follow-up Measurement (Time 2)

CHAPTER 1

ORIENTATION TO THE STUDY

1.1 INTRODUCTION

Children are highly susceptible to diarrhoea because their immune systems are still developing (Kloc, Ghobrial, Kuchar, Lewicki, Kubiak, 2020:[1]). Good health and well-being for every child aligns with one of the Sustainable Development Goals (SDG # 3) adopted by the United Nations (World Health Organization [WHO] 2023b:np). The future of any society depends on its children; therefore, every society must put in efforts to ensure that its children are healthy (United Nations International Children's Emergency Fund (UNICEF [s.a.]b:np). The Sustainable Development Goals (SDGs) address numerous problems affecting children under five years. Diarrhoea disease is a significant health problem among children under five, largely resulting from unsanitary conditions and contaminated water (WHO [s.a.]:1-32). Implementing SDGs 6 (sixth goal clean water and sanitation) will help prevent diseases such as diarrhoea, which, if not properly managed, can lead to malnutrition complicating the child's health status (UNICEF [s.a.]a:np; Sridhar, Okareh & Mustapha 2020:1; Shehu & Nazim 2022:1-2; United Nations Development Programme 2023:1). Efforts should be directed towards preventing and promptly managing diseases that disproportionately affect children under the age of five years (WHO 2022:1).

Diarrhoea is a life-threatening condition for children under five years old (Ugboko, Nwinyi, Oranusi, & Oyewale, 2020:1; Momoh, Olufela, Adejimi, Roberts, Oluwole, Ayankogbe, & Onajole, 2022:1). This disease typically causes malnutrition and dehydration. If not treated promptly, it rapidly results in death among children under five (Oduntan, Sotunsa, & Olajide 2020:3). Globally, diarrhoea disease is responsible for an estimated two million deaths among children each year (Jagadeesh, Narasannavar, Kamble, Prakasha & Raja 2024:322). According to the WHO, as cited in Oduntan et al (2020:3), the mortality rate of children under-five due to diarrhoea has decreased significantly over the years worldide, especially in developed countries. In 1990, the total number of under-five deaths was 12.6 million, and this reduced to 5.3 million in 2018. However, the burden of diarrhoea remains high in developing nations, with more than 12 million deaths are recorded

annually (Fufa, Gebretsadik, Gebregergs & Mokonnon 2019:2; Alghadeer, Syed, Alhossan, Alrabiah, Babeghaith, Al Arifi & Alwhaibi 2021:1).

According to Egbewale, Karlsson, Sudfeld (2022:[1]), the burden of under-five mortality is high in Nigeria. The country's under-five mortality rate is 114 deaths per 1,000 live births: diarrhoea accounts for approximately 16% of these deaths. Diarrhoea disease was the second leading cause of childhood deaths in 2019, after neonatal disorders such as lower respiratory disorders, meningitis and malaria. Globally, in 2019, it is estimated that 858,000, children died due to diarrhoea, with Nigeria accounting for nearly a quarter of global diarrhoea-related deaths. These statistics highlight the urgent need for effective actions to prevent unnecessary child deaths (Ogunbiyi, Ayolabi, Olukoya, Obi, Ayolabi, Onabade, Olawale & Unachukwu 2023:191). Nigeria's under-five mortality due to diarrhoea is quite alarming, despite having a relatively low number of children (Egbewale, Karlsson, Sudfeld, 2022:[1]). It is worth noting that more than 130,000 children die every year in Nigeria, highlighting the country's severe vulnerability (Ogunbiyi, Ayolabi, Olukoya, Obi, Ayolabi, Onabade, Olawale & Unachukwu 2023:191).

World Health Organization in Azeez, Henderson-Mitchella, LaFevor & Gregg (2023: 875) emphasises that access to safe water and sanitation is crucial for health, well-being and daily functioning. Access to and consumption of safe water are among the basic human rights. Safe water should be free of microorganisms caused by contamination. Water, if not properly maintained, can easily become contaminated, and the consumption of unsafe water can lead to serious health outcomes, including diarrhoea. Similarly, an improved sanitation facility should ensure that human water and food have no contact with human-generated wastes. Supporting this, Imarhiagbe and Eghomwanre (2023:1229-1230) note that inadequate access to a good source of water and adequate sanitation increases human vulnerability to gastrointestinal diseases, including diarrhoea.

Victor, Kupoluyi, Oyinlola and Sule 2025: [5-12] reported inadequate access to Water, Sanitation, and Hygiene (WASH) facilities among children in Nigeria. It was observed that one-third of Nigerian children lack access to at least one essential WASH service. Less than 40% lack access to potable water, while more than half are deprived of improved toilet facilities, increasing their exposure to water-related diseases. Poor hygiene remains a significant problem, indicating that children will continue to be vulnerable to preventable diseases. Factors identified as responsible for these problems include the educational

status of the father and residential areas. Fathers with no or only primary education could not afford good accommodation where there is adequate water. Regional and residential disparities were also pronounced. Across all geopolitical zones, lack of sanitation facilities appears more significant than poor water and hygiene in relation to diarrhoea diseases. Overall, WASH deprivation was significantly associated with the father's economic and educational status, including place of residence.

In Ogun state, Nigeria, diarrhoea is one of the prevalent diseases associated with poor source of water affecting infants and young children. Regardless of diarrhoea-induced causes, reported aggravating factors responsible for the high rate of diarrhoea in this state in Nigeria are dirty environment, open defecation, and poor sources of drinking water (Ugboko et al 2020:1).

Diarrhoea can easily be prevented and treated at home once diagnosed (Oji & Okafor 2020:90; Alghadeer et al 2021:1-2). The World Health Organization (WHO) and United Nations International Children's Emergency Fund (UNICEF) advocated that diarrhoea home management should start at home once it is observed that a child is experiencing diarrhoea (Omole, Wamyili-Mshelia, Nmadu, Usman, Andeyantso & Adiri 2019:20). Oral rehydration solution (ORS), zinc supplementation, continuous feeding, and copious amounts of water are recommended by the WHO once diarrhoea episodes begin (Fufa et al 2019:2; Saha 2021:27; Momoh et al 2022:2; Terefe, Murugan, Bededa, Bacha & Bekele 2022:2; UNICEF 2022:np).

Although some studies report good practices in home management of childhood diarrhoea (HMCD), however, most mothers, especially those living in rural communities, have inadequate knowledge of ORS preparation, dosage, and function. Many also found it difficult to access zinc supplements (Fufa et al 2019:6; Gathogo, Oluchyna & Mwangi 2020:2450). Amu, Olatona, Adeyemi and Adegbilero-Iwari's (2022:6) study conducted among mothers residing in one of the urban settings in Lagos State, Nigeria, reported that despite the simplicity and availability of the recommended HMCD, many mothers still do not practice it. Some mothers still have wrong beliefs about the causes of diarrhoea. Alghadeer et al's (2021:6) in Saudi Arabia and Keto, Alemu and Mamo's (2020:343) in Addis Ababa reported that many mothers still believed that teething is responsible for diarrhoea among children.

Furthermore, Oluseye and Oluwatosin (2019:81, 84) previous findings among mothers of the proposed community (Ibogun) revealed “inadequate knowledge of HMCD and its practice among study participants”. The study revealed that more than 50% had low knowledge of HMCD, and approximately 60% practised HMCD inappropriately. Overall, 90% of the mothers had both inadequate knowledge and poor practices regarding HMCD. The mother’s perception of causative factors of diarrhoea includes too much food (81.4%), consumption of bad breastmilk (88.1%), teething (77.9%), and weaning process (65%) which influenced their home management of diarrhoea. Although more than 60% indicated they had previously used ORS/SSS in managing diarrhoea in a child, half combined other drugs with it, when the diarrhoea did not resolve, reflecting poor HMCD.

Studies revealed that targeted health education interventions can effectively improve mothers’ knowledge and practices related to diarrhoea management (Oji & Okafor 2020:90; Alghadeer et al 2021:2). However, few nurse-led interventional studies in the Southwest Nigeria have comprehensively addressed knowledge, attitude, and practice of HMCD (Oji & Okafor 2020:96; Oduntan et al 2020:9). Therefore, this interventional study focused on improving mothers’ knowledge of HMCD, and their practice as regards it. Focusing on mothers’ ability to prepare ORS correctly, administer the recommended zinc dosage, and continue feeding the affected child with age-appropriate diet during diarrhoea episodes. Based on the highlighted gaps in the study community and the limited nurse-led health education programmes in similar settings, there is a need for a context-specific, evidence-based intervention. Health education has been discovered to be an important tool for enhancing mothers’ understanding of diarrhoea prevention and treatment (Alghadeer et al 2021:2). Therefore, this study aimed to develop, validate, and implement a nurse-led health education programme to improve mothers’ knowledge, attitude, and practice of home management of childhood diarrhoea in Ibogun community, Nigeria. The programme consists of three modules; the first module focuses on knowledge about diarrhoea and dehydration, the second addresses how to manage diarrhoea at home and misconceptions about HMCD, and the third module emphasises demonstration of appropriate home management practices. This envisaged nurse-led health education intervention employed various educational strategies such as teaching and demonstration, to improve mothers’ knowledge, attitude, and practice of HMCD.

The study utilised a pre-experimental design to assess changes in mothers’ knowledge, attitudes, and practices as regards HMCD. This design provides initial evidence, but it’s

prone to several threats to internal validity such as history, maturation and test effects. External events during the study period, such as mass media messages or community awareness programme related to childhood diarrhoea, may have contributed to observed changes. Improvements in outcomes may also reflect natural changes over time, especially across the one-month follow-up. In addition, the mothers' exposure to the pretest may have given them insight into the study content, influencing subsequent responses. All these factors do not necessarily invalidate the study but rather should be considered when interpreting the findings.

1.2 BACKGROUND

Diarrhoea disease is a problem of significant concern globally (Soboska, Hailu, Gari & Alemu 2019:2). It is caused by microorganisms which include bacteria, viruses, and parasites (Mohapatra, Dehury, Dehury & Behera 2019:1; Behera & Mishra 2022:2). Bacterial species are the common cause of diarrhoea. The commonest types are Vibrio cholerae, Clostridium botulinum, Salmonellosis, Campylobacter jejuni, Staphylococcal, Escherichia coli, and Shigellosis (Ugboko et al 2020:1).

Diarrhoea is attributed to various risk factors, including suboptimal sanitation, inadequate personal hygiene, poor water supply, ingestion of contaminated foods, and vitamin A deficiency (Fufa et al 2019:1; Mulatya & Ochieng 2020:360). This disease can present in three forms: acute, chronic and dysentery. "Acute diarrhoea is the passage of loose stools more than three times a day which last less than a week" (Ugboko et al 2020:1). Chronic diarrhoea last longer than two weeks, while dysentery is more severe than them all, inflaming the walls of the intestine (Mohapatra et al 2019:1). One major complication common to all forms of diarrhoea is dehydration, which contributes significantly to increased hospitalisation and death among children under five years age (Mohapatra et al 2019:1). This is because a larger percentage of children's body mass is water, and their high metabolic rate causes them to use more water than they conserve (Amu et al 2022:2). Malnutrition and diarrhoea infection in children under five are interrelated. Prolonged diarrhoea subjects children to malnutrition. Likewise, exposure of an already malnourished under-five child to diarrhoea can lead to recurrent episodes of diarrhoea (Mulatya & Ochieng 2020:359; Amu et al 2022:2).

The incidence of diarrhoea disease is disproportionately concentrated in economically disadvantaged countries, underscoring the need for targeted interventions (Kombat, Kushitor, Sutherland, Boateng & Manortey 2024:2). The substantial prevalence of diarrhoea mortality is increasing in economically disadvantaged countries, with approximately 75% of under-five children's deaths from diarrhoea occurring annually in fifteen countries across the African and Asian continents (Fufa et al 2019:2; Jiwok, Adebowale, Wilson, Kancherla & Umeokonjwo 2020:1; Mulatya & Ochieng 2020:359).

Reports from Africa indicate that children under-five experience at least five recurrences of diarrhoea annually and 1 million of this age group die due to dehydration (Jiwok et al 2021:1). Morbidity and mortality due to diarrhoea are high in Benin, Lesotho, Mali, Nigeria, and Sierra Leone than in other African countries (Amu et al 2022:2). The toll of diarrhoea on Nigeria children is quite alarming, with an estimated 150,000 deaths occurring annually (Jiwok et al 2021:2; Oyefabi, Garba, Kure & Ganiyu 2023:2).

Several determinants, including behavioural and environmental elements, contribute to the incidence and prevalence of childhood diarrhoea in communities across developing nations. These determinants include poor environmental hygiene, improper disposal of faeces and household wastes, lack of access to safe water, poor personal hygiene, poor handling of food, poor breastfeeding practices, and malnutrition (Behera & Mishra 2022:5-6; Giri, Behera, Behera, Mishra & Jena 2022:10). These factors also have a strong influence on the management of diarrhoea. Effective diarrhoea treatment requires good maternal hygiene, basic sanitation and access to safe drinking water (Centers for Disease Control and Prevention [s.a.]:np).

Terefe et al’s (2022:2) report that mothers and caregivers are the first point of contact to observe diarrhoea in children and to provide home management for the affected child. Home management of children with diarrhoea is essential before they are taken to a health facility, especially in communities where a health facility is not easily accessible. Treating diarrhoea and preventing its complications is simple and easy using the WHO recommended cost effective ORS as the first basic measure (WHO 2014a; Oji & Okafor 2020:8). This will help in rehydration, reduction of episodes and restoration of lost nutrients (Alghadeer et al 2021:1-2).

A comprehensive and culture sensitive health educational programme can enhance mothers' knowledge, correct misconceptions, and promote effective HMCD among mothers living in rural areas (Oji & Okafor 2020:90). Several studies have proved that nurse-led health education interventions, significantly improve mothers' knowledge and practices regarding home management of childhood diarrhoea (Oduntan et al., 2020; Oji & Okafor, 2020). Studies from various contexts, including Lagos, Rivers, and Ekiti States highlight that although mothers have knowledge of diarrhoea and the use of Oral Rehydration Solution (ORS), many mothers still hold misconceptions as regards the causes of diarrhoea. Many attributes it to teething or excessive feeding which negatively influence their home management practices (Momoh et al., 2021; Owoseni, Muhammad, Asim, Mazhar & Beenish 2021:4615; Oyefabi, Garba, Kure & Ganiyu 2023:[3]).

Okafor, Akinyemi, Wika-Kobani, Olubodun & Eze (2022:7) among mothers in Oshodi area, Lagos State, Nigeria reported that while many of these mothers understood that ORS helps in preventing dehydration, they still held misconceptions that it is effective in stopping or preventing diarrhoea. Hence, this belief made most of the mothers unnecessarily administered antibiotics. Similarly, a study conducted in another major town in Lagos State, Nigeria, among mothers with under-five children identifies that more than half of the mothers had knowledge of diarrhoea and the function of ORS, however considerable proportion of these mothers indicates that they purchased drugs from pharmacy and consulted traditional healers when their children had diarrhoea (Momoh et al 2022:7, 10). Furthermore, despite familiarity with ORS, the knowledge of its correct preparation, and administration, as well as zinc supplementation remains inadequate (Ajayi, Bello, Ijaola, Oke & Fabiyi 2019). These findings indicate that knowledge alone does not guarantee appropriate HMCD practice among mothers, underscoring the need for skill-based, continuous, and context-specific educational interventions tailored to the community needs.

Furthermore, there is scarcity of empirical evidence on HMCD in Ogun State. A previous study conducted in the present study setting reported poor knowledge and practices as regards HMCD, which is deeply rooted in misconceptions about causes of diarrhoea (Oluseye & Oluwatosin, 2019:82). Also, no interventional study has been conducted as regards this issue in this study setting. However, the few interventional studies conducted in other regions have focused primarily on assessing home management practices, without integrating the three key variables, knowledge, attitude, and practice. In addition,

the main method for the health education programme in these studies is teaching (Oduntan et al 2020:9; Oji & Okafor 2020:96).

Therefore, this study aimed to develop, validate, and implement a nurse-led educational intervention for mothers in Ogun State and to assess changes in mothers' knowledge, attitude, and practice of HMCD after the intervention using pre-experimental design. By addressing the observed gaps in knowledge, practice and associated misconceptions, this study generates new evidence on the effectiveness of a locally developed, nurse-led intervention in improving mothers' skills in managing childhood diarrhoea at home.

1.3 RESEARCH PROBLEM

Every child has the right to optimal health, particularly during the first five years of life, a critical period for growth and development. Children need responsive interactions, loving and stable environment, and adequate nutrition from parents and/ or caregivers to thrive (Sargsyan, Tenorio, Uwera, Gasirikare, Habyarimana, Salcido, Felner & Rasheed 2023:[1]). Children can be exposed to several negative conditions in their physical environment during their childhood developmental stage, which can affect their health. Some of the negative conditions and environmental health problems that can affect children's development include consumption of processed foods and contaminated water, air pollution, dirty living environment among many others (Khan, Chakraborty, Brown, Sultana, Colon, Toor, Upreti, & Sen 2021:2; Da Silva & Da Cunha 2022:2). In countries with lower economic status, inadequate hygiene and scarcity of good water are responsible for many communicable and waterborne diseases such as diarrhoea diseases, nematode infections, malaria, and schistosomiasis among many others (Manetu & Karanja 2021:209; Owoseni et al 2021:4615; Ho, Lavinya, Kay, Lee, Razmi, Walsh, Goodson & Eswaran 2022:2).

Globally, diarrhoea affects around 1 billion children under the age of five annually (Fufa et al 2019:2; Mohapatra et al 2019:1). In Africa, it is approximated that under-five children experience five bouts of diarrhoea in a year, of which about 800,000 under-five children die due to dehydration (Fufa et al 2019:2). Apart from dehydration, diarrhoea can result into malnutrition and infections, all of which can negatively affect the growth and development of under-five children (Gathogo et al 2020:2451). These complications and deaths, however, can be prevented with timely intervention. Despite diarrhoea prevention

and treatment is simple using proven evidence-based practices, it remains a significant cause of under-five morbidity and mortality in Nigeria (Oji & Okafor 2020:90).

Mothers and guardians play a critical role in effective home management of childhood diarrhoea. However, their KAP regarding HMCD remain inadequate, particularly among mothers residing rural areas (Mohapatra et al 2019:4; Divya, Nandhini, Pradeep & Subbulakshmi 2020:102; Oluseye & Oluwatosin, 2019; Oji & Okafor, 2020). Oluseye and Oluwatosin (2019:81) previous study among mothers in Ibogun community Ogun State, revealed that most mothers' knowledge of home management was quite low. More than 60% managed diarrhoea at home inappropriately, likely due to myths held about its causes. Many of the mothers believed that bad breast milk and excessive feeding are the major causes of diarrhoea. Furthermore, more than 60% of the mothers believed that diarrhoea is a normal experience during weaning and teething periods in children. These gaps highlight the need for a well-developed and validated nurse-led health education programme tailored to rural mothers' learning needs. Such an intervention is expected to enhance mothers' knowledge, correct misconceptions, improve attitudes, and promote appropriate home management practices for childhood diarrhoea in Ibogun community, thereby contributing to the reduction of childhood diarrhoea-related morbidity and mortality. Although health education has been identified as an effective tool for improving mothers' understanding and response to childhood diarrhoea, few interventional studies in Nigeria, especially in the Southwest region, have been nurse-led or have simultaneously targeted all three KAP components.

1.4 PURPOSE OF THE STUDY

The main purpose of this research was to develop, validate, implement, and evaluate the effectiveness of a nurse-led health educational programme which is aimed at improving mothers' knowledge, attitudes, and practices regarding the home management of childhood diarrhoea in Ibogun community, Ogun State, Nigeria. The developed programme was guided by evidence from prior research, and it was designed to equip the mothers of this community with essential information and skills needed to effectively manage childhood diarrhoea at home, thereby reducing the risk of complications associated with this illness such as dehydration, malnutrition that can easily lead to death among children under-fives. In addition, this study contributes to the existing body of knowledge on the research topic.

1.4.1 Research objectives

Primary outcome/Main objective

To assess changes in mothers' practice of HMCD following a nurse-led health education programme in a rural community in Ogun State, Nigeria

Secondary objectives

- To assess mothers with under-five children in a rural community in Ogun State knowledge of HMCD Nigeria pre- and post-intervention.
- To assess mothers with under-five children in a rural community in Ogun State Nigeria attitude towards HMCD pre- and post-intervention.
- To assess mothers with under-five children in a rural community in Ogun State Nigeria practice of HMCD pre- and post-intervention
- To identify socio-demographic factors associated with mothers' knowledge, attitude, and practice of HMCD pre- and post-intervention.
- To develop, validate, and implement a nurse-led health educational programme aimed at improving mothers' knowledge, attitude and practice of HMCD.

1.4.2 Research questions

Primary Research Question

What changes occur in mothers' practice of HMCD following a nurse-led health education programme in a rural community in Ogun State, Nigeria

Secondary Research Questions

- What changes occur in mothers' knowledge of HMCD following the intervention?
- What changes occur in mothers' attitudes towards HMCD following the intervention?
- What changes occur in mothers practice of HMCD following the intervention?
- Which sociodemographic factors are associated with knowledge, attitude and practice of HMCD among mothers with under-five children in a rural community in Ogun state, Nigeria pre- and post-intervention?
- How does the nurse-led health educational programme improve mothers' knowledge, attitude, and practice regrading HMCD in a rural community in Ogun State, Nigeria?

1.4.3 Research hypotheses

- H_O: There is no significant difference in the pre- and post-intervention knowledge on HMCD of mothers with under-five children in a rural community Ogun state, Nigeria.
- H_O: There is no significant difference in the pre- and post-intervention attitude towards HMCD among mothers with under-five children in a rural community Ogun state, Nigeria.
- H_O: There is no significant difference in the pre- and post-intervention practice of HMCD among mothers with under-five children in a rural community Ogun state, Nigeria.
- H_I: There is significant difference in the pre- and post-intervention knowledge on HMCD of mothers with under-five children in a rural community Ogun state, Nigeria.
- H_I: There is significant difference in the pre- and post-intervention attitude towards HMCD of mothers with under-five children in a rural community Ogun state, Nigeria.
- H_I: There is significant difference in the pre- and post-intervention practice of HMCD among mothers with under-five children in a rural community Ogun state, Nigeria.

1.5 SIGNIFICANCE OF THE STUDY

This study is significant as it addresses diarrhoea disease which is one of the major causes of morbidity and mortality among under-five children through a nurse-led health educational intervention. Effective home management of childhood diarrhoea remains the major approach for reducing child mortality, especially in developing countries like Nigeria where access to health facilities may be limited.

The study will not only bridge the knowledge gap identified among the study participants through the nurse-led educational intervention; the programme developed will be useful by policymakers in formulating policies, rules, and regulations that will support interventional programmes for behavioural change at the community level. This intervention aligns with Sustainable Development Goal 3 (Good Health and Well-being), which emphasises reducing preventable deaths of children under five years.

The programme will give insight to policymakers and health care system managers in the allocation of resources that will be useful in providing educational intervention for mothers

most especially at the community level. The nurse-led educational intervention programme and outcome of study will serve as a model that can be useful by local, state, and national health authorities for the improvement of home management practices among mothers.

It will also be useful for community health nurses and other healthcare providers in guiding their practice, especially health education intervention in various health care settings and the community at large. This programme is intended to assist healthcare providers and recipients of health care and other stakeholders in making informed decisions on children's health.

Ultimately, the findings will not only improve mothers' competence in home management of diarrhoea but also strengthen the health system's preventive approach to childhood illnesses in Nigeria.

1.6 OPERATION DEFINITION OF TERMS

1.6.1 Attitude

Attitude is defined as a psychological inclination to regard a particular entity with a certain level of approval or disapproval (Verplanken & Orbell 2022:329). Contextually, it is described as the mothers' expression of approval or disapproval of HMCD practice.

1.6.2 Childhood diarrhoea

"This is the passage of three or more loose or liquid stools per day (or more frequent passage than is normal for the individual)" (WHO 2024:np; Gathogo et al 2020:2450; Ugboko et al 2020:1).

1.6.3 Health education

This is defined as intentional creation of learning opportunities that employ effective communication strategies to enhance health literacy, knowledge and life skills, which support individual and community health (WHO 2012:14). Contextually, it is an intentional

and conscious development of learning opportunities using effective communication strategies to facilitate and empower the mothers in knowledge and skills in the HMCD.

1.6.4 Home management

Home management include providing ORS, continuous or increased feeding, and zinc supplements to children in a domestic setting (Fufa et al 2019:3; Momoh et al 2022:2-3). Contextually, it is also described as the administration of ORS, zinc supplements and continuous feeding or breast feeding, of a child experiencing diarrhoea at home.

1.6.5 Knowledge

"Knowledge is regarded as the sum of human cognitive experience" (Lin 2019:1754). Knowledge is an organised body of information, understanding, and experience that allows an individual to effectively act in specific contexts (Murthy & Page 2023:15-16). Contextually, it can be defined as the mother's understanding and skills of home management of diarrhoea.

1.6.6 Mother

A mother is a female parent (Angon 2021:np; Merriam-Webster. [s.a]:np). Contextually this includes the biological mother or guardian of under-five children.

1.6.7 Nurse-led health education intervention

This is the process of educating mothers through demonstrating care activities targeted at interfering and improving mothers' knowledge, attitude, and practice of childhood diarrhoea home management (Oji & Okafor 2020:90; Oduntan et al 2020:4).

1.6.8 Practice

Practice involves actions and responses taken by caregivers in response to diarrhoea, encompassing the HMCD techniques. It is also considered as maternal, or caregivers' approaches to diarrhoea in children below the age of five years age (Fufa et al 2019:3;

Terefe et al 2022:3). Contextually, it can be defined as the home-based actions employed by mothers to care for children under-five years with diarrhoea.

1.7 THEORETICAL FOUNDATIONS OF THE STUDY

1.7.1 Research paradigm

A paradigm is the worldview of a phenomenon (Kumatongo & Muzata 2021:17). It is the researcher's perspective or set of beliefs that informs the interpretation they give to data collected. A paradigm guides the formulation of the research statement problem, setting of objectives, identification of methodology, development of models, and the identification of principles that can be useful in solving similar future research problems (Keong & Kamarudin 2021:589). There are different forms of research paradigms, including but not limited to positivism, post-positivism, constructivism, pragmatism, transformative, and constructionism. The selection of a research paradigm for a study depends on the research problem and purpose (Kumatongo & Muzata 2021:17).

The positivist paradigm was selected for this study. This paradigm explains and supports the use of scientific methods such as observation and experimentation to explore phenomena, answer research questions, and test hypotheses (Keong & Kamarudin 2023:590; Nyein & Caylor 2020:np; Park, Konge & Artino 2020:690). This research study entails collecting pre-intervention data using a questionnaire (Annexure J), followed by the administration of a health education intervention, and then collecting post-intervention data to measure the effect of the health education intervention.

The positivist paradigm approach supports the use of scientific methods and measurable procedures to test hypotheses (Creswell & Creswell 2022). This research reflects positivist paradigm approach using one-group pre-test–post-test design. It involves comparing numerical data collected before and after the intervention to determine statistically significant changes. This research study involved the collection of pre-intervention data, the offering of a nurse-led health educational programme, and the collection of post-intervention data to assess the changes that occur following the intervention programme. In line with positivist approach, the study employed objective and standardised instruments, including statistical analysis to determine the extent of change after the nurse-led health education intervention. Positivism emphasises

objectivity and quantification, the study used a self-structured validated questionnaire (Annexure J) to collect data. The KAP measures obtained are numerical in nature making possible statistical comparison between pre- and post-intervention phases. The testing of the instrument reliability and validity (e.g., Cronbach's alpha) reflect true and unbiased data, consistent with positivist rigor.

While minimising researcher bias, descriptive statistics (means, frequencies, percentages) and inferential statistics (Paired T-test. Statistical significance set at $p<0.05$) were used to analyse the data collected. The inferential statistics test for significant differences in KAP scores pre- and post-intervention. The aim is to detect the changes between the pretest and post-test objectively. Hence, the positivist paradigm guided in the selection of quantitative, statistical, and objective analytical approach.

1.7.1.1 Assumptions underlying this positivism

The four fundamental principles of this paradigm are epistemology, ontology, axiology, and methodology.

1.7.1.1.1 Ontology

Ontology explains the nature of reality and human belief. It is simply considered as the world view of reality (Rehman & Alharti 2018:51-52; Nyein & Caylor 2020:np). The key feature of ontology is the reality that can be identified, studied, and known (Park et al 2020:691). This assumption explains that researchers are to find out how things are and what are known about those things. Therefore, this study found out the knowledge, attitude, and practice of home management of diarrhoea and the factors influencing these variables.

1.7.1.1.2 Epistemology

Epistemology is a philosophy or theory of knowledge, derived from the Greek word episteme, meaning knowledge (Keong & Kamarudin 2021:589; Kivunja and Kuyini 2017:27). It is a worldview that describes how knowledge and truth are discovered and how these are communicated. It highlights the characteristics and forms of knowledge (Kivunja & Kuyini 2017:2; Rehman & Alharti 2018:52). It also explains how study findings

are generated from subjects without biases and the influence of the researcher as both relate together (Kivunja & Kuyini 2017:27). Therefore, this research identified mother's knowledge, attitude, and practice of childhood diarrhoea home management using validated and reliable instruments and utilised validated programme to provide nurse-led health education. The information obtained after the intervention will be communicated through publications and will also add to existing knowledge on the research study.

1.7.1.1.3 Methodology

Methodology, as an assumption of the positivist paradigm, concerns systematic processes used in generating new information (Kivunja & Kuyini 2017:28). It encompasses the structured procedures used in discovering new ideas (Keong & Kamarudin 2021:589). Guided by this paradigm, the present research study adopted a pre-experimental research design and employed a structured questionnaire (Annexure J) to collect quantitative data from mothers with under-five children. The questionnaire assessed mothers' knowledge, attitude, and practice of HMCD, providing baseline information for a nurse-led health education intervention aimed at improving HMCD practices. Grounded in positivist assumptions, this approach ensures a rigorous and objective evaluation of the nurse-led intervention outcomes, based on the belief that knowledge is measurable and observable.

1.7.1.1.4 Axiology

Axiology concerns the roles of values in the research process, particularly the commitment to objectivity, compliance with ethical standards, and the use of rigorous research procedures (Park et al 2020:692). Within the positivist paradigm, researchers are expected to minimise personal bias and maintain a value-free approach to inquiry. In this present study, the axiological assumptions guided every stage of the research design and implementation. This was reflected in objective data collection, consistent participant engagement, and rigorous application of ethical principles. Ethical approval was obtained from the College Research Committee (CREC), College of Human Sciences, University of South Africa (UNISA) (CREC:176186_CREC_CHS_2024), as well as from Ogun State Health Research Ethics Committee, Ogun State, Nigeria (OGHREC/467/223/APP) (Annexures B and C). These approvals ensured that the nurse-led educational intervention was conducted in full compliance with ethical standards.

1.7.2 Theoretical framework

The theoretical basis for this study is the knowledge, attitude, and practice (KAP) model. This framework was developed by a group of researchers in 1950s, who studied health behaviour changes (Mohammed, Abdul Rahim, Mohamad & Yusof 2022:1). The model proposed that human behaviour involves interaction of knowledge, attitudes, and practice (Mohammed et al 2022:1). Kang, Zhu, Kan and Zhuang (2023:2) submitted that the KAP model also serves as a rehabilitation strategy aimed at improving individuals' knowledge, attitudes and behavioural outcomes. In 1950s, this model's influence expanded into social science research, with its use becoming increasingly prevalent in family planning and population studies (Liao, Nguyen & Sasaki 2022:42).

A survey guided by KAP model is easy to design, conduct, analyse and interpret. Although it is primarily used in quantitative studies, it can also collect qualitative information. The model is widely applied in public health studies, and its application usually precedes an interventional study (Liao et al 2022:42-43). The effective application of this model requires a systematic process, including identification of the study topic, selection of the target population, development of the KAP questions and scoring patterns, and validation of the instrument. KAP model is valuable for establishing baseline knowledge, beliefs, myths, attitudes, behaviours, and practices related to specific health issues. The model offers a structured framework for examining and effective communication of the findings (Liao et al 2022:41-45). Furthermore, it can serve as an educational tool that promotes improvements in practice and behaviour. It is also useful for assessing the effect of health education on knowledge and practice**.** However, the model mainly relies on closed-ended questions; it rarely reveals new problems and broadens understanding of a topic (Andrade, Menon, Ameen & Praharaj 2020:478-479; Liao et al 2022:42-43).

According to KAP theory, knowledge about a phenomenon will bring about a positive attitude and desirable action. The knowledge of a health condition determines the pattern of attitude towards it, and this will influence the behaviour an individual will display towards the condition (Sharma 2024:2). Several studies have shown that the level of KAP in individuals influences the management of diseases and health promotion. Worldwide, for many years, this tool utilisation has gained popularity, especially as a primary

intervention strategy for tuberculosis control. Self-administered questionnaire is the main instrument used in assessing KAP (Fan, Zhang, Li, Li, Zhang, Liu & Jiang 2018:2).

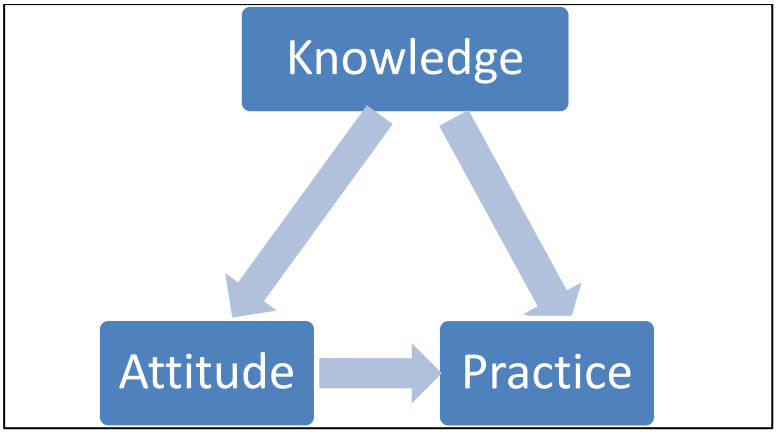

Figure 1.1 Knowledge, attitude and practice theoretical framework

1.7.2.1 Application of theoretical framework to study

This study aimed to develop, validate and implement a nurse-led health educational programme to improve mothers' knowledge, attitude, and practice (KAP) of HMCD in a rural community in Ogun State, Nigeria. The KAP provides the theoretical foundation for this study. According to this framework, an individual's knowledge about a health issue influences attitude, which in turn determines their practice. In public health, the model assumes that increasing knowledge through health education will lead to a positive shift in attitude, ultimately resulting in improved practice or behavioural change (Mohammed, Abdul Rahim, Mohamad & Yusof 2022:1).

Although the KAP model explains that knowledge influences attitude and consequently practice, however, this is not always the pattern. Behavioural change may occur due to so many factors such as cultural, socioeconomic, and environment. In the context of this study, this model serves as a guide and not necessarily as a deterministic sequence. Mothers' knowledge of the causes, prevention, and home management of childhood diarrhoea is expected to shape their attitude toward the condition, which will then influence how they manage diarrhoea episodes in their children at home. This framework provides a comprehensive structure for assessing the knowledge, attitudes, and practices of HMCD among the mothers, which served as the baseline for the intervention.

Importantly, the KAP framework directly informed the development of the study instrument and research questions. The knowledge section of the questionnaire measured mothers' understanding of diarrhoea and HMCD. The attitude items measured beliefs and perceptions to use recommended home management methods, while the practice items assessed actual behaviours caregivers performed during diarrhoea episodes. By structuring the instrument around the three components of the KAP model, the study ensured a clear link between the theoretical framework and the variables assessed, thereby strengthening construct validity.

The nurse-led health education programme was designed based on the KAP model to address existing gaps in knowledge, correct misconceptions and promote appropriate home practices that reduce diarrhoea related morbidity and mortality. The model guided the content of the educational modules and the expected pathway of change, from improved knowledge to improved attitudes and, ultimately better HMCD practices.

Similarly, the pre-experimental design adopted for this study aligns with the KAP framework because it allows measurement of changes in the core components, which include knowledge, attitude, and practice, before and after exposure to the nurse-led health education intervention. The pretest establishes the baseline gaps, while the post-test measures improvements that reflect the model's theoretical pathway of behavioural change. The planned quantitative analyses were appropriate for assessing these changes, consistent with the KAP model's emphasis on measurable outcomes.

Therefore, the integration of the KAP framework with the study design, instrument development, and analysis provides a logical and evidence-based approach for evaluating the effectiveness of the nurse-led intervention.

1.8 RESEARCH METHODOLOGY AND RESEARCH DESIGN

1.8.1 Research methodology

Research methodology is defined as broad philosophical and overall framework or strategy guiding the research process. It links research paradigm with overall approach (Creswell & Creswell 2022:6). It involves understanding the underlying assumptions, selecting appropriate methods for a particular study, and justifying their use. Research

methodology involves defining the study problem, developing hypotheses, data collection and choosing appropriate analytical tools (Kothari 2023:7-10). This research study is based on positivist paradigm, which emphasises objectivity, measurement, and empirical verification used a quantitative research method. It involves understanding the assumptions guiding the study, selecting appropriate quantitative methods, and justifying their use in evaluating relationships between variables. This study adopts a quasi-experimental one group design, using a structured questionnaire (Annexure J). to collect data from mothers with under-five children. This approach aligns with the positivist perspective, that allows for objective assessment of the effect of the nurse-led educational intervention on mother's knowledge, attitude and practice of HMCD.

1.8.2 Research design

Research design describes the overall plan and strategy that researchers choose to address research questions and research hypotheses (Polit & Beck 2017:222). It outlines the approach employed to answer question of interest, providing a roadmap for conducting the study (Asenahabi 2019:77).

A quantitative approach was chosen as the research design for this study. According to Cohen (2018:206-207), there are three fundamental research designs which include qualitative, quantitative, and mixed methods. Quantitative research design measures causal relationships, associations, and correlations between variables using statistical procedures (Leavy 2017:106).

Quantitative research designs are broadly categorised into experimental and non-experimental research designs. The experimental research design includes pre-experimental, quasi-experimental and true experimental designs. The pre-experimental design represents the most fundamental type of experimental research design, characterised by the absence of a control group and randomisation (Bloomfield & Fisher 2019). The pre-experimental design is conducted in a natural setting rather than a laboratory environment. It is the simplest form in which isolating and controlling all variables may not be feasible, meaning randomisation and control may be limited or absent; however, manipulation of independent variables still occurs. When a study lacks both randomisation and a control group, the design is referred to as a one-group design, involving only the interventional group (Cohen 2018:401). In contrast, true experimental

designs involve two or more categories of groups (experimental and control). The features include full randomisation, manipulation and control of variables (Bloomfield & Fisher 2019; Polit & Beck 2017:225-231).

Accordingly, this research study adopted a quantitative one-group pre-experimental design, which does not involve randomisation into groups. The design was deemed appropriate for assessing the changes in mothers KAP of HMCD pre and post intervention following the nurse-led educational intervention on the knowledge, attitude and practice of HMCD among mothers in a rural community Ogun State, Nigeria. It qualifies as a quantitative research design because it examines the relationships and changes among variables using statistical procedures.

1.8.2.1 First phase

The first phase is the pre-intervention data collection phase, which involves gathering data using a questionnaire (Annexure J) from the participants and an observation checklist (Annexure K) to assess each participant's home management (ORS/SSS) preparation before the intervention. Pre-intervention data served as baseline information for comparison with data collected after the intervention.

To enable the researcher to access mothers with under-five children and recruit them for the study, permission was first obtained from the gatekeepers (community leader/decision makers). With the assistance of a trained nurse that works in the community, the researcher identified the households where the eligible mothers resided to invite them to participate in the study. Subsequently, the researcher explained the purpose of the study to each mother, obtained consent, and invited them to attend the pre-intervention phase on the scheduled date.

The pre-intervention phase was conducted on a Saturday at the village hall. The participants were divided into units, and data collection was facilitated by trained research personnel. Each research assistant served as a facilitator for one of the established units. On the scheduled date, the purpose of the study was reiterated to the mothers before the commencement of data collection, and written informed consent was obtained from each participant (Annexure I). This phase took each participant an average of 30 minutes to complete.

All research assistants recruited for the study signed a confidentiality agreement before the commencement of the data collection (Annexure M).

- **Training of research assistants**

Nine (9) trained nurses who are familiar with the community were trained as research assistants for data collection and the intervention session.

Research assistants were trained in research methods and ethical issues. They were provided with information on how to communicate with participants, engage the participants, and collect the data with minimal errors. The training spanned for two days, and each daily session lasted for about three hours. The initial session included a review of the research purpose, methodology and participants engagement strategies including inform consent procedures. The final session focused on equipping the research assistants with the knowledge on the questionnaire's content, administration techniques, and practical demonstrations modalities. Importantly, discussions on ethical issues were raised especially on how to obtain consent from the participants.

1.8.2.2 Second phase

This phase represented the intervention stage, which was conducted one week after the first phase. A nurse-led health education intervention, guided by a well-developed and validated health education programme, was implemented among the study participants. This health educational programme consisted of three modules delivered over three consecutive Saturdays. The first module of this programme provided information on diarrhoea, the second addressed the management of diarrhoea and misconceptions around HMCD, and the third consisted of a practical demonstration on the preparation of ORS. Each session did not exceed an average of 60mins.

The content of the module was adapted from established public health resources, including two World Health Organization documents (WHO 2011:58-63; WHO 2014:8-38), a training guide by Child Health Division, Ministry of Health and Welfare Government of India (2017:6-19) and Federal Ministry of Health & Nigeria Centre of Disease Control (2017:32-33,57-61). All documents are publicly available and do not require permission

for use. The development of the programme was guided by the Knowledge, Attitude and Practice model (Liao et al 2022:42-43).

Following the development of this programme, it was reviewed and validated by a panel of experts in child health, public health education, and community health adapting the Delphi technique. The experts reviewed the programme twice with the aim of evaluating the items for clarity, relevance, and feasibility. Validation criteria were established using a Content Validity Index (CVI ≥ 0.80).

The researcher, assisted by trained research assistants, facilitated the health education sessions for each established unit. These research assistants are trained nurses with at least three years of experience in pediatric or community health. Sessions were conducted in groups lasting 45–60 minutes per session over three consecutive Saturdays. Researcher considered the participants' literacy levels and baseline knowledge during the intervention process. Intervention fidelity was monitored using a structured checklist completed by an independent observer. Co-interventions and contamination were minimised by scheduling sessions exclusively for study participants. Mothers were equally advised not to attend any similar health education programmes during the study period. Various educational methods, such as lectures, role play, and demonstration, with the use of different teaching aids, such as leaflets (Annexure N), were used for the nurse-led educational intervention programme, which differentiates it from previous studies. Before the use of the leaflet, it was assessed for literacy appropriateness and cultural relevance. It was pretested among a small group of mothers (n = 40) outside the main study to ensure clarity and usability. However, the research assistant who collected data from a unit was not the same person who conducted the intervention from that same unit. At the onset of data collection (pre-intervention), each research assistant was assigned to a unit. After data collection, the facilitators were rotated between units in sequential numerical order for the intervention phase. This rotation was done to minimise bias and ensure objectivity. Hence, the facilitator who assessed a group was different from the one who educated that same group.

After, the educational intervention, evaluation was conducted to elicit if mothers understood the content of the module, questions were asked based on set module objectives at the end of each module to assess comprehension and make necessary

clarification objectives. The post-intervention assessments, after the intervention was equally conducted as a method of evaluation.

1.8.2.3 Third phase

This is the post-intervention phase. The researcher collected post-intervention data from the study group after the intervention programme (phase). The data were collected twice; once immediately after the intervention and the second a month later. The questionnaires were retrieved immediately after each session. With the aid of checklist, the researcher observed the participants as they demonstrate (do) the home management (ORS/SSS) preparation in both sessions. This post-intervention phase was completed within 30 minutes per participant, research assistants provided support.

1.9 SCOPE OF THE STUDY

The research study focused on the Development of a Nurse-led Educational Programme aimed at improving the knowledge, attitude, and practice of mothers regarding the Home Management of Childhood Diarrhoea (HMCD) in a rural community in Ogun State, Nigeria.

1.10 STRUCTURE OF THE DISSERTATION

The structure of the proposed dissertation includes the following:

Chapter 1: Orientation to the study

This chapter provides orientation to the study. It discusses the introduction and background to the study, the research problem, the purpose of the study, and the significance of the study. It explains the research paradigm, definition of terms, operational definition of terms, theoretical foundations of the study, and research methodology and design. It also discusses the scope of the study, the structure of the thesis and the summary.

Chapter 2: Literature review

This chapter provides insight into the major concepts and variables of the study as discussed in relevant journal articles, books, and other available sources of knowledge within and outside Nigeria. Concepts such as diarrhoea, and variables such as knowledge, attitude and practice of HMCD were covered, and information was sourced via Google Scholar, Google advanced search, PubMed and the University of South Africa (UNISA) library repository.

Chapter 3: Research design and method

This chapter presents a detailed description of the research design and methodology, encompassing sampling strategies, data collection techniques, data analysis procedures and measures to ensure validity and reliability.

Chapter 4: Data analysis, interpretation and description of research findings

This chapter focuses on the analysis, presentation, and interpretation of the research results, including data management, analysis, and presentation of findings in alignment with the study objectives and with a concluding summary of the findings.

Chapter 5: Nurse-led health education programme (module)

This chapter contains the full description of developed nurse-led health educational programme with the report on validation of experts.

Chapter 6: Discussion, conclusions, limitations and recommendations

This chapter captures an introduction, a brief description of the research design and method, a summary and interpretation of the research findings, conclusions, recommendations, contributions of the study, limitations of the study and conclusion.

1.11 SUMMARY

Poor hygiene and lack of safe water in most communities in developing countries are the major risk factors for diarrhoea disease. Diarrhoea is one of the most common diseases claiming the lives of millions of under-five children, highlighting the need for urgent and effective intervention. Treating diarrhoea at home is inexpensive and practical; however, many mothers do not engage in proper HMCD due to inadequate knowledge of its principles. This study assessed not only mothers' knowledge of HMCD but also their attitudes and practices. Based on these findings, the researcher developed a nurse-led educational intervention programme, validated to improve mothers' knowledge, attitudes, and practices of HMCD, and equally measures changes that took place across the three timepoints. The developed and validated programme will be useful for policymakers, healthcare managers, and healthcare providers.

The significance of this study lies in its potential to bridge the knowledge gap identified among the study participants through the nurse-led educational intervention. Additionally, the findings will serve as a resource for healthcare providers, particularly nurses, to enhance health education activities in both healthcare settings and community outreach. Furthermore, the study will provide policymakers with evidence to inform the development of policies, rules, and regulations that promote positive behavioural change at the community level.

The positivist paradigm was selected for this study. This paradigm aims at predicting relationships between variables and generating numerical data that can be analysed statistically to draw objective conclusions. The underlying assumptions of this paradigm are ontology, epistemology, methodology, and axiology. The theoretical basis for this study is the Knowledge, Attitude and Practice (KAP) model, which is widely used in public health and quantitative research. It explains how knowledge influences attitudes and practices regarding HMCD. It is easy to design, conduct, analyse, and interpret.

This study employed a quantitative approach, using a pre-experimental research design. This study specifically used a one-group pretest-posttest study design conducted within a naturally existing population. This study investigated the changes in the mothers' KAP pre and post intervention. The study was conducted in Ibogun, a rural community in Ogun State, Nigeria. A multi-stage sampling approach was used to select participants. Data

were collected using a structured questionnaire and observational checklist (Annexures J and K), which were validated and tested for reliability. The study was in three phases. The first phase is the pre-intervention phase, which involves the collection of initial data from the selected sample using a questionnaire and checklist (Annexures J and K). The second phase, which is the Intervention phase, involves the administration of a nurse-led health education intervention programme to the mothers using a well-developed and validated programme. The post-intervention phase was conducted twice, immediately after the intervention and a month after the intervention using the same instruments. Data were analysed using descriptive and statistical inferential with the aid of the SPSS Version 29.0. These were interpreted and discussed in line with previous studies' findings. Conclusions, recommendations, and further suggestions were drawn from the study findings.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter presents a narrative literature review on diarrhoea and the home management of childhood diarrhoea (HMCD) among mothers of under-five children. The approach was adopted because of the limited number of studies available in this field. It is suitable for integrating multiple conceptual, theoretical, and empirical evidence from different sources without rigid procedures of systematic search review. This method further allows for structured organisation, critical appraisal of findings, and contextual interpretation relevant to developing countries such as Nigeria.

Search engines and databases consulted for this review include Google Scholar, ResearchGate, PubMed Search engine, MEDLINE, ScienceDirect, ProQuest, JSTOR, CINAHL, EMBASE. AJOL, HINARI, and WHO IRIS.

The inclusion criteria were: studies published between 2019-2024; studies focusing on nurse-led programmes, community-based interventions, or home management strategies for childhood diarrhoea; studies conducted in developing countries; peer-reviewed journal articles; quantitative, qualitative, or mixed methods studies; studies written in English; studies involving under-five children; and studies addressing management or home care of diarrhoea. Considering the flexibility inherent in narrative reviews, studies that met most of the inclusion criteria and were relevant to the research topic were included.

The review is organised into five major sections:

1. Conceptual review – definitions, classifications, causes, mode of transmission, and complications of diarrhoea, including recommended home management strategies.
2. Theoretical framework – KAP model guide the research study.

3. Empirical review – this consists of literature review and discussion on global, regional, and Nigerian studies on knowledge, attitude, and practice (KAP) of HMCD, factors associated with HMCD.

2.2 CONCEPTUAL REVIEW

2.2.1 Overview of diarrhoea

Diarrhoea disease is a major contributor to a high proportion of childhood hospitalisation and mortality (Amu et al 2022:1007). It continues to pose a significant public health challenge among children under five, particularly in developing countries (Melese, Paulos, Astawesegn & Bati 2019:2). Cases of diarrhoea are common in low- and middle-income nations due to lack of basic facilities such as good source of water, appropriate waste disposal measures, and health facilities. Most of the populace in these nations are illiterate and poor which affects their feeding pattern causing deficiency of certain micronutrients in children, and ineffective use of ORS and zinc supplement (Adepoju & Sowunmi 2022:2; Demissie, Yeshaw, Aleminew & Akalu 2021:2; Momoh et 2022:1; Wolde, Tilahun, Kotiso, Medhin & Eguale 2022:2).

Reports of diarrhoea in Africa are highest in countries such as Benin, Lesotho, Mali, Nigeria, and Sierra Leone (Amu et al 2022:1007). In Nigeria, it ranks the second most common cause of death among children under five (Jiwok et al 2021:2). Approximately 300,000 fatalities are caused by diarrhoea every year, which is equivalent to 16% of children's death per year (Yusuf, Junaidu & Abubakar 2022:315). The alarming death toll in Nigeria is largely due to complications such as loss of body electrolytes, shock, and sepsis. Long-term complications associated with this disease among this age group are malnutrition, growth retardation, and reduced mental functioning (Afolabi, Saka & Ojuawo 2019:183). One in ten children under five in Nigeria experiences diarrhoea (Jiwok et al 2021:2). This state of illness deteriorates as the feeding pattern of the affected child is altered during the episodes (West & Okari 2023:545).

Millennium Development Goal (MDG 4) was aimed at reducing child mortality by two-thirds between 1990 and 2015. The rate of child mortality has declined from 213 deaths

per 1,000 live births in 1990 to 18.8% by 2015, which is still a significant concern. Meanwhile, the Sustainable Development Goal (SDG 3) targets a reduction of 25 cases of diarrhoea per 1000 children. Reducing diarrhoea cases among children below five has been quite slow over the years. According to data, the child mortality rates decreased from 201 deaths per 1000 live births in 2003 to 128 deaths per 1000 live births in 2013, and by 2015, the reduction was 109 per 1000 live births representing approximately 46% reduction over the period of 12years (Okafor et al 2022:3).

2.2.2 Definition of diarrhoea

Diarrhoea is characterised by three or more loose or liquid stools per day (Demissie et al 2021:2; Keto, Alemu & Mamo 2020:338; Melese et al 2019:2; Ugboko et al 2020:1; Momoh et al 2022:1; WHO 2014:8). It is also defined as abnormal frequent passage of stools for an individual in a day (Demissie et al 2021:2; Momoh et al 2022:1). Gastrointestinal disturbance or bowel infection are another definitive term for diarrhoea (Oduntan et al 2020:3). Notably, diarrhoea in children is often passed more regularly than what the child normally passes in a day (Gathogo et al 2020:2450). Apart from the loose stools, other symptoms the child with diarrhoea may experience include abdominal pain, nausea and vomiting, weight loss and fever, especially if it is infectious in nature (Gathogo et al 2020:2450; Ndou, Lebese, Tshitangano & Damian 2021:[1]).

Micro-organisms such as viruses, bacteria, and protozoa, which are transmitted faecally-orally through consumption of unsafe water and bad behavioural practices, are the cause of diarrhoea (Keto et al 2020:338; Manetu, M'masi & Recha 2021:212-213). Rotavirus is one major deadly micro-organism causing an acute form of diarrhoea, and this is responsible for about 40 per cent of all hospital admissions due to diarrhoea among children under five worldwide (Manetu et al 2021:208).

2.3 CLASSIFICATIONS OF DIARRHOEA IN CHILDREN

Diarrhoea is classified based on the characteristics of the stool (Kombat, Kushitor, Sutherland, Boateng & Manortey 2024:[2]). Diarrhoea has four major classifications acute, chronic, persistent, and dysentery (Ugboko et al 2020:3).

2.3.1 Acute diarrhoea

Acute diarrhoea also known as acute watery diarrhea is a sudden passage of loose stools more than three times a day that lasts less than 14 days (WHO 2013:127; WHO 2014:8; Mohapatra et al 2019:1; Ugboko et al 2020:3). It presents with the following signs, nausea, vomiting, abdominal discomfort, and pyrexia (Ugboko et al 2020:3). It rapidly leads to drastic substantial fluid loss which is mostly responsible for death cases in acute diarrhoea (Child Health Division, Ministry of Health and Family Welfare of India 2017:6; (Kombat et al 2024:[2]; WHO 2014:8). The common micro-organisms that are responsible for acute diarrhoea are *Escherichia coli* and *Vibrio cholerae. The later type is responsible for* fluid loss without destruction of epithelium cells (Manetu et al 2021:208; Ugboko et al 2020:3). Rotaviruses and calciviruses are examples of viruses causing diarhoea, these will not only deplete body fluid but will equally damage intestinal epithelium cells (Ugboko et al 2020:3).

2.3.2 Chronic diarrhoea

Chronic diarrhoea is the passage of liquid stools three or more times in a day which lasts for more than twenty-eight days (Chu, Rotando-Trivette & Michail 2020:np). Chronic diarrhoea is classified based on stool analysis especially when there exists differential diagnosis. It is classified into watery, fatty, and inflammatory diarrhoea (Burgers, Lindberg & Bevis 2020:472; Shankar & Rosebaum 2020:1031-1034).

The etiology of chronic diarrhoea in children is multifactorial, influenced by age, immune status, socioeconomic conditions, and clinical context. Globally, enteric infections remain the most common cause, with recurrent or sequential infections by similar or different pathogens often responsible for prolonged symptoms. Other significant causes include nutrient malabsorption, inflammatory bowel diseases, functional gastrointestinal disorders, and certain medications side effects (Nemeth & Pfleghaar 2022:np; Vecchio, Conelli & Guarino 2021:255).

In developed countries, chronic diarrhoea is generally self-limiting but remains a significant cause of outpatient visits, absenteeism, and hospital admissions, with incidence peaking during the winter. Children returning from tropical regions may present with diarrhoea up to two weeks after travel. Etiological agents of chronic diarrhoea in high-

income countries include viral and bacterial pathogens, such as *rotavirus*, *norovirus*, *sapovirus*, *Salmonella spp.*, *Yersinia enterocolitica*, *Yersinia pseudotuberculosis*, and *Clostridioides difficile*, often transmitted through contaminated food. Children with underlying chronic illnesses are vulnerable to chronic diarrhoea due to increased mucosal susceptibility and specific dietary practices. In low-resource settings, chronic diarrhoea is a leading cause of morbidity and mortality, primarily due to dehydration, malnutrition, and the cyclical relationship between infection and undernutrition. Chronic diarrhoea leads to stunting and nutritional deficiencies, with pathogens persisting in undernourished children, contributing to intestinal inflammation. Children with diarrhoea episodes exceeding seven days in developing countries are six times more likely to develop chronic diarrhoea and twice as likely to have recurrent episodes of chronic diarrhoea later in childhood (Vecchio, Conelli & Guarino 2021:255).

Chronic diarrhoea can lead to long-term gastrointestinal and neurological complications that may have negative effect on a child's development and growth. Clinically, the frequency and consistency of stool are often used as primary indicators to differentiate acute diarrhoea, which typically resolves on its own, and chronic diarrhoea, which may require some intervention or therapy. The clinical presentation and complications of chronic diarrhoea differ among healthy and immunocompromised children, as well as between high- and low-income regions (Kombat et al 2024:[2]; Vecchio, Conelli & Guarino 2021:255-256).

2.3.3 Persistent diarrhoea

Persistent diarrhoea is an acute prolonged type of diarrhoea that lasts at least 14 days or longer (Child Health Division, Ministry of Health and Family Welfare of India 2017:6; Manetu et al 2021:208; Dahl 2022:6; Ugboko et al 2020:3; WHO 2013:127; WHO 2014:8). It is the rare prevalent type of diarrhoea, only about 20% of diarrhoea becomes persistent (Child Health Division, Ministry of Health and Family Welfare of India 2017:6; Ugboko et al 2020:3; WHO 2014:8). However, persistent diarrhoea is accountable for many cases of nutritional problem in diarrhoea and approximately 50% of death caused by diarrhoea (Ugboko et al 2020:3; WHO 2014:8). Risk factors that often make diarrhoea persist for a longer duration can be categorised into infectious or non-infectious (Ugboko et al 2020:3). The non-infectious risk factors include malnutrition, comorbid illness, prior diarrhoea episodes, inadequate breast feeding, and drinking of unsafe water during the episodes

(Roy, Bazlul Karim, Das, Maksud, Sultana & Sultana 2019:14). Persistent diarrhoea is quite prevalent among undernourished children and children living with HIV/AIDS. These conditions invariably complicate the diarrhoea disease (Manetu et al 2021:208; Zangenberg, Johansen, Abdissa, Eshetu, Kurtzhals, Friis, Sommerfelt, Langeland & Hanevik 2019:1088). Micro-organisms causing infectious form of persistent diarrhoea are intestinal parasites, bacteria such as Salmonella, E. coli, C. difficile, and Shigella species, and viruses (norovirus, rotavirus) (Ugboko et al 2020:3). While causative factors for non-infectious form include poor nutritional status, prior recent diarrhoea illness, inadequate breast feeding, recent consumption of antibiotic for diarrhoea, use of unsafe drinking water, food sensitivity disorders, and intestinal disorders among many others (Roy et al 2019:14; Ugboko et al 2020:3).

2.3.4 Dysentery

In some cases, diarrhoea may contain blood with or without mucus and this is called dysentery (Child Health Division, Ministry of Health and Family Welfare of India 2017:6; WHO 2013:127; Yimenu, Kasahun, Chane, Getachew, Manaye & Kifle 2022.1). Dysentery onset is sudden; however, the stools come with blood and even pus and are usually in smaller quantity. Victims may present with high body temperature, rectal urgency, abdominal cramps; and sometimes vomiting (Ugboko et al 2022:3). Bacteria and parasites are mostly responsible for dysentery (Manetu et al 2021:208). Meanwhile, not all forms of bacteria induce this infection, the commonest ones are *Shigella* species causing bacillary dysentery and *Entamoeba hystolytica* causing amoebic dysentery of which Shigellae is the main cause of dysentery in children. Bacteria that rarely cause diarrhoea in children are *Campylobacter jejuni,* enteroinvasive *E. coli* and salmonellae of different species (Manetu et al 2021:208; Ugboko et al 2020:3; WHO 2014:8).

2.4 CAUSES AND RISK FACTORS OF DIARRHOEA

Diarrhoea disease can be attributed to a spectrum of microorganisms with rotavirus being the leading cause, while Escherichia coli, Shigella, salmonella, enterotoxigenic cryptosporidium, Vibrio cholerae, campylobacter are significant bacterial contributors. (Gathogo et al 2020:2450; Jalo et al 2020:32; Mohapatra et al 2019:1; Onasoga, Afolayan, Owoeye & Umar 2019:109; Gathogo et al 2020:2450). Vibrio cholerae remains the deadliest of all the organisms and is highly prevalent in Africa and Asia continents

(Garberna, Chub, Yangc, Gaineyd, Nasrine, Kanekarc, Qub, Nelsonf, Leungg, Ahmede, Schmidb, Alame & Levine 2021:436). The commonest protozoa causing diarrhoea among children is Cryptosporidium (Manetu et al 2021:208). Meanwhile, the leading cause of diarrhoea related deaths among under-five children in Nigeria includes rotavirus (45%), Cryptosporidium (14.3%) and Adenovirus (10.3%). Other pathogens are less than 10%, these include Shigella, Salmonella spp, Campylobacter spp, Norovirus, Vibrio cholera, Entamoeba histolytica, and Escherichia coli (Efunshile, Ezeanosike, Nwangwu, Konigs, Jokelainen & Robertson 2019:1-2).

There exist some complex and interrelated factors that predispose children to micro-organisms causing diarrhoea. These factors include socio-economic factors, behavioural factors and environmental factors (Melese et al 2019:2; Ogunmiluyi & Ayodele 2021:44; Behera & Mishra 2022:2; Wolde et al 2022:2).

2.4.1 Socio-economic factors

According to Moniz, Fernande, Belo, dos Santos & Carvalho (2025:3138), children from low-income families with low socioeconomic status experience a significantly higher incidence of diarrhoea compared to those from higher income families. Low household income households often have limited access to basic essential needs such as clean water, safe sanitation and adequate nutrition, all of which are critical for the prevention of diarrhoea diseases. Contaminated water and poor hygienic conditions are key determinants to this disease among the poor families (Demissie et al 2021:2,7). Furthermore, limited education due to low socioeconomic status can impair mothers understanding of proper hygiene practices and reduce maternal self-efficacy in managing and preventing diarrhoea (Moniz et al 2025:3138).

Socioeconomic conditions play an important role in determining the prevalence of diarrhoea diseases among under-five children. Socio-economic factors are factors related to caregivers social and financial status such as educational level, family size, occupation, age, and the number of children (Manetu et al 2021:208). Children from poor homes are more vulnerable to diarrhoea. Studies reveal that the risk of under-five children having diarrhoea is higher among poor families than rich families. Contaminated water and poor sanitation are significant contributors to this disease among the poor families (Demissie et al 2021:2, 7).

2.4.2 Environmental factors

Environmental factors that promote the transmission of diarrhoea include contaminated water and poor sanitation (Ajayi, Bello, Ijaola, Oke & Fabiyi 2019:35; Demissie et al 2021:2). Diarrhoea is prevalent in areas where there exist poor water and sanitation (Shafizadeh, Nasiri-Amiri, Sayadi & Imanzadeh 2019:342-343; Wolde et al 2022:2). Environmental sanitation has improved over the years across the developing countries however the progress is slow in most of Sub-Sahara Africa (Wolde et al 2022:2). Similarly, Aremu, Akanbi, Idowu, Mbonu, Adeniran, Alabi, Ajisafe, Ahossinme, Amu, Omotoso, Omoyinmi, Olaogun, David, Adeagbo, Abiodun, Ekomaye & Akinjare (2025:122) emphasised that environmental determinants such as sanitation practices, waste disposal systems and access to safe drinking water are closely related to the incidence of diarrhoea diseases.

Environmental sanitation has improved over the years across the developing countries however the progress is slow in most of Sub-Sahara Africa (Wolde et al 2022:2). Aremu et al (2022) found that households practicing open defecation reported a significantly higher prevalence of childhood diarrhoea compared to households with safely managed sanitation facilities. The disparity shows that poor sanitation environments is a contributory factor to faeco-oral transmission of diarrhoea microorganism. Millions of under-five children are hospitalised and die due to diarrhoea globally every year. Averagely, 60-90% is due to the consumption of unsafe water and poor environmental hygiene (Giri et al 2022:2; Okafor et al 2022:3). Some poor communities drink from open surface water which is a good source of microorganisms causing diarrhoea (Mulatya & Ochieng 2020:359-360).

Available statistics from Nigeria indicate that diarrhoea-related morbidity and mortality remain unduly high among children residing in rural communities, slums, and suburban settlements. The emergence of diarrhoea in these settings is worsened by the reinforcing relationship poverty, ignorance, malnutrition, and limited health literacy (Odo et al 2021:2).

Diarrhoea continues to be an important public health concern across Nigeria, notable in the northern regions where water contamination, and environmental pollution are

frequently reported. These areas record higher diarrhoea incidence rate than the southern regions, largely due to poor sanitation, overcrowding, inadequate housing, ineffective waste management, poor disposal of children's faeces, and the consumption of contaminated water (Odo et al 2021:2; Jiwok et al 2021:[2]).

Egbewale, Karlsson and Sudfeld (2022:[5]), reported that the national prevalence of childhood diarrhoea among children under five years in Nigeria was 12.9%. However, the prevalence varied widely across states, the burden was noted to be lowest in the southwest (5.2%) and highest in the northeast (24.6%), reflecting persistent regional disparities in sanitation, access to safe water, and hygiene practices, notable Ogun State alone recorded 0.9%.

2.4.3 Behavioural factors

Behavioural factors encompass poor hygiene habits of the mothers or caregivers in daily care of children (Ogunmiluyi & Ayodele 2021:44). Diarrhoea disease occurs most frequently in households with inadequate personal hygiene (Okafor et al 2022:3). Certain practices that mothers engage which commonly affect children's health include not washing feeding containers with soap, using uncovered containers for fetching drinking water, and indiscriminate disposal of children's stool (Momoh et al 2022:2-3; Saha 2021:2). Mothers with inappropriate feeding practices and infrequent handwashing before feeding a child easily transmit diarrhoea to their children (Alghadeer et al 2021:1; Jiwok et al 2021:2; Ogunmiluyi & Ayodele 2021:44). Additional factors contributing to diarrhoea include poor personal hygiene, food preparation in an unsanitary condition, and dirty water for domestic purposes including cooking (Gathogo et al 2020:2450). Demographic and health surveys (DHS) datasets of thirty-four (34) sub-Saharan countries between the periods of 2009 to 2018 compiled by Demisse et al (2021:5) identified that factors such as maternal age, wealth index, maternal education, region, maternal occupation, number of under-five children, children age, time of initiation of breastfeeding and time to get water from good water source were significantly associated with diarrhoea.

2.5 TRANSMISSION OF DIARRHOEA

Diarrhoea is mainly transmitted through the faeca-oral route (Child Health Division, Ministry of Health and Family Welfare of India 2017:7; Ndou, Lebese; Tshitangano &

Damian 2021:1). The causative microorganism may find it way; into the water system and be drunk by a child, through an unwashed hand after using a toilet to the mouth directly which can then spread to other children through same route (Child Health Division, Ministry of Health and Family Welfare of India 2017:7). Most victims acquired these organisms through ingestion of contaminated drinks and foods (Ndou, Lebese; Tshitangano & Damian 2021:1).

2.6 COMPLICATIONS OF DIARRHOEA

Diarrhoea is a significant condition that is very devastating to children's health and can lead to death (Child Health Division, Ministry of Health and Family Welfare of India 2017:9). If not attended to promptly, it seriously impacts children's health resulting in complications such as loss of appetite, electrolyte imbalance, malnutrition, increased risk of developing secondary diseases and impaired physical growth and mental development. In addition, unresolved diarrhoea for a long time can impact cognitive development and results into other forms of disabilities that have significant impact on family economic status (Demissie et al 2021:13).

2.6.1 Dehydration

Dehydration is one of the major complications of diarrhoea which is due to the continuous passage of loose stools (Daley & Avva 2024:np; Oduntan et al 2020:3). Dehydration is the loss of body fluid resulting to electrolytes (sodium, chloride, potassium and bicarbonate) imbalance in children under-five years which affects major body organs (Amu et al 2022:2; Child Health Division, Ministry of Health and Family Welfare of India 2017:8; Mohapatra et al 2019:1; Omole et al 2019:20). The loss of fluids in children can be very devastating (Amu et al 2022:2). Fluids make up the larger percentage of children's body, in addition children losses fluids during the day due to increase metabolic activities compared to adults (Amu et al 2022:2). Dehydration in children less than five is marked by dry mouth, sunken fontanelle, reduced volume of urine, fast and feeble pulse and loss of skin elasticity. These signs might not be obvious until there is more than 4 percent loss of body fluids. If such a child is not attended to adequately and urgently, dehydration may result into shock (Oduntan et al 2020:3).

2.6.1.1 Classification of dehydration

Dehydration is in three forms, mild or no dehydration form, moderate or some dehydration form and severe form of dehydration.

2.6.1.1.1 Mild or no dehydration form of dehydration

There are no obvious signs and symptoms in cases of mild dehydration (Child Health Division, Ministry of Health and Family Welfare of India 2017:9; WHO 2013:128).

2.6.1.1.2 Moderate or some dehydration

Moderate dehydration presents with symptoms such as thirst, drinking eagerly or being unable to drink, restlessness, dry oral mucous membranes, irritability, sunken eyes and decreased skin elasticity. The skin pinch test returns slowly in affected individuals (Daley & Avva 2024:np; Child Health Division, Ministry of Health and Family Welfare of India 2017:9; Onasoga et al 2019:109; WHO 2013:128).

2.6.1.1.3 Severe dehydration

Severe dehydration is a life-threatening condition that includes the signs and symptoms of moderate dehydration with additional manifestations such as of pale skin, lethargy and deep and rapid breathing. Hypotension, shock, and loss of consciousness are considered as late clinical signs indicating circulatory collapse and need for immediate medical intervention (Daley & Avva 2024:np; Child Health Division, Ministry of Health and Family Welfare of India 2017:9; WHO 2013:128).

2.6.2 Other complications

Apart from dehydration, diarrhoea in under-five children is associated with nutritional and growth consequences. Affected children may experience a weight loss of approximately 30grams every day during diarrhoea episodes. If such episodes occur for an average of 73 days a year, the weight loss of the child in the next one year will be equivalent to 370grams. Moreover, children who experience diarrhoea disease within the first 24

months of birth are likely to be 1.5 cm shorter than their healthy counterparts (Momoh et al 2021:2).

Diarrhoea negatively influences the growth and development of under-five children (Momoh et al 2021:9; Mulatya & Ochieng 2020:359; Wolde et al 2022:2). Loss of appetite, continuous stooling and poor absorption of nutrients by the gastrointestinal tract mucosa lining can lead to malnutrition, one of the significant complications of diarrhoea (Giri et al 2022:1; Momoh et al 2021:9). Malnutrition, in turn, adversely affects a child's growth and development (Jiwok et al 2021:1; Momoh et al 2021:9).

The relationship between malnutrition and diarrhoea is intertwined, recurrent diarrhoea episodes lead to nutrient depletion and weight loss, while malnourished under-five years children are more susceptible to frequent and severe episodes of diarrhoea (Amu et al 2022:2; Mulatya & Ochieng 2020:359). Diarrhoea in a malnourished child can therefore be life threatening (Jalo et al 2020:32). In the long-term, diarrhoea has both direct and indirect effect on a nation's socio-economic burden (Mulatya & Ochieng 2020:359).

2.7 HOME MANAGEMENT OF DIARRHOEA

Once diarrhoea is identified the mother should assess for dehydration and its level of severity before commencing treatment (WHO 2014:23). According to World Health Organization (WHO) (2010:1), treatment of diarrhoea should begin with assessment of dehydration to establish a baseline for commencement of rehydration therapy. There exist some key essential rules to follow in the HMCD, these include, giving of extra fluid, administration of zinc supplements, continuing feeding and reporting to health facility if danger signs are noticed (WHO 2013:125, 133; WHO 2014a:18, 29). WHO (2010:1)

2.7.1 Management of diarrhoea

2.7.1.1 Rehydration therapy

The mainstay of managing diarrhoea over the years has been ORS which is a mixture of glucose and several salts. The recommended ORS is low osmolarity ORS (WHO 2014:10). A child with diarrhoea requires extra fluids more than the usual normal intake and in quantity the child can tolerate. The goal is to prevent dehydration by the

replacement of the lost fluid during the episodes of diarrhoea. ORS and water should be given to children during diarrhoea episodes with until it subsides together with exclusive breast feeding especially (WHO 2013:130-132).

Mothers are to be educated on how to prepare and administer ORS.

The process of preparing ORS includes:

(1) Washing of hands before the preparation.
(2) Empty the entire packet of the ORS into a clean container.
(3) Fill the container with 1 litre of clean cooled boiled water and pour it into the container.
(4) Stir the mixture with a clean spoon until it completely dissolved.
(5) Taste the solution before administering to the child.
(6) This mixture should be used only for 24 hours, and another prepare till diarrhoea stops.

The steps of giving ORS are:

(1) Give ORS frequently in small sips.
(2) Give 50-100ml to children under 2 years after each diarrhoea episode.
(3) Give 100ml-200ml to children that are 2 years and above after each diarrhoea episode.
(4) If child vomits, pause for 10 minutes before restarting administering the ORS gradually (WHO 2014:29-32).

2.7.1.2 Zinc supplements

Zinc supplementation alleviates diarrhoea duration and frequency thus reducing the risk of hospitalisation. Zinc should be administered to children between the age group 2 years and 5 years for 14 days. A tablet of zinc is 20mg. Children less than 6 months should be given 10mg/half a tablet while those above 6 months should receive 20mg/1 tablet. To administer zinc tablets to children, mix it with small quantity of water, ORS or breast milk in a spoon or cup. Older children can be given the zinc tablet to chew or dissolve it in a small amount of clean water for consumption (WHO 2014:29-32).

2.7.1.3 Continue feeding

Continuous breastfeeding not only replaces lost nutrients but also confers immunological protection for children under-five. Adequate food intake during weaning period helps to prevent and manage diarrhoea by ensuring sufficient nutrient replacement. Maintaining proper nutrition during diarrhoea episodes is crucial to prevent further complications and reduce the duration of diarrhoea. Both breastfed and weaned children should therefore continue their regular diet during diarrhoea episodes (Abbas, Pandey & Verma 2019:np; Tsehay, Aschalew, Dellie & Gebremedhin 2021:70).

2.7.2 Management of dehydration

Dehydration can be managed only if the mother can assess the child with diarrhoea to determine the form of dehydration present. The pattern of treatment of diarrhoea in children is to be guided by the findings of the assessment. Each form of dehydration has its treatment plan (WHO 2014:23).

2.7.2.1 No dehydration

Managing diarrhoea with signs of no dehydration requires following the fundamental rules of managing diarrhoea at home including extra fluids, giving zinc supplements, continuing feeding and reporting to the hospital if danger signs such as reduced levels of drinking and blood in the stool is observed (Child Health Division, Ministry of Health and Family Welfare of India 2017:10; WHO 2013:136; WHO 2014:18). ORS should be giving continuously after each loose stool until diarrhoea subsides. Give ORS to children according to their weight or age (Federal Ministry of Health, & Nigeria Centre for Disease Control 2017.59-60).

Administration of more fluids is essential for children at home during episodes of diarrhoea with or without signs of dehydration (WHO 2013:134-136). Mothers are to give the child fluid more than the usual intake, as much as the child will take (WHO 2014:29). Mothers should be encouraged to increase the duration and frequency of breastfeeding in an exclusively breastfed child. Non-exclusive breastfed children and children above 6 years should be placed on ORS, fluid-based foods, and increased water intake (WHO 2013:134-136; WHO 2014:29). Zinc supplement is also essential for children

experiencing diarrhoea with no dehydration. The dosage is like the prescription of children experiencing diarrhoea with mild dehydration (WHO 2013:134-136; WHO 2014:31). Continuous feeding and monitoring of the child hydration status is crucial in children with no sign of dehydration.

Table 2.1 Recommended dose per kilogram of body weight and age

Age	**ORS**		Where measurement is difficult, children can be given the fluid in sips. If the child vomits during the administration of ORS, mother should stop and wait for 10 minutes before recommencing, but this should be done gradually.
Less than 2 years	50-100ml after each loose stool	1 sachet per day for two days	
>2	100-200ml after each loose stool	1 sachet per day for two days	

(Federal Ministry of Health & Nigeria Centre of Disease Control 2017:32-33,57-61; WHO 2013:134-136)

2.7.2.2 Mild or some dehydration

Children with some dehydration may be admitted to the clinic and may be initially placed on IVF (WHO 2014:25). The four key rules of managing diarrhoea are to be considered first in the management of mild dehydration**.** Mild or some dehydration should be treated with fluid replacement, zinc supplementation and continuous feeding (WHO 2014:18). The under-five children should be given ORS the first 4 hours. Mothers are to administer ORS according to the child's weight or age if weight is unknown. Children should be given as much as they demand and can tolerate (WHO 2013:132; WHO 2014:25).

Table 2.2 Recommended dose per kilogram of body weight and age

Age	**Less/equal 4-12 months**	**4-12 months**	**12 months-less/equal 2 years**	**2 years less/equal 5 years**
Weight	<6kg	6-<10kg	10-<12kg	12-19kg
ORS measurement	200-400ml or 1-2 cups	400-700ml or 2-3 cups	700-900ml or 3-4 cups	900-1400ml or 4-7 cups

(Child Health Division, Ministry of Health and Family Welfare of India 2017:9; WHO 2013:132)

Meanwhile, when the above prescription cannot be achieved, mothers are advised to administer a teaspoon of ORS every 1-2 minutes for children less than two years while

children above two years should be given in sips**.** However, it is important to monitor the child while administering ORS, if the child vomits this should be stopped and resumed after 10 minutes at slow intervals (every 3 minutes) (WHO 2013:132). Children can be breastfed intermittently when the child requests for this, alongside the rehydration therapy. Other children who are not on breast milk can be given clean water of 100-200ml during this period. After the initial treatment for 4 hours, the mother should reassess the form of dehydration and use an appropriate treatment plan based on the assessment outcome (WHO 2014:25). Administration of ORS includes teaching mothers about personal hygiene before preparation and during administration of ORS. Effective handwashing entails, washing both hands under running water with soap and water for 30 minutes. Rubbing of both hands while washing is required for adequate removal of dirt's and micro-organism. Hand washing should take place before preparing foods, feeding a child, eating food and attending to a sick child while it should equally take place after using the toilet, changing diapers, coughing/sneezing and blowing or wiping of nose (Child Health Division, Ministry of Health and Family Welfare of India 2017:17). The teaching can be reinforced by offering mothers a leaflet containing detailed information on ORS preparation (WHO 2014:26).

Another important need of a child with mild diarrhoea is zinc supplements. Zinc is an important micronutrient, essential for a child's growth and development which is lost in greater quantities during diarrhoea. The replacement helps reduce the duration of diarrhoea episodes duration, hastens recovery and prevents its frequent recurrences. Children less than 6 months should be given half a tablet while children 6 months older should be served 1 tablet for 10-14 consecutive days (WHO 2013:133-134).

Feeding is crucial for the recovery of a child with some dehydration. Only breast milk is recommended during the first 4 hours of the rehydration phase, after which other food can be introduced for babies that are no longer on breast milk (WHO 2014:18). Breastfed babies should continue to receive breast milk either directly from the breast or through assistive expressed methods. Non-breast-fed children can be given lactose-free milk (WHO 2013:134). Children consuming table foods can be served starchy foods mixed with pulses, vegetables and meat or fish, mashed banana as a source of potassium or fruit juice (Child Health Division, Ministry of Health and Family Welfare of India 2017:21; WHO 2014:27). Nutrition guidance on post-diarrhoea feeding includes provision of

frequent meals at least six times a day and for two weeks after diarrhoea subsides, increase meals to seven times a day (WHO 2013:134).

2.7.2.3 Severe dehydration

Children with severe dehydration require prompt administration of intravenous fluid (IVF) and if IVF is not possible nasogastric tube feeding is recommended (Federal Ministry of Health & Nigeria Centre of Disease Control 2017:32-33,57-61; WHO 2014:24). After, the condition of the child stabilises, ORS and zinc supplements can commence. Some cases of severe dehydration may be due to cholera, for such instances, the child will require antibiotics (WHO 2013:129). The major way to identify cholera is when a child presents with acute watery diarrhoea and severe dehydration or shock. In most cases of severe dehydration, the children are admitted and placed on IVF for rehydration. Once the condition of the child improves and the severe stage has been resolved, IVF can be discontinued and ORS with zinc supplement commenced. Mothers should be taught how to prepare and administer ORS at home. ORS should be given by cup frequently for the replacement of potassium which is not available in most IVF. Children on breast milk should be breastfed frequently (WHO 2013:130).

2.7.3 Management of persistent diarrhoea

Children with persistent diarrhoea but without severe malnutrition can be taken care of at home. However, if such a child, has signs of severe dehydration such requires hospital admission. ORS is very effective for children with persistent diarrhoea, meanwhile, some children may experience poor glucose absorption. ORS in such children may increase stool volume with the presence of unabsorbed glucose in stool, thirst may increase, and signs of dehydration may be worsened. These categories of children require IVF replacement until the child can tolerate ORS without complication. The persistent diarrhoea treatment may require antibiotics if it is due to non-intestinal or intestinal infections, however, in most cases, they do not need antibiotics treatment.

Continuous feeding is essential for children with persistent form of diarrhoea (WHO 2014:42). Children experiencing persistent diarrhoea with mild or severe forms of dehydration should be breastfed in the first 4-6 hours. Immediately after the first 4-6 hours rehydration phase, it is recommended that other children not on breast milk should be

given sips of lactose-free drinks such as yoghurt from a cup. Also, children above 6 months should be served age-appropriate foods once they can eat. These foods should be given at least 6 times daily to achieve 110 calories/kg/day.

Children with non-severe persistent diarrhoea rarely require hospitalisation, they can be managed at home. ORS is the first line therapy considered to be given but its use in children with glucose impairment requires caution until the impairment resolves. Like other types of dehydration management, exclusively breastfed children should receive frequent breastfeeding, while non-exclusively breastfed children on animal milk should be given lactose-free milk such as yoghurt. Children with persistent diarrhoea find it difficult to digest animal milk, milk products with less lactose should be encouraged. Other children above 6 months should receive adequate complementary foods appropriate with age. These complementary foods should be given frequently at least six times a day. Other important essential nutrients for persistent diarrhoea are supplementary vitamins, minerals and special feeding. Successful management should result in weight gain and reduced stool (WHO 2013:137-143).

2.7.4 Management of dysentery

Dysentery is a form of diarrhoea that presents with blood in stool, abdominal pain, fever, convulsion, lethargy, dehydration and rectal prolapse. Children with dysentery require treatment with antibiotics (WHO 2013:143-146; WHO 2014:43). ORS and continuous feeding are to be practiced at home like other types of diarrhoea. Although, feeding children at home during dysentery is often difficult due to lack of appetite hence mothers are to be encouraged and educated on the importance of continuous feeding. Children above 6 months should be given age-appropriate foods frequently according to the child's preference.

ORS administration to a child with dysentery depends on the form of dehydration. ORS should be given slowly and frequently. The weight or the age of the child should guide the amount to be given. ORS is to be administered until dehydration is resolved. Children with dysentery are prone to potassium loss. ORS will not only restore lost fluid and electrolytes, but it is also very effective in the restoration of lost potassium. Foods rich in potassium are advisable for children with dysentery, such as bananas, coconut and dark green leafy vegetables. High fever is one of the major signs of dysentery, this can be

managed at home by mothers by tepid sponging, use of antipyretics and prescribed antibiotics (WHO 2013:143-146).

2.8 EMPIRICAL REVIEW: KNOWLEDGE, ATTITUDE AND PRACTICE (KAP) OF HMCD

2.8.1 Knowledge of HMCD

Several evidence across multiple regions in Africa, Asia, and the Middle East, revealed that mothers generally demonstrated basic awareness of diarrhoea and dehydration, yet concerns persist as regards their full understanding of the causes, mode of transmission, preventive measures, and appropriate home management. Although many correctly define diarrhoea as the passage of loose stool three or more times daily, a substantial proportion still attribute it to teething, excessive feeding, or breastfeeding rather than acknowledging infection and poor hygiene practices as the main cause (Alghadeer et al's 2021:4-8; Keto et al's 2020:341-344; Oji & Okafor's 2020:107).

These same observations have been observed across several regions In Nigeria; many mothers lack adequate knowledge of diarrhoea and its complications. Many mothers do not recognise the signs of dehydration, often misinterpreting these signs as indicators of unrelated health issues. Studies by Ogunmiluyi and Ayodele's (2021:43, 49-54) and West & Okari's (2023:547-552) in Ondo and Rivers State, revealed that while most of the mothers knew that diarrhoea significantly affect under-five children and could defined diarrhoea correctly, less than 60% were able to identify the common signs and symptoms of dehydration (Oyefabi et al's 2023:1, 3-4; West & Okari's 2023:547-552). Additionally, Momoh et al's 2021:6-7; West & Okari's 2023:547-552; Yusuf et al's (2022:315) reported that more than half of mothers in in Rivers, Lagos and Kebbi States, were unable to identify causes of diarrhoea and its complications, many associated it with tooth eruption

Several studies, both within and outside Nigeria, have reported varying levels of Knowledge regarding HMCD. Some group of mothers demonstrated good knowledge of HMCD practices (Alghadeer et al's 2021:4-8; Guillaume 2020:29-49; Terefe et al's 2022:4-6). In Ethiopia, mothers generally recognise that diarrhoea can be managed at home; however, significant knowledge gaps persist regarding HMCD.

Furthermore, study among mothers in Hosanna community, Addis Ababa, revealed that more than 80% mothers agreed that diarrhoea could be managed at home, yet fewer than 20% recognised ORS as an effective home remedy (Keto et al's 2020:341-344). Similarly, Terefe et al's (2022:4-6) found that only about half of the mothers in Ginchi town knew how to correctly prepare ORS and understood its benefit in restoring lost body fluids. Meanwhile, Fufa et al's (2019:4) study in Ethiopia reported significant urban-rural disparities in HMCD knowledge, with more than 80% of urban mothers demonstrating good knowledge of HMCD than half of their rural counterparts.

Additionally, Alghadeer et al's (2021:4-8) study among mothers living in Saudi Arabia found that a significant proportion of the mothers knew of ORS in which approximately 50% identified its ability in treating diarrhoea. Likewise, Dhar and Majumder's (2019:128-130) study in two hospitals in India, reported that most mothers are aware of ORS and demonstrated good knowledge of importance of handwashing. However, the study highlights that many of the mothers do not have adequate knowledge of the functions of ORS and signs of severe dehydration.

In Nigeria, several studies have explored home management of diarrhoea; however, there are limited studies that examined the three variables, knowledge, attitude and practice in relation to HMCD. Furthermore, there are scant interventional studies assessing the effectiveness of HMCD practices.

Momoh et al's (2021:6-7) reported that mothers displayed a high knowledge of HMCD. This finding is in line with West and Okari's (2023:547-552) study in Rivers State, which showed that more than 60% knew that diarrhoea could be managed at home. Similarly, Omole et al's (2019:21) study in Kaduna State, found that most mothers knew that diarrhoea can be treated at home. However, despite this general awareness, gaps persist in the knowledge and appropriate home management practices. Momoh et al's (2021:6-7) noted that less than half of the mothers knew that ORS could be used to treat diarrhoea. This finding is consistent with West and Okari's (2023:547-552) findings in Rivers State, where less than 30% of the mothers were aware of the combination of ORS and zinc in the management of diarrhoea.

Apart from ORS, other forms of home management of diarrhoea exist. Some studies identified other forms of home management practices adopted by mothers, these include

the continued breast feeding, the use of herbal remedies, and orthodox treatment such as antibiotics, and antimotility drugs (Omole et al's 2019:21; Owoseni et al's 2021:4619; Oyefabi et al's (2023). Also, some mothers believed that eating local food like "eba" will help stop diarrhoea, and many do not see the need of taking their children to hospital even after 24 hours of diarrhoea episodes. Additionally, a large proportion of mothers believed that a cleric and traditional healers should be consulted during episodes of diarrhoea (Owoseni et al's 2021:4619).

In Ogun State, Nigeria, there is a scarcity of studies on HMCD. Ajayi et al's (2019:35-37), found that although majority of mothers were aware of ORS, less than half had adequate knowledge of the zinc supplementation. Notably, a study by Oluseye and Oluwatosin's (2019:81) conducted among current study population Ibogun community, revealed inadequate knowledge and poor home management practices. It was reported that most mothers' attribute diarrhoea to certain misconceptions such as identified part of teething experience, and consumption of excessive breastfeeding. These beliefs influenced their management approaches. These misconceptions underscore the need for targeted, nurse-led educational interventions in this context. Interestingly, only a few nurse-led interventional studies existed in Nigeria, Oduntan et al's (2020:6-8) demonstrated that mother's knowledge of diarrhoea and its home management improved significantly following the nurse-led educational intervention among mothers in Oyo State.

2.8.2 Attitude towards HMCD

Mothers attitude towards diarrhoea, it causes, severity, modes of transmission and prevention will determine their practice of HMCD. Regarding attitudes, Momoh et al's, 2021; Njokuobi 2024. 6-7; West & Okari's, (2023;547-552) reported that most mothers held positive perceptions of diarrhoea prevention and management, acknowledging its seriousness and preventability. Many expressed readiness to use ORS, increase fluid intake, and continue feeding during diarrhoea episodes. In addition, high percentage indicated that they would look for danger signs of diarrhoea, continue to breastfeed, give more fluids, report to a health facility, and administer zinc tablets and ORS during episodes of diarrhoea in children (West & Okari's, 2023;547-552). Meanwhile some mothers believed that antibiotics should be part of home management of diarrhoea among children under five (Njokuobi 2024. 6-7). These mixed attitudes highlight that positive intentions may coexist with traditional misconceptions, limiting consistent

adherence to recommended practices. Evidence from nurse-led interventions identified that structured health education can moderate these attitudes (Oduntan et al's 2020:6-8; Oji & Okafor's 2020:107).

2.8.3 Practice of HMCD

In terms of practice, a mixed pattern emerges. While many mothers reported administering ORS, continuing breastfeeding, and maintaining hygiene during diarrhoea, others continued to rely on antibiotics, herbal mixtures, or food restriction (Keto et al's 2020:341-344; Onasoga et al's 2019:108). These variations reflect that practice is often influenced by cultural norms, accessibility of ORS, and perceptions of treatment effectiveness. Good practices of HMCD among mothers were consistently associated with higher education, urban residence, and access to health information (Gathogo et al's 2020:2451-2453; Terefe et al's 2022:4-6). Interventional studies in Nigeria and Ethiopia demonstrated that nurse-led education significantly improved mothers' ability to prepare ORS correctly, display appropriate personal and environmental hygiene, and maintain feeding during childhood diarrhoea experience (Oduntan et al's 2020:6-8; Terefe et al's 2022:4-6).

It is important to highlight that some studies revealed that mothers demonstrated appropriate home management practices for childhood diarrhoea. The actions taken in treating diarrhoea at home included the administration of ORS as first line treatment, increasing the child's fluid intake above normal, continuing feeding with age appropriate diet during childhood diarrhoea episodes (Azene, Eisenberg, Espira, Abebe, Habtamu, Iweriebor , Mkolo, Shibeshi, Assefa & Baye 2025:[5]**;** Fufa et al's 2019:6; Terefe et al's 2022:4-6).

Conversely, a study conducted in Rwanda reported that most mothers mentioned used of sweetened tea, fruits, drinks or coffee in treating diarrhoea at home (Ndayisaba, Uwizeyimana, Jeanne, Tuyisenge & Chironda's 2022:4). In Ethiopia, many mothers did not administer ORS at the correct time; only a few gave it immediately, majority administered it the following day after the onset of loose stool. Approximately only 30% indicated that ORS should be started on the first day of diarrhoea episode (Terefe et al's 2022:4-6).

Remarkably is that home management of diarrhoea differs across residential settings. Fufa et al's (2019:6) observed that the majority of the respondents practised home management inappropriately, a pattern more pronounced in rural settings, where many mothers reduced fluid and food intake during diarrhoea episodes compared to urban areas.

Evidence from Nigeria revealed mothers' effort in the home management of childhood diarrhoea. Many mothers indicated that they would personally treat their children at home (Keto et al's 2020:341-344). Momoh et al's (2021:6-7) and Onasoga et al (2019:108) reported that most mothers in Lagos and Kwara States respectively, administered ORS and continued breastfeeding during diarrhoea episodes. In addition, Okechukwu et al (2022:[3-4) highlighted that awareness of ORS among mothers in Port-harcourt was high; however, the appropriate use of ORS and its preparation were considerably low, indicating gaps in knowledge and practice that interventions could address. However, several studies reported various inappropriate practices. Momoh et al's (2021:6-7); Onasoga et al's (2019:108); Terefe et al's 2022:4-6). found out that only a few mothers gave zinc supplements and increased water intake. Other forms of treatments administered included the salt and water solution, "garri" water (local flakes water), anti-diarrhoea and antibiotics drugs. Some mothers reduced the frequency of breastfeeding and food intake as a mode of reducing the episodes of diarrhoea. In addition, some mothers resorted to the use of native medicine (Keto et al's 2020:341-344; Momoh et al's 2021:6-7; Onasoga et al's (2019:108).

Interestingly, a few health education intervention studies in Nigeria have been shown to be effective. Oji and Okafor's (2020:1-10) reported that before intervention, less than 40% of the mothers agreed to administer ORS at the onset of diarrhoea episode, while after intervention, more than 90% agreed to do change their approach. Furthermore, there was improvement in hygiene practices, particularly hand washing with soap, the use of clean water or boiled water, and the correct preparation of ORS post-intervention. It is noteworthy that many of the guardians initially agreed to administer anti-diarrhoea agents and antibiotics during diarrhoea episodes; however, this response declined after the intervention. In addition, the proportion of caregivers who agreed to seek care at a health facility if no improvement takes place after 24-48 hours increased to above 90% post-intervention. These findings are consistent with Oduntan et al.'s (2020:6-8) findings,

which revealed there were statistical differences between the pre- and post-intervention mean scores of participants' knowledge of diarrhoea and knowledge of management of diarrhoea. Similarly, Nanbur, Dongurum, Achema, Emmanuel and Chunuan (2025:[3]) found a significant increase in mothers' mean knowledge of ORS and its preparation after an educational intervention. Additionally, Oruikor and Durotoye (2023) reported a mean improvement of 36.55 in mothers' knowledge of ORS therapy following an intervention educational program, with no mother scoring below average post-intervention and more than 80% achieving good knowledge, suggesting that educational interventions can effectively improve mothers' knowledge across diverse populations.

2.8.4 Factors associated with HCMD

Across studies, several factors have been identified influencing the home management of childhood diarrhoea (HMCD), including age of caregivers, difficulty in preparing ORS, educational status, and knowledge of HMCD (Dhar and Majumder's 2019:128-130; Fufa et al's 2019:6; Kacan, Palloa & Ozkaya's 2022:677). Among Nigerian mothers, factors such as educational level, income, caregivers' relationship to the child, age of the mother, parity, and socio-economic status were noted as the main determinants of HMCD (Omole et al's 2019:21; Terefe et al's 2022:4-6; West & Okari's 2023:547-552). There was a significant association between practice knowledge and attitude toward diarrhoea home management (West and Okari's 2023:547-552).

Importantly, across all the studies reviewed, educational status consistently emerged as a strong predictor of appropriate home management practices, mothers with high level of education approached HMCD appropriately than the other groups. The availability and affordability of ORS and zinc have also influenced their use in the management of diarrhoea (Ajayi et al 2019:37; Dhar & Majumder's 2019:128-130; Gathogo et al's 2020:2451-2453; Terefe et al's 2022:4-6).

Conclusively, no intervention study has been conducted in Ogun State. Conducting a nurse-led educational intervention will not only improve mothers' understanding but also transform their attitudes and change their practices, especially in underserved areas such as Ogun State.

2.9 SUMMARY

This chapter discusses the main variables of this study as highlighted in the study objectives. The study specific objectives include to assess; the knowledge of HMCD among mothers with under-five children in a rural community in Ogun state, Nigeria pre- and post-intervention, the attitude of mothers with under-five children towards HMCD in a rural community in Ogun state, Nigeria pre- and post-intervention, the practice of HMCD among mothers with under-five children in a rural community in Ogun state, Nigeria pre- and post-intervention, socio-demographic factors associated with knowledge, attitude and practice of HMCD among mothers with under-five children in a rural community in Ogun state, Nigeria pre- and post-intervention and to develop and validate health educational programme to improve mothers' knowledge, attitude and practice of HMCD.

The chapter reviewed the concepts of diarrhoea, its causes, mode of transmission and management. It describes the theoretical framework grounding the research study. The empirical studies on the research variables as contained in the objectives were discussed extensively. Empirical studies reveal that most mothers had good knowledge of diarrhoea, however most of them only had average knowledge of HMCD. Majority attitudes towards HMCD were quite negative this is mostly because of their belief systems which are reflected in their diverse practices of HMCD. Age, level of education and monthly income were the common factors identified associated with HMCD.

CHAPTER 3

RESEARCH DESIGN AND METHOD

3.1 INTRODUCTION

Research approach refers to the overall plan or strategy that guides how a study is conducted, including the collection, analysis, and interpretation of data (Creswell & Creswell, 2018:3). It defines whether the research will primarily explore phenomena to understand experiences (qualitative), measure and test relationships between variables (quantitative), or combine both strategies (mixed methods) (Cohen 2018:06-207; Asenahabi 2019:78). In this study, a quantitative research approach was adopted. This approach is appropriate for examining and testing relationships or associations between variables using statistical procedures (Leavy 2017:106). The quantitative approach allows for objective measurement of outcomes and provides data that can be analysed numerically to determine patterns, or relationships of variables.

Research design and methods are key parameters crucial to undertaking any research study. Research design serves as a structured plan that outlines the strategies for data collection and analysis in alignment with the study objectives, available time, personnel and financial resources (Kothari 2004:32). This chapter presents the study's research design and methods utilised to assess mothers with under-five children knowledge, attitude and practice of HMCD, conduct the health educational intervention programme and measure the changes that occur in the mothers KAP before and after intervention. The chapter addresses issues of research design, method and rigour of the study: validity and reliability/trustworthiness.

3.2 RESEARCH DESIGN

Research design describes the overall strategy or structure that researchers choose to address the set research questions and research hypotheses within the chosen approach (Marczyk, DeMatteo & Festinger 2010:22).

Within the quantitative approach, there are two types of quantitative research design experimental and non-experimental research design. The experimental research designs include pre-experiment, true experiment and quasi- experiment (Zubair 2023:5-6). The pre-experimental research design is the most basic type of experimental research design in statistics and does not include control group. Therefore, it cannot fully establish causal relationships between variables. Quasi-experimental research design involves studying phenomena in real-world setting. It is nearly not possible to isolate and control variables in a natural setting hence randomisation and control are either partially present or absent in quasi-experimental studies (Cohen 2018:401). A true experimental study involves two categories of groups, including an experimental group and the control group. The true experiment study involves providing treatment to the experimental group while denying it to the control group and thereafter evaluates the treatment impact. Subjects are placed in each group through randomisation. This randomisation differentiates true experiment from quasi-experiments (Polit & Beck 2017:225-231; Zubair 2023:5-6).

This study employed a quantitative research approach to investigate improvements in mothers' knowledge, attitude and practice regarding HMCD in a rural community Ogun State, Nigeria after the nurse-led educational intervention. The research design used was a one-group pre-experimental design, which lacks randomisation and does not include a control or comparison group. Instead, it involves assessing an existing group in its natural setting before and after exposure to the intervention. In this study, the nurse-led health education programme served as the treatment. The design was implemented in three phases consisting of a pre-intervention assessment, delivery of the intervention, and a post-intervention assessment.

Nurse-led health education intervention has tendency for certain threats, maturation and history. There is possibility for changes to take place irrespective of the intervention. The KAP of the mothers as regards diarrhoea may improve due to informal learning or on-going personal experiences during the study rather than as a result of the educational programme. Furthermore, some external events might occur during the study period that might influence the mothers' responses. Participants could be expose to information related to study from mass media or community outreach which may affect their KAP. These external factors could potentially confound the effects of the intervention. Therefore, researcher limited the study to short period of two months and were asked

about any prior health educational programmes during the study. This helped to monitor and account for any potential external influences on the outcomes.

***First phase**:* this is the pre-intervention data collection phase, which entails the collection of baseline data (T0) from the participants with the aid of questionnaire (Annexure J) and the use of an observation checklist (Annexure K) to observe each participant's home management (ORS/SSS) preparation. This pre-intervention data serves as baseline information for comparison with data collected after the intervention.

With the gatekeeper's permission (community head and/chiefs) the researcher was able to enter the community. With the assistance of a trained nurse that works in the community, the researcher was able to locate the houses where the mothers reside informing them about the study. After the selection process of the study participants using multi-stage sampling technique, they were informed about the purpose of the study and consent was obtained. They were invited to come for the pre-intervention phase on the scheduled date. The first phase was conducted on a Saturday in the village hall and not the same day with the remaining phases, this was done for blinding purpose and reduce bias.

The participants were divided into nine (9) units, and data were collected with the assistance of trained research personnel. Nine (9) trained nurses who are familiar with the community were trained as research assistants for data collection and the intervention session. The purpose of the study was explained again to the mothers on the scheduled date before commencement of the study, and written informed consent was obtained from each participant (Annexure I). Research assistants served as a facilitator for the established units. A code was assigned to each unit, and the units were kept at far distance from one another. The participants in each unit were attended to privately to limit contamination. This phase took each participant an average of 30 minutes to complete.

All research assistants recruited for the study signed a confidentiality agreement before the commencement of the data collection (Annexure M). They were all trained on how to administer the questionnaire and use the observation checklist. The research assistants were instructed to follow the data collection procedures, and they were closely supervised and monitored throughout the data collection process to ensure completeness and compliance with the study protocol.

Development of programme

The Knowledge, Attitude and Practice model guided the development of the programme (Liao et al 2022:42-43). The KAP model assumes that improvements in knowledge influence attitudes and, in turn, lead to positive changes in practice. Therefore, the development of the intervention was guided by knowledge, attitude, and practice gaps identified from literature and initial observations among mothers in the study area. Existing studies indicated that many mothers have limited knowledge of the causes of diarrhoea, and demonstrated negative attitudes toward HMCD, and exhibited poor practices related HMCD. These deficiencies necessitated the development of the modules, ensuring that KAP component was logically addressed. The logical link between the KAP constructs, the identified gaps, and the corresponding module content is presented in the table below

Table 3.1 Link between KAP Constructs, Identified Gaps, and the Programme Content.

Construct	Identified Gap	Programme Module/Content Addressed
Knowledge	Poor understanding of - causes, - transmission, of diarrhoea, - and dehydration	Module 1: Understanding Diarrhoea and Dehydration
Attitude	Mothers hold misconceptions and negative attitudes towards HMCD such as beliefs that - food should be withheld during diarrhoea, and - mistrust of ORS,	Module 2: Promoting positive attitudes towards HMCD including use of ORS, feeding practices, etc - by addressing how to treat different types of dehydration, - emphasising the rules of HMCD, especially importance of ORS, continued feeding and adequate fluid intake, - addressing misconceptions towards HMCD
Practice	Incorrect preparation of ORS, and administration of zinc supplement.	Module 3: Demonstration of appropriate HMCD - step-by-step preparation of ORS, - administration of zinc and - handwashing

After developing this programme, expert validation was sought through adapting Delphi method, which involved specialists in health education, community health nursing & research to refine and validate the programme. The review of the experts informed the refinement of the modules until it was validated for use.

The content of the programme was adapted from four key documents by the Federal Ministry of Health & Nigeria Centre of Disease Control (2017), two World Health Organization manuals (WHO 2011:58-62; WHO 2014a:8-38) and a training guide by Child Health Division, Ministry of Health and Welfare Government of India (2017:6-19). These documents are publicly available and do not require permission for reference. The programme consists of three (3) modules. According to the KAP model, knowledge improvement precedes attitude and behaviour change. The first module provided information on diarrhoea to correct misconception about diarrhoea. The second module focused on the home management of diarrhoea and common misconceptions related to HMCD. The third module consisted of a practical demonstration on HMCD.

Second phase: This is the phase of the intervention, which took place one week after the first phase. The one-week interval between the pre-intervention and intervention phases was maintained to minimise the risk of contamination

.

Standard Protocol and Fidelity Monitoring

To ensure consistent and effective delivery of the nurse-led educational intervention, a standard protocol was developed prior to the commencement of the study. The developed protocol outlined the session duration, sequence of topics, teaching methods, group arrangement, teaching materials, and evaluation methods. This provided a structured framework for uniform implementation across all the established groups.

Intervention Session

The intervention consisted of three modules, delivered over three consecutive Saturdays, with each session lasting an average of one hour.

Sequence of topics: The module comprised of three sessions:

1. The first module addressed, causes and transmission of childhood diarrhoea.
   Method: teaching and discussion

2. The second module focused on: home management of childhood diarrhoea including preparation of ORS/SSS and continued feeding practices. Method: teaching and discussion
3. The third module: steps of hand washing, preparing ORS/SSS and administering zinc. Method: Role-play and group guided discussion.

Teaching methods

1. Teaching
2. Demonstration and return demonstration
3. Role play

Group Arrangement

1. Participants were divided into nine groups/units, each containing approximately 19 participants. The larger group sizes were due to limited availability of trained nurses to facilitate smaller units.

Materials Used

1. Leaflets
2. ORS, sachets
3. Measuring cups&spoons
4. Bottled water, and covered
5. Covered bowls/jugs.

All sessions were delivered by trained nurses using the same instructional approach, with leaflets provided in English and explained in Yoruba as necessary.

Delivery procedures:

1. Researcher greets the participants
2. Introduces the topic and objectives
3. Delivers the teaching
4. Conducts the role play
5. Demonstrates ORS preparation and return demonstration
6. Answer questions
7. Shared leaflets
8. Reminds participants of follow-up assessments

Evaluation method:

An evaluation was conducted to assess the participants' understanding and skills acquired at the end of each module. This was done to ensure objectives were achieved, ascertain comprehension, clarify any area of misunderstanding and support fidelity of the intervention. Evaluation methods include

- Asking of questions based on the module objectives
- Return demonstration following the facilitator's demonstration

Although the KAP framework guided the entire study, RE-AIM framework (Reach, Effectiveness, and Implementation) was not applied as a primary framework, but it was incorporated to provide additional structure for assessing the mode of delivery, fidelity and sustainability of the intervention. This framework helped to reinforce the evaluation of the intervention. Reach was assessed by recording the number and characteristics of mothers who participated in the study. Effectiveness was assessed through changes in KAP scores at pre and post intervention. implementation was assessed using an observer checklist to ensure proper adherence to the protocol.

Fidelity monitoring was conducted using an observer checklist by the principal researcher to confirm adherence to the protocol. Any deviations in content, method or procedures were documented and addressed to ensure consistent delivery across all the sessions. This approach helped in strengthening the internal validity of the study and ensured that observed changes in mothers' knowledge, attitudes, and practices could be confidently attributed to the nurse-led educational intervention. Because of the potential for Hawthorne effects, efforts were made to conduct the intervention and assessments in a naturalistic manner, that promote free participation. Also, they were informed that the purpose was to assess their understanding rather than to evaluate their individual performance thus reducing any potential for behavioural modification.

A nurse-led health education intervention using a well-developed and validated health education programme, was conducted among the mothers. The standard protocol described above guided the implementation process to ensure consistency across all sessions. Although the programme was originally developed in English, the official language of instruction, the health education was communicated both in English and local dialect (Yoruba) spoken by the participants to ensure comprehension. No formal written translation of the programme module into Yoruba was made, but verbal explanations were provided consistently by the trained nurses fluent in both English and Yoruba. This approach ensured the participants understood all content while maintaining fidelity to the originally developed programme. Due to limited personnel, the trained research assistants serve as facilitators, providing the health education intervention to each of the established units. To ensure fidelity check, the principal researcher supervised the

sessions and reviewed all collected data for completeness and accuracy. served as supervisor, checking all the collected data for completion.

To avoid inter-observer errors, the same researcher assistants were engaged for both data collection and intervention. However, to minimise bias, ensure objectivity, and maintain blinding, the research assistant who collected data from a unit was not the same who delivered the health education. This was achieved by assigning each research assistant a numerical code and each unit an alphabetical code. At onset of data collection (pre-intervention), each research assistant was assigned to a unit. After data collection, the facilitators were rotated between units in sequential numerical order for the intervention phase.

A replication-ready implementation toolkit was developed to ensure fidelity and replicability of the study in other similar settings. This toolkit includes, training guides, materials, and documentation.

Third phase: The post-intervention phase involved two-rounds of data collection - an immediate/ first follow-up assessment phase (T1) and a month/second follow-up assessment (T2).

To ensure consistent timing and reduce bias, immediate post-assessment was conducted within 30-60 minutes after the third and final module session for each unit. This short window measured immediate learning and skill acquisition following the nurse-led health education intervention.

All participants were given a slip with the scheduled date written on it as means of identification for the one-month follow-up (T2) phase. A reminder visit was made to the community leader, who through the community town criers, helped to remind the mothers three days before the scheduled date.

One-month follow-up (T2) was conducted exactly one month after the intervention at the same venue and using the same instruments. Although participants might have received related information from other sources before the follow-up (a limitation of the study), the reduced time frame between the intervention and follow-up was intended to minimise this

potential bias. On average, participants spent an average of 30minutes completing this phase.

To ensure comparability across the established units and timepoints, all practical demonstrations used identical, pre-packaged kits and standardised procedures.

The questionnaires were retrieved immediately after each session from the participants. Using an observation checklist, the research assistants assessed the participants' performance as they demonstrated the home management of diarrhoea, specifically the preparation of ORS/SSS following the intervention.

To ensure rigour within the limitations of this design, the researcher implements strategies to minimise bias and threats to internal validity, such as maintaining consistent data collection procedures, using validated instruments, and ensuring blinding data entry and analysis. Nevertheless, potential threats to validity such as maturation, testing effects, history, and assessors' involvement are acknowledged, as these could influence participants' post-intervention responses independent of the education intervention

3.3 RESEARCH METHOD

Research method refers to the various techniques used in conducting a study (Kothari 2004:7). It encompasses the strategies employed for data collection, analysis and interpretation of findings. The nature of the data collected may vary ranging from numerical information obtained through structured instruments to textual data that captures participants' perceptions and experiences. Researcher may interpret statistical outcomes in quantitative studies or analyse themes that emerge from qualitative data. In some cases, both qualitative and quantitative approaches are integrated to provide more comprehensive understanding of the research problem (Creswell & Creswell 2022: [32]).

This research study employed a quantitative research method. This is ideal for this investigation as it enables the collection of data from a large sample through a structured questionnaire which enabled the analysis of variable relationships and outcome prediction.

3.3.1 Sampling

3.3.1.1 Research setting

The study setting is Ibogun Community in Ifo LGA, Ogun State, Nigeria. This community is located to the west of a major town called Ifo and it consists of thirty-two villages, each with its own head. The villages include Ibogun-Olaogun, Ibogun-Adina, Ibogun-Akiode, Ibogun-Suola, Ibogun-Ekundayo, Ibogun-Akinside, Ibogun-Olaoparun, Ibogun-Opo, Ibogun-Alasia, Ibogun-Oderinlo, Ibogun-Alapako Ibogun-Oke, Ibogun-Alapako Isale, Ibogun-Odeyemi, Ibogun-Alapoti, Egbeda, Ibogun-Fasina, Osungboye, Ibogun-Ilugboro, Ibogun-Omitoro, Ibogun-Balogun, Ibogun-Sowunmi, Ibogun-Igbogun, Ibogun-Awe Nla, Ibogun-Awe kekere, Ibogun-Awe Alapapo, Ibogun-Fayelu, Ibogun-Abudu, Ibogun-Giwa, Ibogun-Olorunda, Ibogun-Ojodu, Ibogun- Ibogun-Abudu Tuntun and Ibogun-Epoto (Badejo, Ogunseye & Olasunkanmi 2020:10-11).

Just like any rural community, Ibogun community lacks basic modern infrastructure and facilities. However, it has one tertiary education Institution which is the major asset of the community. It also has few secondary and primary schools and one primary healthcare centre. On approximation, there are 2,000 houses in the community, which are a mixture of mud and brick houses. The closeness of this community to some sub-urban communities has brought about new houses built with bricks. The settlers of the community are mostly farmers, others who are new residents are mostly artisans, petty traders and a few are civil servants. The entire community has three public boreholes which serve the entire community. Some of the new houses have constructed wells or boreholes. Most of the villagers fetch water from rivers for domestic purpose. In addition, the only road network of the community is bad. Motorcycles are their major means of transportation within the community and to surrounding communities.

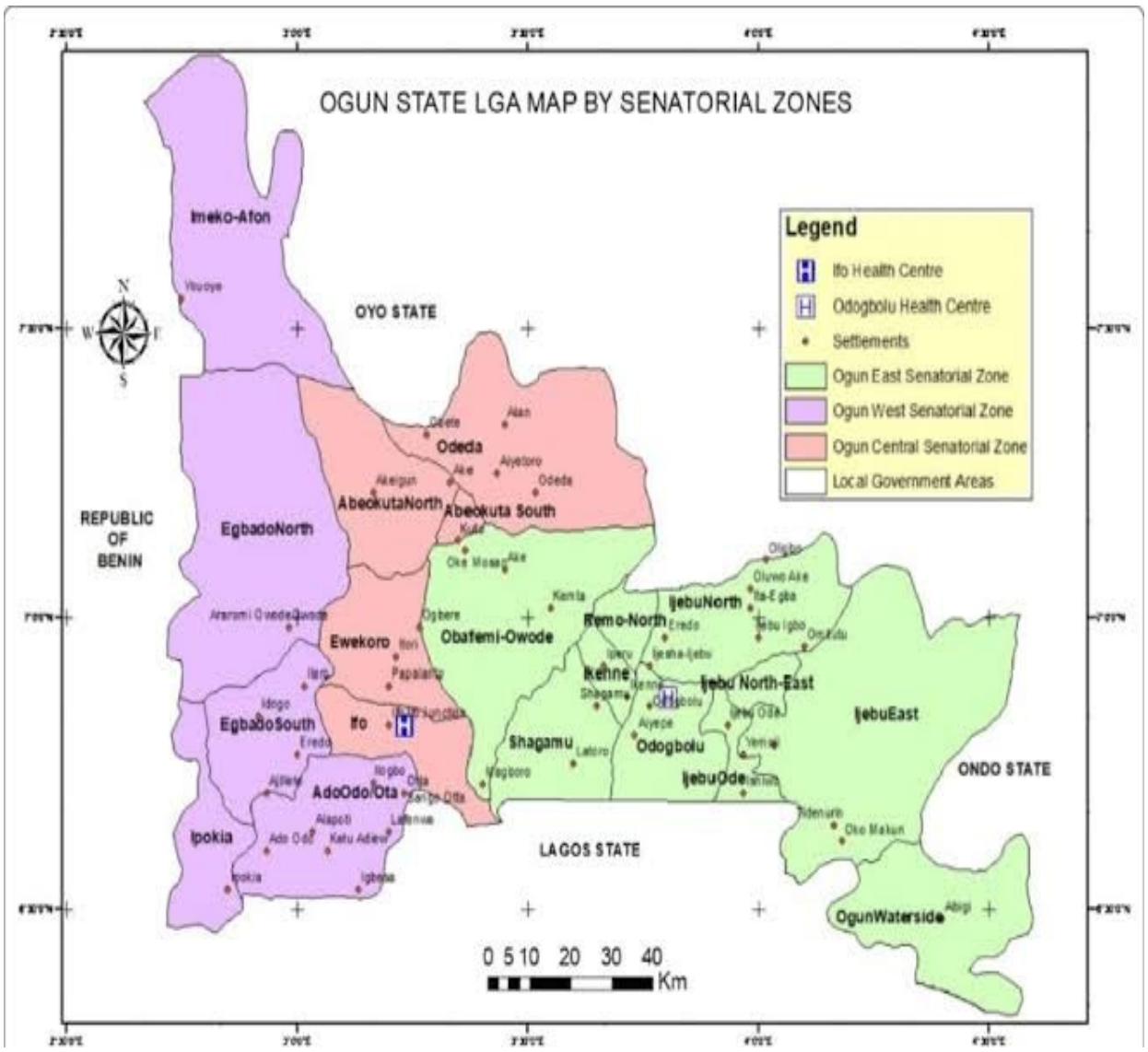

Figure 3.1 Map of Ogun State showing the LGAs (Ifo LGA the last coloured pink part)

(Okonofua, Akinsanya, Idowu & Otubanjo 2021:4)

Population: A population is the entire elements in which a researcher is interested in and will generalize findings to (Leavy 2017:76). It is also referred to as the all the units to whom the research findings will be relevant (Shukla 2020:2). The population for the study is mothers with under-five children.

Target population: This is the entire population in which the researcher is interested in and from which the researcher will draw a sample (Polit & Beck 2017:307). The target population for this study is mothers with at least one child under-five years in Ibogun community Ogun State, Nigeria.

3.3.1.2 Sampling

Sampling is the process of selecting a small group of elements or cases from a large group to represent the entire population (Cohen et al 2018:202). It is also defined as choosing subset from the larger population (Shukla 2020:5). The two main sampling methods in quantitative research are non-probability sampling and probability sampling methods (Cohen 2018:231; Shukla 2020:6; Na'Iya, Aminu, Rabiu, Nalado & Abubakar 2021:168-169).

Probability sampling method involves chance-based selection to eliminate any form of bias, ensuring equal representation and independence of subject selection. This method provides opportunity to determine the confidence level of the result (Shukla 2020:5). Probability sampling method consists of several sampling techniques which include simple random sampling, cluster sampling, stratified random sampling, systematic sampling and multi-stage sampling techniques (Leavy 2017:98; Cohen et al 2018:244).

Probability sampling was utilised in this quantitative investigation to provide an unbiased and equal representative sample. Hence, the researcher selected the study sample using appropriate technique, keeping in mind the sample size.

A multistage sampling technique was utilised to accommodate the large population. The researcher moved from one stage to another using random sampling techniques in selecting samples at each stage.

- **First stage**

At first stage, the researcher purposively selected four villages (Ibogun-Akiode, Ibogun-Odejinmi, Ibogun-Alapoti, and Ibogun-Olaogun) based on their peculiar characteristics. All these villages are in proximity with one another and a hall they all used for community meetings. The major source of drinking water for all the villages is one public borehole, a well built by one of the community heads and a few new settlers have their own personal built wells. Most of the villagers fetch water for domestic purposes from the nearby river.

- **Second stage**

In the second stage, to generate a list to creating the sampling frame, the researcher obtained the estimated number of houses in each study village from the village representatives. To verify these estimates, the researcher, with the help of research assistants, conducted house counts in each village. Ibogun-Akiode 120, Ibogun-Odejinmi 90, Ibogun-Alapoti 100, and Ibogun-Olaogun 90, total 400 houses. Following this, a systematic random sampling technique was employed to select households from each village using a sampling interval (kth) derived from the formular $k^{th} = N/n$. Every fifth house on the sampling frame was selected, with the starting point determined by simple random selection.

Systematic sampling calculation $k^{th} = N/n$
N = approximated total number of houses in Ibogun community (2000)
N = approximated total number of houses in the four communities (400)
2,000/400 = 5
$K^{th} = 5$

- **Third stage**

After the selection of the houses using systematic sampling procedure, the researcher identified all eligible mothers with under-five children residing in each selected house. Because many houses in rural communities in this region contain multiple households and may have more than one eligible biological mother or caregiver, simple random sampling technique (balloting method) was used to select at least one eligible mother per selected house. This ensured that each eligible mother had an equal chance of being selected and prevented over-representation of houses with more residents.

The required sample size was distributed evenly across the four villages. This approach was used because, at the time of data collection, no published records existed on the number of women or households per village, making proportional allocation impossible. The even distribution ensured that each village was represented while maintaining transparency in the sampling process. However, the systematic selection reached the end of the village list before meeting allocated quotas for all the villages, hence a circular procedure was used; counting continued from the start of the list using the same sampling

interval (k) and selecting every kth house not previously selected until the village quota was achieved. This procedure maintained the systematic interval while avoiding duplicate selection.

Eligibility criteria

Inclusion criteria

This specifies the characteristics that delimit the study population (Polit & Beck 2017:306). The inclusion criteria include

- Mothers (biological mothers or caregivers) with at least one child under five years of age
- Mothers aged 18-45 years
- Permanent residents of the selected villages in Ibogun community for ≥6 months
- Good state of health (physically and mentally) at the time of data collection
- Willing to participate and available throughout the research process.
- No prior structured HMCD training.

Exclusion criteria

This specifies the attributes that render individual's ineligible for participation (Polit & Beck 2017:306).

The following mothers were excluded from the study:

- Mothers (biological mothers or caregivers) who are unwilling to participate
- Non-residents or temporary visitors to the study setting
- Mothers who were seriously ill or medically unfit at the time of data collection
- Individual unavailable during the research process.

3.3.1.3 Ethical issues related to sampling

L

Health research studies are primarily conducted to develop guidelines for care, treatment, and improve the health care system. Healthcare research usually involves the use of human participants, hence, there is a need for such study to be well organised and conducted (Correia 2023:122). Ethics are set of standards that guide practice or behaviour. It is also defined as standards or codes of conduct governed by certain principles or assumptions describing the way individuals or organisations should behave. In research, ethics entails application of some principles to research activities. Ethics

guides researchers in conducting research according to standards. Ethical considerations are ethical values and principles that are to be considered when carrying out research (Cohen et al 2018:112-113). Research requires considering certain ethical principles. The Belmont Report (1979:3) report indicated three basic ethical principles to be considered while undertaking human research this includes the principle of respect for human dignity, beneficence and justice.

Respect for the research participant: This principle ensures the protection of individual right to autonomy, informed decision making, self-determination, and dignity (Polit & Beck 2017:121-125).

The eligible participants were informed of their right to self-determination and withdrawal without any negative consequence for doing so.

Principle of beneficence and non-maleficence: These principles are often considered together when conducting human studies (Bifarin & Stonehouse 2022:3). The principle of beneficence ensures ethical treatment of person, respecting individuals' decision, acting for the person benefits, protecting the right of person and preventing from harm (Polit & Beck 2017:121-125; Varkey 2021:18). The principle of maleficence explains a duty to avoid harming human subjects (Bifarin & Stonehouse 2022:3; Varkey 2021:18).

Before carrying out sampling activities, all eligible participants were given adequate information about the research process, which includes the research is an academic activity, the outcome can be useful by health care policy makers, and the validated health education programme can be adopted for use both at local and state health facilities towards promoting under-five children's health. The participants were assured that the study will pose no harm (physical, social, psychological, and legal). An informed consent form designed according to the Institution's Ethical Review Board (IRB) to indicate the interest of the participants to participate in the study were administered to the study participants (Annexure I).

Justice simply implies fairness: This principle covers the right to fair and equitable treatment. It addresses questions such as who ought to receive the benefits of research and the burdens of research across the population. The selection of subjects for a research study should be based on the research problem and not on the subject's easy

availability, vulnerability, and compromised state (Damtew 2019:7; Polit & Beck 2017:121-125).

The researcher conducted the study among the group of mothers where the research problem was identified. The researcher employed a probability sampling technique to ensure fairness and unbiased population representation in the sampling selection process.

- **Researchers/scientific integrity of the research**

Ethical approval was obtained from the College Research Committee (CREC), College of Human Sciences, University of South Africa (UNISA) CREC:176186_CREC_CHS_2024 (Annexure A). A letter of introduction was collected from the Department to obtain ethical approval from the Ogun State Health Research Ethics Committee, Ogun State, Nigeria OGHREC/467/223/APP (Annexures B and C). Following this, the ethical approval letter from the Ogun State Health Research Ethics Committee, Ogun State, Nigeria and letter of permission were presented to the Chairman of the Local Government to obtain his permission into the community (Annexure C and D). The chairman officially endorsed the research project by stamping the duplicate of ethical approval, thereby giving the requisite authorisation to proceed with the study (Annexure E). The researcher presented a letter of permission to the community leader and discussed the purpose of the study with the leader and decision makers; permission was granted by the leader (Annexures F and G). The researcher made use of appropriate research methodology according to literatures reviewed. All forms of misconduct such as falsification, fabrication, or misrepresentation of results were avoided. Also, the researcher avoided any form of plagiarism.

3.3.1.4 Sample

3.3.1.4.1 Sample and sample size

A sample is a unit, or a part selected from the entire population that represents the population completely (Shukla 2020:4). Sample size is the number of subjects in a sample. There are different methods that can be used in quantitative study in calculating

sample size. Quantitative study requires substantial sample sizes to achieve a reliable representation and minimise sampling error (Polit & Beck 2017:316).

The study employed a pre-experimental one-group pre-post design. Although the design involved only a single group, the sample size for this study was calculated using the formular described by Charan, Kaur, Bhardwaj, Singh, Ambwani & Misra (2021:5) for experimental studies comparing two proportions and estimating sample size in an experimental study where the end point is qualitative outcome variable.

The approach is justified because the pre-intervention assessment serves as a baseline control, while the post-intervention assessment represents the outcome after the intervention, this effectively allows for a comparison of proportions pre and post intervention.

Additionally, this formula was selected based on accessibility and methodological relevance. It was the most accessible and clearly detailed model within the researcher's reach that directly aligns with studies, employing categorical outcome variables in public health and nursing interventions. Similar approaches have been applied in related intervention studies that evaluated changes in knowledge and practice proportions before and after an educational programme.

The formular is stated as

$$\text{Sample size } n = \frac{2(Z_{\alpha/2} + Z_{\beta})^2 P(1- P)}{(p_1 - p_2)^2}$$

$Z_{\alpha/2}$ = is the standard normal variate is 1.96 at 5% error and Z_{β} is 0.842 at 80% power.

p_1 = proportion or prevalence previous study.
p_2 = proportion or prevalence (assumption of 15% increased of p1).
p_1 =27% (0.27) (Oduntan et al 2020:7) p_2 = 42% (0.42).
$p = (p_1 + p_2)/2 = 0.345$.

Effect size (p1-p2) 0.27-0.42 = -0.15

$$\text{Sample size } n = \frac{2(1.96 + 0.84)^2 \ 0.345\ (1 - 0.345)}{(-0.15)^2}$$

$$\text{Sample size } n = \frac{3.543288}{0.0225}$$

Sample size n = 157.48

Considering drop-out rate of 10%

= 157.48+15.75 = 173

The calculated sample size was 173.

Due to unavailability of current population figures for each village (last census 1991), the sample size was allocated equally across the four villages to maintain consistency, minimize bias, and ensure representativeness 173/4 = 43.

During recruitment, 174 mothers consented to participate and were enrolled in the study. However, due to loss to follow-up, and withdrawal only 164 mothers completed the post-intervention phase. The slight reduction in sample size was due to minimal attrition (5.7%), which is within acceptable limits and does not significantly affect the study's statistical power.

3.3.2 Data collection

Data are information collected, observed and generated. Data collection process includes gathering original data (primary) through interview, self-reports, observation, experiment and bio-physiologic measures or utilizing existing data (secondary) from newspaper, internets, journals, magazines etc. (Polit & Beck 2017:225-232; Taherdoost 2021:12-13).

3.3.2.1 Data collection approach and method

Data collection approach and method are the process of gathering data. There are several instruments that can be used in collecting data be it primary or secondary data. Primary data can be gathered using questionnaires, observation checklists, interviews, focus group discussions etc (Taherdoost 2021:12-13). A questionnaire is an instrument used to collect information from participants through mail, phone, or online. With the use

of a questionnaire, the researcher can plan and structure questions in line with objectives. Participants can answer the questionnaire at their own convenient time, and it can cover a wide range of people. However, questionnaires can be quite passive thus not eliciting in-depth information (Garcia, Jha & Talwar [s.a.]:9). The data collection approach and method that was used for this study is questionnaire and an observation checklist. The questionnaire was adapted from past similar studies to collect self-report data from the participants, and a structured observation checklist was used to score participants during demonstration pre- and post-intervention. The observation checklist was used to elicit some of the information that the questionnaire may not be able to assess.

3.3.2.2 Development and testing of the data collection instrument

This research data was collected using a questionnaire and an observation checklist (Annexures J and K). The questionnaire was developed based on findings and constructs from previous related studies, while the observation checklist was developed following the basic steps of ORS preparation outlined in the World Health Organization (WHO 2011:66-72) and the Integrated management of childhood illnesses (IMCI) guidelines (WHO 2014). The questionnaire was developed in both English and Yoruba versions. The Yoruba version of the questionnaire was developed using back-to-back translation by a bilingual expert to ensure conceptual and semantic equivalence between both versions and minimise ambiguity. Although the standard is to use two independent back-translators, the use of a single bilingual expert where resources are limited is widely acceptable and methodological recognised.

Prior to the full-scale study, a pilot study is usually conducted before the main research to enhance the study tool validity and reliability, and to identify appropriate methods for data analysis. It also assesses the feasibility, methodology, and efficacy of the research design. It also helps to identify any potential issues or limitations and allows researchers to make necessary adjustments before conducting the full-scale study (Shakir & Rahman 2022:1620; Teresi, Yu, Stewart & Hays 2022:95).

A pilot study which also include cognitive debriefing was conducted prior to the main intervention study to assess the feasibility, clarity, comprehension, and internal consistency of the questionnaire. The pilot involved forty (40) mothers from a community similar to the study setting, selected using the same eligibility criteria as the main study.

The KAP questionnaire was developed in English and translated into Yoruba version by a bilingual expert translator to ensure conceptual and semantic equivalence with the original English version, thereby maintaining accuracy and clarity during delivery. The Yoruba version was first administered to test for internal consistency, then the English version was administered a week later using the test-retest method to check for instrument stability. The internal consistency of the Yoruba version of the questionnaire was assessed using Cronbach's alpha coefficient, as the aim was to determine the coherence of the translated items. The Cronbach's alpha coefficients were 0.718, 0.853, and 0.896, respectively which were considered acceptable for reliability. These steps demonstrate the equivalence and reliability of the Yoruba language instrument. The final version was administered during data collection, with participants free to choose the language they understood best. The Yoruba version of the questionnaire was checked for reliability to ensure the internal homogeneity of both versions, and the temporal stability of the original English version was adequately established.

The English version's reliability was 0.723 using the Pearson Correlation Coefficient. This approach allowed both the translated and original instruments to be tested efficiently while minimising participant burden. Appropriate intervals and procedures were maintained to reduce potential recall or learning effects between administrations. Feedback from the pilot study informed minor amendments to the questionnaire items, language phrasing and workflow. Data from the pilot study were used solely for instrument refinement and were not included in the main analysis.

An observation checklist was also tested during the pilot study to assess the feasibility of the instrument. The checklist consists of seven (7) items**;** the reliability analysis for the seven items is related to the health-related procedure, assessed by two raters over two time points with 40 participants, which demonstrated strong to excellent consistency across all items. The Intraclass Correlation Coefficient (ICC) values for all items were statistically significant, indicating that the rates were highly consistent.

3.3.2.3 Characteristics of the data collection instrument

Questionnaire

The questionnaire consists of four sections.

Section A: This section consists of socio-demographic information of the respondents, such as ages, marital status, level of education, occupation, and number of children.

Section B: This focuses on knowledge of HMCD. It consists of twenty-two (22) closed and open-ended questions. Most of the questions were positively worded, and a few were negatively worded; this was done to minimise acquiescence bias and improve validity

It consists of three domains

- Knowledge of the benefits of ORS or SSS (Salt, Sugar Solution)
- Knowledge of the use of ORS or SSS (Salt, Sugar Solution)
- Knowledge on how to prepare ORS or SSS (Salt, Sugar Solution)
- Knowledge on other aspects of home management of diarrhoea (frequent watery stooling)

Responses were scored 1 for correct and 0 for incorrect. Negative statements were reverse-coded.

Section C: This focuses on the attitude towards home management of diarrhoea. It consists of eight (8) questions in Likert scale format of Strongly Agreed=4, Agreed=3, Undecided=0, Disagreed=1, Strongly Disagreed=2. Questions are negatively worded.

Section D: This focuses on the practice of HMCD**.** It consists of nineteen (19) closed and open-ended questions. Most of the questions were positively worded, and a few were negatively worded; this was done to minimise acquiescence bias and improve validity. Responses were scored 1 for correct and 0 for incorrect. Negative statements were reverse-coded.

Observation checklist

This consists of seven questions assessing the step-by-step procedure in preparing ORS/SSS by participants. This required that the participants demonstrate and report specific HMCD behaviours (e.g steps in ORS preparation). Responses include not done = 0, partially done = 1 (participant attempted the action but missed one or more critical steps), and done = 2 (the actions were carried out correctly and completed), which were

scored by the assessors. Higher scores reflect better adherence to recommended HMCD behaviours

3.3.2.4 Data collection process

The data collection process was carried out in two stages: one prior intervention and another post-intervention, both spanning a period of two months. Between the two activities was the health education intervention programme. Before the commencement of the data collection, nine research assistants who are trained nurses with experience in childcare, childhood illnesses, and community-based health services were recruited to assist with data collection and the intervention sessions. All are familiar with the study community. They received training on research methods and ethical considerations. The training also covered effective communication and engagement with participants, as well as procedures for collecting data with minimal error.

The training lasted for two days, with each daily session running for about three hours. The first training session covered the study rationale, research methods, and participant recruitment. The second and final day focused on the content of the questionnaire, the pattern of its administration, and the modality for practical demonstrations. Importantly, discussions on ethical issues were held, particularly on how to obtain consent from participants. All research assistants recruited for the study signed a confidentiality agreement before the commencement of the data (Annexure M).

Following endorsement obtained from the Local Government Area Chairman, the researcher met with the community gatekeepers, which include the overall community head, and/or the decision makers. The researcher introduced herself, provided detailed information about the study, and explained its purpose to familiarise them with the research. The community leader subsequently granted permission to enter the community (Annexures F and G). With the assistance of a trained nurse working in the community, the researcher was able to locate the houses where the mothers resided and invited them to participate in the study. Subsequently, the researcher explained the purpose of the study to each mother, obtained her consent, and invited her to attend the pre-intervention phase on the scheduled date at the village hall.

The researcher assigned each research assistant to handle at least an average of nineteen (19) study participants per unit. As the mothers arrived at the venue, they were systematically distributed into the established units in sequential order by the principal researcher. The units were blind coded to minimise bias. Each research assistants attended to participants individually and promptly to avoid unnecessary delays. The purpose of the study was reiterated to each participant, and informed consent was obtained (Annexure I) before administration of the instruments. On average, each participant spent approximately 30 minutes to complete the process. This procedure applied to both the first phase (pre-intervention) and the last phase (post intervention). Both the pre-intervention and post-intervention phases were conducted on Saturdays, which were identified as the most suitable days for the mothers to participate.

Data were collected with the aid of a questionnaire (Annexure J) and an observation checklist with clear itemised criteria (Annexure K) to assess each participant's home management (ORS/SSS) preparation prior to the intervention. The participants IDs were de-identified on these instruments and the assessors did not have access to the participants baseline scores. The questionnaire was translated back-to-back into indigenous language (Yoruba) to serve as a guide for research assistants when collecting data from non-English speaking participants. However, all responses were recorded on the English version of the questionnaire to ensure uniformity during data entry. The pre-intervention data served as baseline information for comparison with data collected after the intervention.

3.3.2.5 Ethical considerations related to data collection

3.3.2.5.1 Principle of beneficence and non-maleficence

The study was designed to ensure that no form of risk or harm befell the participants at any stage of the research. The participants were informed that the study posed no significant risk and required only brief participation of an average of 30 - 60 minutes per visit over a two-month period. Procedures were non-invasive, and data collection times were planned to reduce fatigue or burden. The educational intervention was delivered in a supportive and easily accessible environment (community hall) and participants were provided clarification throughout. The principle of beneficence was upheld by ensuring that participants could benefit indirectly through increased knowledge of diarrhoea

prevention and management. In addition, the essence of the research as purely an academic exercise, which in the long run may be a source of information for policymakers and community decision-makers were communicated.

All identifiable information was removed during data entry to protect confidentiality. Data were password-protected and accessible only to authorised research personnel. No harm, distress or adverse event was reported during the study. Throughout the research process, the researcher maintained sensitivity and respect for participants' well-being, thereby upholding the principles of beneficence and non-maleficence.

3.3.2.5.2 Respect for the research participant

This principle emphasises the autonomy and dignity of all research participants. Participants' autonomy and rights were respected throughout the study. Participants' rights to privacy, anonymity, and confidentiality were maintained as indicated by the University of South Africa (UNISA) Humans Ethics and Research Policy. Participation was entirely voluntary, and informed consent was obtained from all mothers individually and privately in each unit after explaining the purpose, procedures, potential benefits, and right to withdraw at any stage without any negative consequences to them. Each participant was given the opportunity to ask questions, and explanations were provided verbally in Yoruba or English, as preferred by the participant. These measures were taken to uphold participants' autonomy, prevent coercion, and ensure that their involvement was based on free, informed, and voluntary consent.

To address potential vulnerability, especially among mothers who might feel obliged to participate due to the presence of community leaders or healthcare workers, gatekeeper influence was carefully managed. The community leaders and the health workers were not involved in participants selection or recruitment to avoid undue pressure. Their permission and assistance were sought only to access the mother and locate houses with mothers with under-five children. The researcher ensured that recruitment discussions were conducted privately and respectfully to maintain participants' freedom of choice. The incentives shared were kept modest and were not linked to participant completing the study. Additionally, they were informed of their right to withdraw without preventing them from being given the incentives and refreshments. All these prevented undue pressure on the participants.

The participants were allowed privacy while filling the questionnaire, and all information they supplied were made strictly confidential. To ensure confidentiality, research assistants and translators signed a confidentiality agreement form (Annexure M) and were briefed on the importance of data protection. The issue of research confidentiality and the importance of data protection were explained to all the third parties. All collected data were coded to prevent identification of individual participants. The hard copies of the questionnaires were kept in a locked cabinet, while electronic data were saved on a password-protected computer. All data will be retained for a minimum of five years before being destroyed.

Following data collection, a debriefing session was held to explain the study's purpose, provide feedback, and allow participants to ask questions. This process ensured transparency, promoted trust, and helped alleviate any potential psychological discomfort. All sources of information used in the research were properly acknowledged.

3.3.2.5.3 Justice simply implies fairness

Justice implies fairness in the selection and treatment of research participants. To minimise the risk of undue pressure on the study population, participant recruitment was conducted through approaching the mothers rather than gatekeeper-driven selection. All eligible mothers within the study setting had equal opportunity to participate, ensuring fair selection. These participants may be considered as a vulnerable group due to economic, low education and influence of their leader; therefore, all participants were treated equitably throughout of the study. Incentives given include leaflets and ORS, these were uniformly provided. Participants received leaflets and ORS packets as part of the educational intervention. These materials were provided to support learning and facilitate HMCD and were not contingent on study completion. Also, light refreshments such as snacks and water were provided to ensure participants' comfort and active participation during the intervention sessions. The tokens were uniformly provided to all participants, irrespective of their level of participation or whether they completed all study phases. The value of each token was minimal, to avoid undue influence, particularly considering the rural and low-income setting. To avoid gatekeeper influence, community leaders only assisted with allowing access to the community and did not distribute incentives or observe data collection. Incentives and refreshments were given privately by the research

team in a manner that protected confidentially and prevented social pressure or comparison among participants.

No financial compensation tied to attendance or participation. This approach ensured that incentives served only as appreciation rather than inducement, thereby maintaining participants' autonomy, protecting the right to withdraw at any stage without disadvantage, and aligning with the ethical guidance of the Belmont Report and UNISA Research Ethics Policy.

The information about incentives were included in the participant information sheet and approved by the University of South Africa Research Ethics Committee, and the privacy of participants was maintained during distribution. This approach ensured voluntariness, fairness, and equity across all participants, aligning with the Bemont Report principles.

3.3.3 Data analysis

Data analysis is the process of cleaning, transforming, and organising data with the intent to extract useful information. It is either in descriptive or statistical inferential format (Polit & Beck 2017:392; Johnson 2023:np).

To ensure blinding and prevent bias, participants' questionnaires were coded, no identifying information was included. Data were entered and analysed on de-identified files by an analyst who was not involved in delivering the intervention. These procedures were implemented to minimise measurement bias and enhance the objectivity of the results.

The data collected was quantitative in nature. After the collection of data from each participant, the questionnaire was checked for proper completion. Serial numbers were written on the questionnaires for easy identification. A guide was prepared, and this was used in coding the variables. Each participant received a unique ID written on their reminder slip and this was linked to their pre-intervention T0 (baseline assessment), and post-intervention T1(first follow-up), and T2 (second/one month follow-up) questionnaires. The completeness and consistency checks were conducted before analysis.

Item-level missingness was assessed for each KAP domain. When >10% of items within a domain for a participant were missing, the domain score was prorated using the participant's mean on the computed items. This approach preserves internal consistency while preventing unnecessary loss of data. If ≤10% of items in a KAP domain were missing, the participant's response for that domain was excluded listwise for that domain to avoid distortion of the computed score.

For analysis requiring data across multiple KAP domains, pairwise deletion was used for analyses so that all available information was retained for each specific analysis. Additional sensitivity checks were conducted to confirm whether alternative missing-data approaches produced materially different results, thereby supporting the robustness of the results.

Attrition was defined as participants who completed the baseline (T0) but did not return for the post-intervention (T1 and T2), this was documented and evaluated. Participants with complete data across three timepoints were included in the primary analysis. Attrition was assessed to determine whether it exceeded 10% and whether the loss to follow-up occurred randomly or systematically.

Data were password-protected, only the principal researcher and data analyst had access. Questionnaires were stored in a place where they won't be destroyed by water or fire and where unauthorised persons will not have access to them.

With the aid of the SPSS, Version 29.0, the data were analysed based on set objectives using descriptive statistics and inferential statistics. Variables were presented using frequency tables, charts, and mean and ± SD for clear visualisation.

The primary endpoints of the study were changes in the knowledge, attitude, and practice scores, assessed pre- and post-intervention. No composite KAP score was created. Each construct (K,A,P) was analysed separately, not combined into a single score. Thus K,A,P were treated as co-primary outcomes. While the KAP framework allows for describing changes in these domains, it is important to note that the single-group pretest-post-test design cannot establish causality. Observed changes may be influenced by testing effects, maturation, regression to the mean, or external factors, and thus should be interpreted as descriptive trends rather than definitive programme effects.

Total domain scores were treated as continuous variables for all descriptive and inferential analyses relating to intervention effects at baseline (T0), post-intervention - first follow-up (T1), and second/one month follow-up (T2). Descriptive statistics (mean, standard deviation, frequency, and percentage) were used to summarise respondents' characteristics and KAP scores. Because there is no external validated benchmark for categorising knowledge, attitude, and practice (KAP) scores in this specific population, categorisation (e.g good/poor) was required for analysing associations between KAP and sociodemographic factors. Therefore, scores were categorised using a data-driven approach based on the distribution of scores within the sample, which prevented the use of arbitrary external cut-off points and ensured that classification reflected the actual characteristics of the study population. Chi-square tests were then used for assessing these associations.

The socio-demographic data was analysed using descriptive analysis and the data is presented in tables and graphs.

Objective 1: To assess the knowledge of HMCD among mothers with under-five children in a rural community in Ogun state, Nigeria pre- and post-intervention.

This objective was analysed using descriptive statistics. The results were summarised using frequencies, percentages, and charts illustrations for clarity. Each of the respondent's knowledge score was computed based on their responses to the questionnaire items, with correct responses scored 1, while incorrect responses scored 0. Negative worded items were reverse coded to maintain consistency in scoring. The total knowledge scale ranged from 12 to 34 points, and a continuous knowledge score was computed for each participant. The total continuous knowledge scores were computed at pre-intervention, immediate post-test and one-month post-test. Mean ± SD was used to summarise and compare the scores across the three assessments T0, T1 and T2.

The distribution of the knowledge scores was assessed and checked to meet normality assumptions. Repeated Measures ANOVA was used to determine changes in knowledge across the three time points. Bonferroni-adjusted post-hoc pairwise comparisons and

Cohen's d effect sizes were computed to identify the magnitude and direction of differences. The level of significance was set at p = 0.05.

Objective 2: To assess the attitude of mothers with under-five children towards HMCD in a rural community in Ogun state, Nigeria pre- and post-intervention.

This objective was analysed using descriptive statistics. The results were summarised using frequencies, percentages, and charts illustrations for clarity. The attitude of respondents was assessed using test items with a total possible score ranging from 35 to 42. Each participant's responses were scored, and the results were summarised using frequencies and percentages. All attitude questions were negatively worded. Responses were coded as follows: Undecided=0, Strongly agreed=1, Agreed=2, Disagreed=3, Strongly disagreed=4.

A total continuous attitude score was computed for each participant. These continuous scores were computed at pre-intervention (baseline T0), first follow-up (T1) and second/one-month follow-up (T2). The mean ± SD was used to summarise and compare the scores across the three time points.

Objective 3: To assess the practice of HMCD among mothers with under-five children in a rural community in Ogun state, Nigeria pre- and post-intervention.

This objective was analysed using descriptive statistics. The results were summarised using frequencies, percentages, and charts illustrations for clarity. The test items assessing practice ranged from 43 to 61, and negative words items were reverse-coded. Each participant's responses were scored, and the results were summarised using frequencies and percentages. Correct responses were scored 1, while incorrect responses were scored 0.

A total continuous practice score was computed for each participant. These continuous scores were computed at T0, T1 and T2. The mean ± SD was used to summarise and compare the scores across the three time points.

Objective 4: To identify socio-demographic factors associated with knowledge, attitude and practice of HMCD among mothers with under-five children in a rural community in Ogun state, Nigeria pre- and post-intervention.

To examine factors associated with knowledge, attitude and practice at baseline and post-intervention, the categorical KAP variables (good vs poor; positive vs negative) were used. This was analysed using Chi-square test for categorical associations and where expected cell counts were < 5, Fisher's exact test was applied

Using categorical KAP variables for this objective is appropriate because:
1. Associations between sociodemographic factors and KAP are more interpretable using categories.
2. Chi-square requires categorical variables.
3. It complements the continuous-score analyses used for pre–post changes.

Hypotheses analysis plan

The hypotheses as stated below were analysed following this plan:
Inferential Statistics for Pre- and Post-Intervention Comparisons.

Because the study involved repeated measures on the same participants, the baseline data -pre-intervention (T0) and post-intervention (TI, and T2), the following analytical strategy was used

1. Repeated Measures ANOVA (Preferred Test): To evaluate overall changes across the three time points (T0, T1, T2) in continuous Knowledge, Attitude and Practice scores.
2. Pairwise Post-Hoc Comparisons: To determine where significant differences occurred, the following paired comparisons were conducted using paired t-tests with appropriate correction for Type I error:
   - T0 vs T1
   - T0 vs T2
   - T1 vs T2

An appropriate adjustment for Type 1 error (e.g Bonferroni correction) was applied to ensure accurate interpretation of multiple comparisons).

Statistical significance was set at $p<0.05$. Intervention effectiveness of the intervention was evaluated using mean scores, standard deviations, confidence intervals, and effect sizes to determine the magnitude of change over time.

- H_O: There is no significant difference in the pre- (T0) and post-intervention (T1, T2) knowledge on HMCD among mothers with under-five children.
- H_O: There is no significant difference in the pre- (T0) and post-intervention (T1, T2) attitude towards HMCD among mothers with under-five children.
- H_O: There is no significant difference in the pre- (T0) and post-intervention (T1, T2) practice of HMCD among mothers with under-five children.
- H_I : There is significant difference in the pre- (T0) and post-intervention (T1, T2) knowledge on HMCD among mothers with under-five children.
- H_I : There is significant difference in the pre- (T0) and post-intervention (T1, T2) knowledge on HMCD among mothers with under-five children.
- H_I : There is significant difference in the pre- (T0) and post-intervention (T1, T2) practice of HMCD among mothers with under-five children.

3.4 RIGOUR OF THE STUDY: VALIDITY AND RELIABILITY

3.4.1 Validity of Instrument

Validity is the degree to which an instrument measures what it is supposed to measure (Polit & Beck 2017:377-379). Validity is in two parts, external validity and internal validity. External validity is used for descriptive research, and it reveals whether a study result can be generalised to other people and settings. Internal validity is mostly used in hypotheses testing research ensuring that research measures accurately the intended construct, considering the methods of group selection, data collection, and data analysis (Mohajan 2017:70-71). Types of validity are content validity, face validity, construct validity and criterion-related validity. An instrument validity requires reliability, but reliability is insufficient to establish validity (Polit & Beck 2017:377-379).

The validity of this study research questionnaire was tested by employing content and face validity techniques. Content validity assesses whether items in an instrument adequately represent the dimensions of the construct (Mohajan 2017:71-72). Face

validity refers to whether an instrument appears as though it is measuring the appropriate construct it claims to measure (Mohajan 2017:72-73; Polit & Beck 2017:377-379). Hence, face and content validity were conducted to ensure the instrument accurately measured what it is intended to measure and that the items are clear and appropriate for the study population.

Face validity involves the experts assessing whether questions were clear, appropriate for the target population, and logically structured. Feedback obtained from the face validity exercise led to minor adjustments in the wording and sequence of some items.

Content validation entails consulting several experts, whose areas of specialisation included community health nursing, child health, nursing/health education, and research methodology. The experts evaluated each item for relevance, clarity, and alignment with the study objectives. Their suggestions and corrections were incorporated to refine the final version of the instrument.

Four experts evaluated the questionnaire, which focused on four key criteria: relevance, clarity, simplicity, and unambiguity. Each expert rated every item on a 4-point likert scale. The I-CVI for each item was calculated separately for each domain. An average I-CVI≥0.78 was considered acceptable. Items with I-CVI values below 0.78 were revised according to expert feedback to improve clarity, simplicity, and relevance. Scale-Level Content Validity Index (S-CV) was calculated as the average of all I-CVI scores across the instrument for each domain, providing an overall measure of content validity. A (S-CVI)/Ave≥0.90 was considered satisfactory and indicative of strong content validity (Polit & Beck 2017)

3.4.2 Reliability of instrument

Reliability measures the accuracy, consistency and repeatability of instrument. A reliability analysis is often performed to assess the quality of the questionnaire. It evaluates the extent at which an instrument administered to same group of subjects at different separate occasions will yield similar results. There are three aspects of reliability: internal consistency, equivalence and stability. Test-retest and parallel-form are the two reliability methods used to assess instrument stability (Mohajan 2017:68-69; Polit & Beck 2017:373-376).

The internal consistency of the Yoruba version of the questionnaire was assessed using Cronbach's alpha coefficient, as the aim was to determine the coherence of the translated items. The Cronbach's alpha coefficients were 0.718, 0.853, and 0.896, respectively which were considered acceptable for reliability. The reliability of the validated English version was established through test re-test method. The questionnaire was administered to forty (40) mothers with under-five children in another community with similar characteristics with the study community (Annexure L). The same group of respondents completed the English version twice at a two-week interval under similar conditions, and Pearson Correlation Coefficient was used for analysis. Pearson Correlation Coefficient obtained was 0.723, indicating an acceptable level of reliability.

Observation checklist consists of seven (7) items**,** the reliability analysis for the seven items is related to the health-related procedure, assessed by two raters over two time points with 40 participants, which demonstrated strong to excellent consistency across all items. The Intraclass Correlation Coefficient (ICC) values for all items were statistically significant, indicating that the raters were highly consistent in their evaluations.

For Items 1 to 4, the ICC values ranged from moderate to perfect consistency, with Items 5 to 7 showing excellent agreement between raters. Specifically, Item 6 (Mix ORS with water) and Item 7 (Pour solution into covered container) had the highest reliability, with ICC values of 0.983 and 0.980, respectively. Item 1 (Wash hands), Item 2 (Wash utensils), and Item 3 (Boil water or bottled Water) demonstrated good to excellent reliability, with ICC values ranging from 0.717 to 0.937. The overall results reflect that the raters' assessments were highly consistent, providing reliable data for each step of the process across time. These findings suggest that the rating procedure is robust and can be confidently used in future evaluations of the health-related steps.

3.5 SUMMARY

Diarrhoea disease though is one of the diseases responsible for increased mortality rates among under-five children, yet it can be easily prevented and managed at home using simple and cost-effective interventions. Despite this, diarrhoea is still responsible for almost half of a million deaths among children's annually, particularly in developing

countries. Several studies have been conducted on HMCD, in which average to low scores have been reported on knowledge, attitude and practice of HMCD among mothers with under-five children. The purpose of the study is to improve mothers' knowledge, attitude and practice of HMCD through a well-designed health educational intervention programme. This programme can be adopted by local, state and national health authorities.

This study was conducted among mothers with under-five children in a rural community (Ibogun) in Ifo LGA, Ogun State Nigeria. The study is a quantitative, quasi-experimental one group study. The sample size was calculated using a formular for two groups when the endpoint is qualitative outcome variable. The study participants were selected using a multi-stage sampling technique. Upon obtaining ethical approval, informed consent (verbal and written) was obtained from the participants after receiving a thorough briefing on the research process (Annexure I). A structured questionnaire and observation checklist were used in collecting data (Annexure J). Data were analysed using descriptive statistics and inferential statistics.

The research findings have added to the existing body of knowledge and demonstrated the effectiveness of a nurse-led health education intervention in improving mothers' knowledge, attitudes and practices regarding HMCD. The validated programme can be used by nurses and other healthcare providers for health education community settings. Also, policymakers can make use of findings generated from the study to formulate policies and guidelines that promote effective HMCD practices among mothers in the community and across the entire State.

CHAPTER 4

DATA ANALYSIS, PRESENTATION AND DESCRIPTION OF RESEARCH FINDINGS

4.1 INTRODUCTION

This is the analysis and interpretation of the data collected for the study titled "Development of Nurse-Led Health Educational Programme to improve HMCD among mothers in Ogun state, Nigeria".

4.2 DATA MANAGEMENT AND ANALYSIS

The collected data were analysed based on study objectives. All quantitative data were coded, entered, and cleaned using SPSS, Version 29.0. Descriptive statistics were used to summarise respondents' characteristics and study variables, and results were presented using frequency distribution tables, percentages, and charts for clear visualisation. Inferential statistical outputs, including chi-square tables and repeated measures analyses, were performed where appropriate.

For analysis involving paired t-tests and repeated-measures ANOVA, the Bonferroni correction was applied. The adjusted significance level was calculated as $\frac{\alpha}{3} = \frac{0.05}{3} = 0.017$, the significance level was set at n≤0.017 †<0.017 (compared to the conventional significance level <0.05).

Effect sizes were interpreted using Cohen's d as follows
d = 0.2 → small effect
d = 0.5 → medium effect
d = 0.8 → large effect
d > 1.5 → very large

$d > 2 \rightarrow$ extremely large

Data were organised logically, labelled using appropriate file names and stored on a password-protected personal computer, an external drive, and cloud storage platform to ensure data safety. To preserve participant confidentiality, all responses were coded, and no identifying information was included in the analysis. The questionnaires were kept in a locked cabinet at the researcher's residence and will be kept for a minimum of five years before being destroyed.

4.3 RESULTS

4.3.1 Socio-demographic characteristics of study respondents

The calculated sample size was 173, a total of 174 female respondents were recruited for this study and all participated at baseline (pre-intervention) phase. However, due to loss to follow-up, and withdrawal only 164 mothers completed the post-intervention phase giving an attrition rate of 5.7%. Attrition was therefore below 10% and considered acceptable for the study. The mean age of the participants was 32.7±9.75 years.

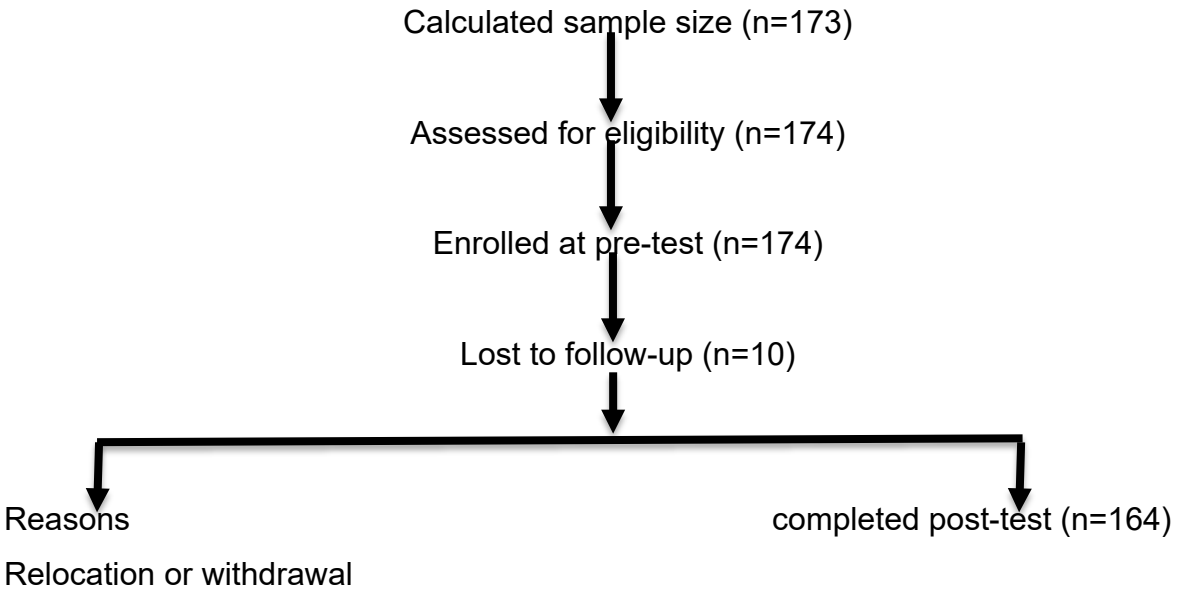

Figure 4.1 Flow chart

Table 4.1 and Figures 4.2, 4.3, 4.4, 4.5 and 4.6 show the socio-demographic characteristics of study respondents. A total of 104 mothers (59.8%) were <35 years old, 146 (83.9%) were married, and 84 (48.3%) had no formal education. The majority, 100

(57.5%), were Christians, and 148 (85.1%) were self-employed. Most respondents, 95 (54.6%), had 2-3 children. Regarding the source of drinking water, mothers gave multiple responses, 255(49.8%) indicated borehole water as one of the sources. Other information is in Table 4.1.

Table 4.1 Socio-demographic characteristics of study respondents (N=174)

Variable	Frequency (n)	Percentage (%)
Age mean (32.7±9.75)		
18-24 years	49	28.2
25-34 years	55	31.6
≥35 years	70	40.2
Marital status		
Married	146	83.9
Separated/divorced	13	7.5
Single	10	5.7
Widowed	5	2.9
Education		
No formal education	84	48.3
Primary education	38	21.8
Secondary education	41	23.6
Tertiary education	11	6.3
Religion		
African traditional religion	10	5.7
Christianity	100	57.5
Islam	63	36.2
Others	1	0.6
Tribe		
Igbo	20	11.5
Yoruba	134	77.0
Others	20	11.5
Occupation		
Unemployed	13	7.5
Self-employed	148	85.1
Employed	5	2.9
Others	8	4.6
Estimated income per month median (IQR) 15,000 (9,000-20,000)		
<30,000	139	86.3
≥30,000	22	13.7
Number of children		
1	24	13.8
2-3	95	54.6
4-5	55	31.6
Number of children under-five		
1	136	78.2
2-3	38	21.8
Age of younger child in months		
<13	117	67.2
13-24	38	21.8
>24	19	10.9

Variable	Frequency (n)	Percentage (%)
Source of drinking water		
Borehole	255	49.8
Personal well	49	9.6
Public well	197	38.5
Stream	11	2.1

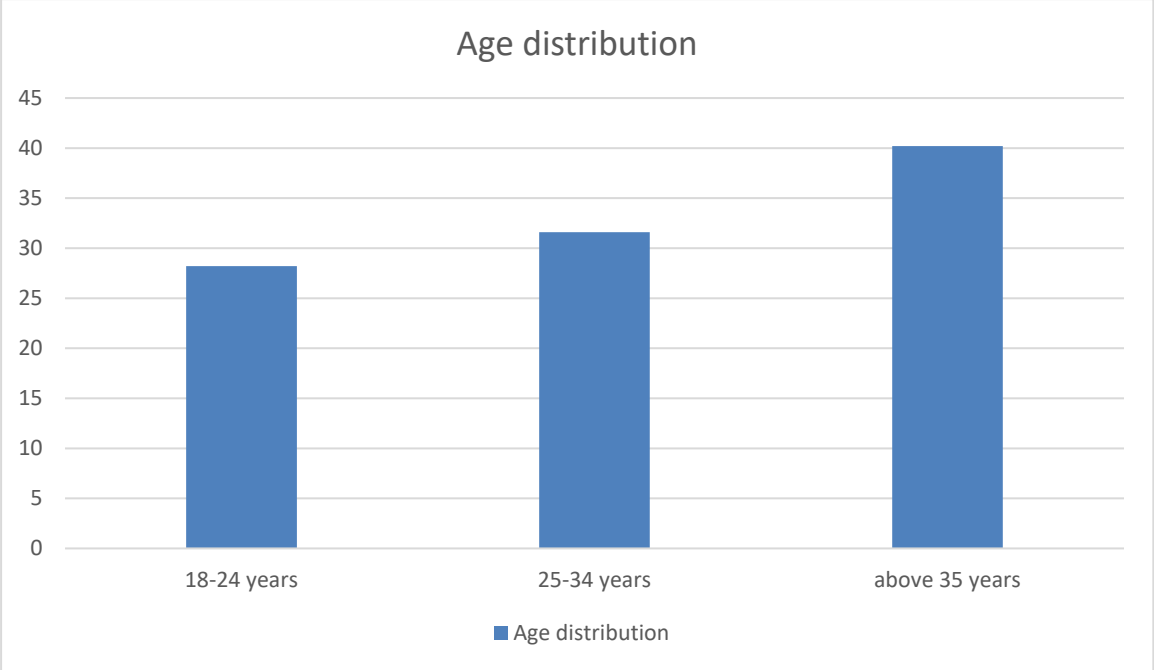

Figure 4.2 Age distribution of the mothers

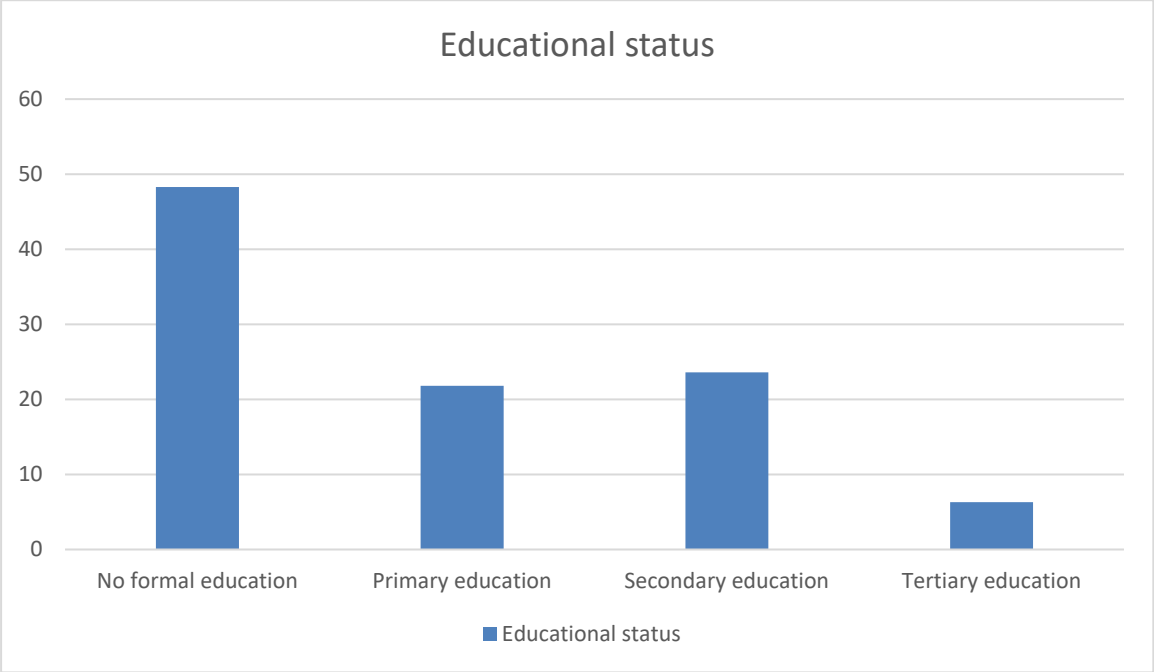

Figure 4.3 Education status of the mothers

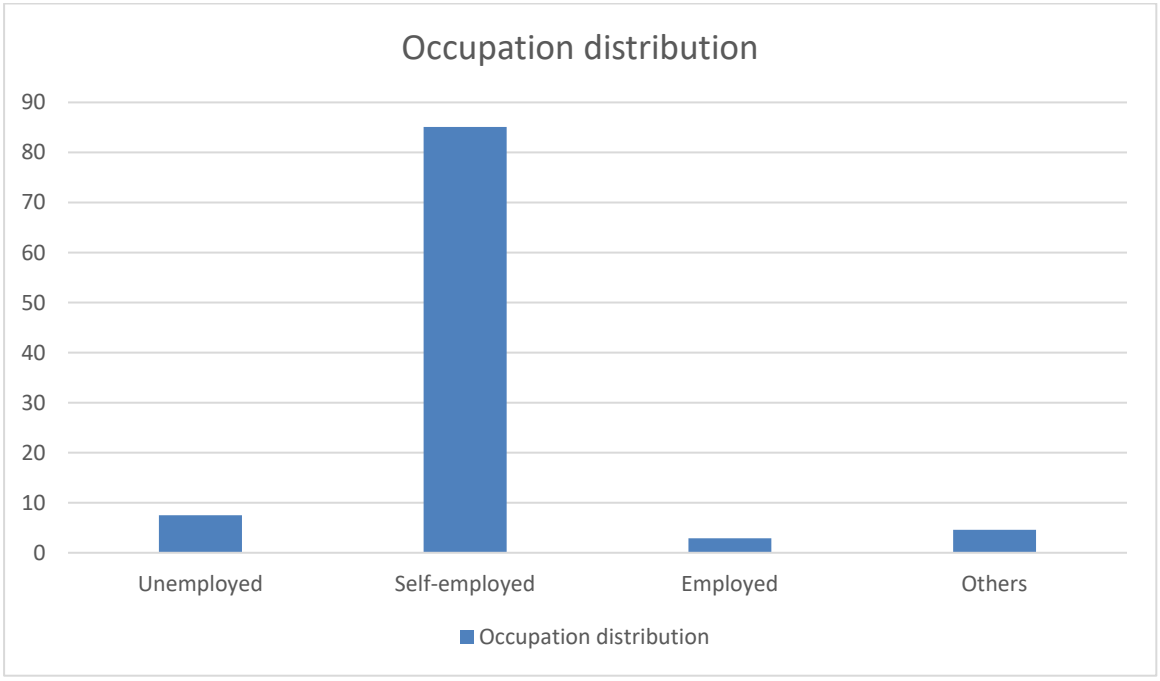

Figure 4.4 Occupation distribution of the mothers

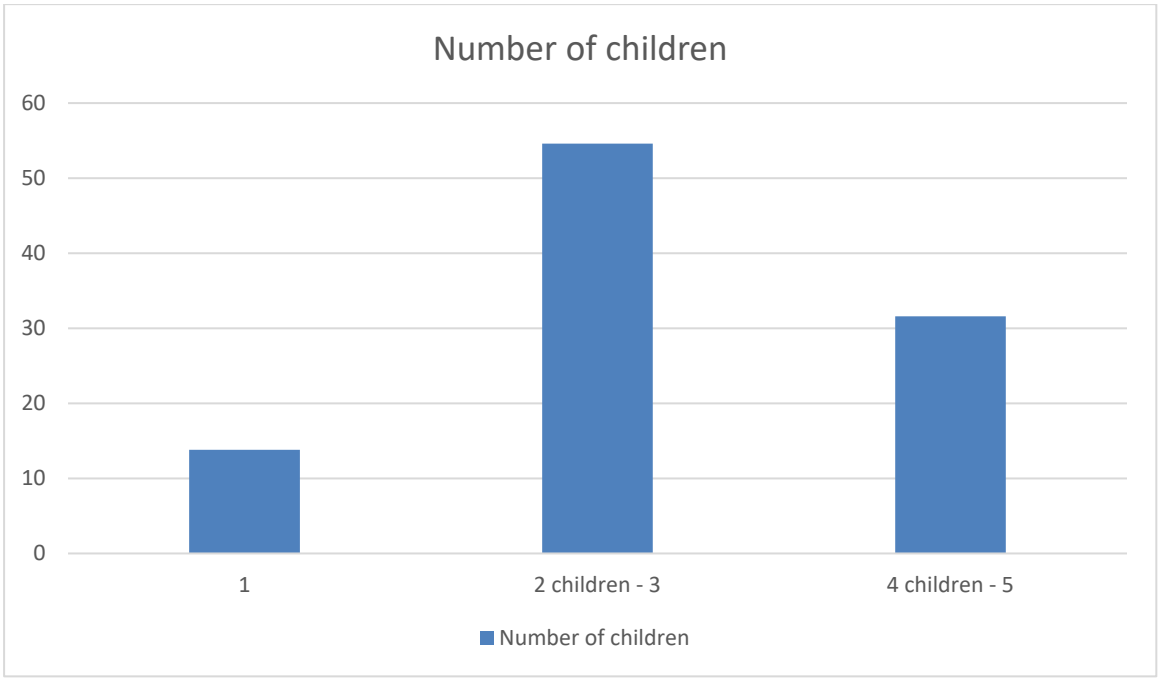

Figure 4.5 Number of children among the mothers

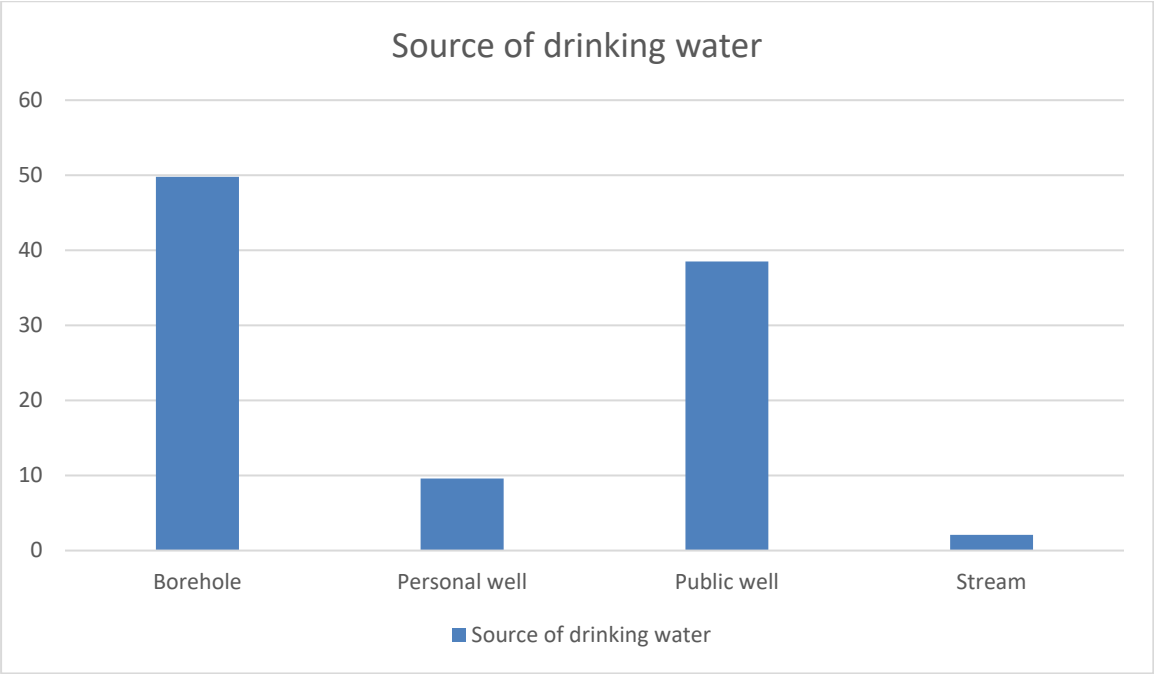

Figure 4.6 Sources of drinking water among the mothers

4.3.2 Mothers' knowledge of home management of childhood diarrhoea pre- and post-nurse-led intervention

Table 4.2 presents the respondents' pre- and post-intervention knowledge levels. Before intervention, most respondents, 124 (71.3%), correctly indicated that ORS or SSS helps stop frequent watery stooling, replaces water lost from the child's body, and is simple to prepare. A high proportion of the respondents had low knowledge of how to use ORS or SSS. For example, many respondents incorrectly indicated No to the following questions, ORS or SSS is not the first thing to give a child with frequent watery stooling 140 (80.5%), ORS or SSS can be given to a child who is having frequent watery stooling without being told to do so by health care providers153 (87.9%), and it can only be given only if a child is weak 155 (89.1%). Also, 50 (28.7%) did not know how to prepare ORS or SSS, and all the respondents, 174 (100%) did not know how many days to administer zinc tablets during diarrhoea.

At post-intervention, knowledge improved markedly. All respondents 174 (100%) understood the benefits of ORS and SSS, and a higher proportion of the respondents >90.0% had adequate knowledge of how to use ORS and SSS. Similarly, 174 (100.0%) knew how to prepare ORS and SSS. There was increase in knowledge across all

domains, benefits, usage and preparation of ORS or SSS, other aspects of HMCD at post-intervention compared to pre-intervention $p<0.005$.

Table 4.2 Mothers' knowledge of home management of childhood diarrhoea pre- and post-nurse-led intervention (N=174)

Variable	Pre-intervention		Post-Intervention 1		Post-test 2		χ^2	p-value
	No N (%)	Yes N (%)	No N (%)	Yes N (%)	No N (%)	Yes N (%)		
Knowledge of the benefits of ORS or SSS (Salt, Sugar Solution)								
It helps in stopping frequent watery stooling	50 (28.7)	124 (71.3)	0 (0.0)	174 (100.0)	0 (0.0)	164 (100.0)	107.64	<0.001
It replaces water lost from the child's body	50 (28.7)	124 (71.3)	0 (0.0)	174 (100.0)	0 (0.0)	164 (100.0)	107.64	<0.001
Knowledge on how to use ORS or SSS (Salt, Sugar Solution)								
ORS or SSS is simple to prepare	50 (28.7)	124 (71.3)	1 (0.6)	173 (99.4)	0 (0.0)	164 (100.0)	103.62	<0.001
ORS or SSS is the first thing to give a child with frequent watery stooling	140 (80.5)	34 (19.5)	4 (2.3)	170 (97.7)	3 (1.8)	161 (98.2)	344.86	<0.001
ORS or SSS can be used more than 24 hours after preparation	93 (53.4)	81 (46.6)	6 (3.4)	168 (96.6)	4 (2.4)	160 (97.6)	182.27	<0.001
ORS or SSS can be given to a child who is having frequent watery stooling without being told to do so by health care providers	153 (87.9)	21 (12.1)	37 (21.3)	137 (78.7)	36 (22.0)	128 (78.0)	205.00	<0.001
ORS or SSS can be given only if a child is weak	155 (89.1)	19 (10.9)	12 (6.9)	162 (93.1)	5 (3.0)	159 (97.0)	364.32	<0.001
ORS or SSS should be stopped once a child vomits when serving it	152 (87.4)	22 (12.6)	84 (48.3)	90 (51.7)	53 (32.3)	111 (67.7)	111.19	<0.001
ORS or SSS can be given only when a child who is having frequent watery stooling requests for it	136 (78.2)	38 (21.8)	14 (8.0)	160 (92.0)	14 (8.5)	150 (91.5)	257.63	<0.001
ORS or SSS should be given in small amounts to children with frequent watery stools at small intervals	76 (43.7)	98 (56.3)	5 (2.9)	169 (97.1)	47 (28.7)	117 (71.3)	78.98	<0.001
The age of a child will determine the amount of ORS or SSS to give	77 (44.3)	97 (55.7)	19 (10.9)	155 (89.1)	33 (20.1)	131 (79.9)	54.59	<0.001
If a child vomits when serving such with ORS/SSS, one should wait for some minutes before recommencing	66 (37.9)	108 (62.1)	3 (1.7)	171 (98.3)	15 (9.1)	149 (90.9)	92.43	<0.001
Knowledge on how to prepare ORS or SSS (Salt, Sugar Solution)								
Do you know how to prepare ORS or SSS	50 (28.7)	124 (71.3)	0 (0.0)	174 (100.0)	0 (0.0)	164 (100.0)	107.64	<0.001

Cleaned bowl, cup and spoon	52 (29.9)	122 (70.1)	0 (0.0)	174 (100.0)	0 (0.0)	164 (100.0)	112.43	<0.001
Sterilized or boiled water or sealed bottled water of ONE litres	58 (33.3)	116 (66.7)	1 (0.6)	173 (99.4)	1 (0.6)	163 (99.4)	119.03	<0.001
1 sachet of ORS or 6 tablespoon(s) of sugar and 1/2 tablespoon(s) of salt for SSS	52 (29.9)	122 (70.1)	2 (1.1)	172 (98.9)	0 (0.0)	164 (100.0)	104.59	<0.001
Knowledge of other aspects of home management of diarrhoea (frequent watery stooling)								
Is there any other drugs to use together with ORS/SSS for a child with frequent watery stooling?	60 (34.5)	114 (65.5)	2 (1.1)	172 (98.9)	0 (0.0)	164 (100.0)	124.07	<0.001
Please state examples of such drugs								
Zinc		3 (1.7)		167 (96.0)		155 (94.5)	433.61	<0.001
Not zinc		171 (98.3)		7 (4.0)		9 (5.5)		
For how many days can we give a child with frequent watery stooling Zinc tablet; 14 days?	174 (100.0)	0 (0.0)	17 (9.8)	157 (90.2)	17 (10.4)	147 (89.6)	385.24	<0.001
Is it good to continue feeding a child during frequent watery stooling?	63 (36.2)	111 (63.8)	1 (0.6)	173 (99.4)	0 (0.0)	164 (100.0)	135.46	<0.001
Is it good to continue breastfeeding a child during frequent watery stooling?	78 (44.8)	96 (55.2)	0 (0.0)	174 (100.0)	0 (0.0)	164 (100.0)	178.75	<0.001
Is it good to give water or increase it when a child has frequent watery stooling?	78 (44.8)	96 (55.2)	0 (0.0)	174 (100.0)	0 (0.0)	164 (100.0)	178.75	<0.001

4.3.3 Summary of mothers' knowledge level of home management of childhood diarrhoea pre- and post-nurse-led intervention

Table 4.3 reveals the mothers' knowledge levels of HMCD pre-and-post-nurse-led intervention. The pre-intervention mean knowledge score of HMCD was 10.31 ±SD 6.84, which suggests that the respondents' knowledge of childhood diarrhoea before intervention was below the average. However, following the nurse-led educational programme, the mean knowledge scores increased significantly to 21.68 ±SD 1.51 at first post-intervention assessment and 21.37 ±SD 2.03 at the second post-intervention assessment, demonstrating a significant improvement in mothers' knowledge of HMCD.

Table 4.3 Descriptive statistics (Summary) of mothers' knowledge of home management of childhood diarrhoea pre- and post-nurse-led intervention (N=174)

Variable	N (%)	Mean	SD	SE
Pre-intervention	174 (100.0)	10.31	6.84	0.519
Post-intervention 1	174 (100.0)	21.68	1.51	0.114
Post-intervention 2	164 (100.0)	21.37	2.03	0.158
SD-Standard deviation, Se-Standard error				

4.3.4 Comparison of mothers' knowledge level of home management of childhood diarrhoea pre- and post-nurse-led intervention

Table 4.4 reveals the repeated measures ANOVA and post-hoc comparisons of mothers' knowledge scores on HMCD pre-and-post-nurse-led intervention. The mean score on HMCD increased from 10.31 ±SD 6.84 pre-intervention to 21.68 ±SD 1.51 at first post-intervention/follow-up and slightly decreased to 21.37 ±SD 2.03 at second follow-up/post-intervention. The repeated measures ANOVA revealed a statistically significant difference in knowledge scores across the three time points, $F(2.172)=401.56$, $p < 0.001$.

Post-hoc Bonferroni adjusted comparisons showed that the mean knowledge score was significantly higher at first post intervention compared to pre-intervention (11.37, 95% CI;10.31-12.44, $p<0.001$, Cohen's d = 2.68) and at second post intervention compared to pre-intervention (mean difference=11.06, 95% CI: 9.97-12.14, $p< 0.001$, Cohen's d = 2.60). There was no statistical difference between first post-intervention and second post-intervention (mean difference = -0.32, 95% CI: -1.40-0.77, $p< 0.770$, Cohen's d = 0.07), suggesting that the effect of the intervention was largely sustained over one month.

Table 4.4 Comparison of mothers' knowledge scores on home management of childhood diarrhoea pre- and post-nurse-led intervention (N=174)

Variable	N (%)	Mean 95% CI	SD	SE	F-Statistics	p-value
Pre-intervention	174 (100.0)	10.31 (9.29, 11.33)	6.84	0.519	401.56	<0.001†
Post-intervention 1	174 (100.0)	21.68 (21.45, 21.91)	1.51	0.114		
Post-intervention 2	164 (100.0)	21.37 (21.37, 21.67)	2.03	0.158		
Post-Hoc						
	Difference	Lower	Upper	p-value	Cohen's d	
Pre-intervention vs post-intervention 1	11.37	10.31	12.44	<0.001	2.68 (2.41, 2.95)	
Pre-intervention vs post-intervention 2	11.06	9.97	12.14	<0.001	2.60 (2.34, 2.87)	
Post-intervention 1 vs post-intervention 2	-0.32	-1.40	0.77	0.770	0.07 (0.29, 0.14)	

SD-Standard deviation, Se-Standard error
The Bonferroni correction is $\frac{\alpha}{3} = \frac{0.05}{3} = 0.017$, the significance level is now ≤0.017
†<0.017;

4.3.5 Socio-demographic factors associated with mothers' knowledge of home management of childhood diarrhoea

Table 4.5 presents the association between respondents' knowledge and demographic characteristics. At baseline, age, education and occupation are associated with knowledge p<0.05. Mothers <35 years 95 (57.6%) had good knowledge than mothers >35 years 70 (42.6%). Most respondents with no formal education (84, 50.9%) had poor knowledge, and none of this category had good knowledge. In contrast, a majority with at least a tertiary education (6, 66.7%) had good knowledge. Most of the respondents, 143 (86.7%), who were self-employed, had poorer knowledge than others. After the second intervention, there was no significant association between the knowledge of HMCD and age, education and employment categories, p>0.05. Other information is in Table 4.5.

Table 4.5 Socio-demographic factors associated with mothers' knowledge of home management of childhood diarrhoea (N=174)

Variable	Pre-intervention		p-value	Post-intervention 1		p-value	Post-intervention 2		p-value
	Poor knowledge	Good knowledge		Poor knowledge	Good knowledge		Poor knowledge	Good knowledge	
Age mean									
18-24 years	44 (26.7)	5 (55.6)	0.03	1 (33.3)	47 (27.5)	0.302	1 (12.5)	55 (35.3)	1.00
25-34 years	51 (30.9)	4 (44.4)		2 (66.7)	54 (31.6)		0 (0.0)	55 (35.3)	
≥35 years	70 (42.6)	0 (0.0)		0 (0.0)	70 (40.9)		7 (87.5)	64 (41.0)	
Marital status									
Married	139 (84.2)	7 (77.8)	0.138	3 (100.0)	144 (84.2)	0.905	6 (75.0)	130 (83.3)	0.353
Separated/divorced	13 (7.9)	0 (0.0)		0 (0.0)	13 (7.6)		1 (12.5)	12 (7.7)	
Single	8 (4.8)	2 (22.2)		0 (0.0)	9 (5.3)		0 (0.0)	10 (6.4)	
Widowed	5 (3.0)	0 (0.0)		0 (0.0)	5 (2.9)		1 (12.5)	4 (2.6)	
Education									
No formal education	84 (50.9)	0 (0.0)	<0.001	1 (33.3)	78 (45.6)	0.001	4 (50.0)	83 (53.2)	0.492
Primary education	38 (23.0)	0 (0.0)		0 (0.0)	38 (22.2)		3 (37.5)	28 (17.9)	
Secondary education	38 (23.0)	3 (33.3)		0 (0.0)	44 (25.7)		1 (12.5)	35 (22.4)	
Tertiary education	5 (3.0)	6 (66.7)		2 (66.7)	11 (6.4)		0 (0.0)	10 (6.4)	
Religion									
African traditional religion	10 (6.1)	0 (0.0)	0.275	0 (0.0)	11 (6.4)	0.895	1 (12.5)	13 (8.3)	0.147
Christianity	92 (55.8)	8 (88.9)		2 (66.7)	101 (59.1)		2 (25.0)	93 (59.6)	
Islam	62 (37.6)	1 (11.1)		1 (33.3)	59 (34.5)		5 (62.5)	50 (32.1)	
Others	1 (0.6)	0 (0.0)		0 (0.0)	0 (0.0)		0 (0.0)	0 (0.0)	
Tribe									
Igbo	20 (12.1)	0 (0.0)	0.531	0 (0.0)	20 (11.7)	0.465	1 (12.5)	14 (9.0)	0.599
Yoruba	126 (76.4)	8 (88.9)		2 (66.7)	131 (76.6)		7 (87.5)	125 (80.1)	
Others	19 (11.5)	1 (11.1)		1 (33.3)	20 (11.7)		0 (0.0)	17 (10.9)	
Occupation									
Unemployed	9 (5.5)	4 (44.4)	<0.001	2 (66.7)	12 (7.0)	<0.001	0 (0.0)	13 (8.3)	0.663
Self-employed	143 (86.7)	5 (55.6)		0 (0.0)	147 (86.0)		8 (100.0)	130 (83.3)	
Employed	5 (3.0)	0 (0.0)		0 (0.0)	5 (2.9)		0 (0.0)	5 (3.2)	
Others	8 (4.8)	0 (0.0)		1 (33.3)	7 (4.1)		0 (0.0)	8 (5.1)	
Income median (IQR)	15,000(8,500 – 20,000	20,000(12,500 – 25,000	0.48	5000(5000 – 5000)	16,000(10,000-25,000)	0.17	22,500(20,000 – 30,000)	15,000(10,000-20,000)	0.02

Variable	Pre-intervention		p-value	Post-intervention 1		p-value	Post-intervention 2		p-value
	Poor knowledge	Good knowledge		Poor knowledge	Good knowledge		Poor knowledge	Good knowledge	
<30,000	135 (86.5)	4 (80.0)	0.68	1 (100.0)	134 (84.3)	0.67	5 (62.5)	125 (87.4)	0.05
≥30,000	21 (13.5)	1 (20.0)		0 (0.0)	25 (15.7)		3 (37.5)	18 (12.6)	
Number of children									
1	19 (11.5)	5 (55.6)	0.006	2 (66.7)	22 (12.9)	0.096	22 (12.5)	48 (14.3)	0.061
2-3	92 (55.8)	3 (33.3)		1 (33.3)	96 (56.1)		95 (54.0)	188 (56.0)	
4-5	54 (32.7)	1 (11.1)		0 (0.0)	53 (31.0)		59 (33.5)	100 (29.7)	
Number of children under five									
1	128 (77.6)	8 (88.9)	0.721	2 (66.7)	134 (78.4)	0.870	6 (75.0)	124 (79.5)	0.918
2-3	37 (22.4)	1 (11.1)		1 (33.3)	37 (21.7)		2 (25.0)	32 (20.5)	
Age of younger child in months									
<13	112 (67.9)	5 (55.6)	0.178	3 (100.0)	114 (66.7)	0.475	5 (62.5)	84 (53.8)	0.214
13-24	34 (20.6)	4 (44.4)		0 (0.0)	38 (22.2)		1 (12.5)	57 (36.5)	
>24	19 (11.5)	0 (0.0)		0 (0.0)	19 (11.1)		2 (25.0)	15 (9.6)	
Source of drinking water									
Borehole	87 (52.7)	5 (55.6)	0.972	3 (100.0)	82 (48.0)	0.362	0 (0.0)	78 (50.0)	<0.001
Personal well	15 (9.1)	1 (11.1)		0 (0.0)	16 (9.4)		5 (62.5)	12 (7.7)	
Public well	60 (36.4)	3 (33.3)		0 (0.0)	69 (40.4)		3 (37.5)	62 (39.7)	
Stream	3 (1.8)	0 (0.0)		0 (0.0)	4 (2.3)		0 (0.0)	4 (2.6)	

4.3.6 Mothers' attitude towards home management of childhood diarrhoea pre- and post-nurse-led intervention

Table 4.6 presents a descriptive result of the mother's attitude toward the HMCD. In measuring the mother's attitude at baseline few mothers; 13 (7.5%), 0 (0.0%), 4 (2.3%), 4 (2.3%), 9 (5.2%), and 10 (5.7%) strongly disagree that ORS or SSS is not all that effective in treating frequent watery stooling, It is not all cases of frequent watery stooling that requires ORS or SSS, Apart from a tablet called zinc, some other important drugs can be given to a child with frequent watery stooling, There is a need to combine some drugs with ORS or SSS in childhood frequent watery stooling, Feeding or breastfeeding a child in frequent watery stooling is optional, and Feeding or breastfeeding a child with frequent watery stooling will increase it. After intervention, the percentage of the respondents who disagreed with all the negative attitudinal statements increased: ORS or SSS is not all that effective in treating frequent watery stooling, 100 (57.5%). It is not all cases of frequent watery stooling that require ORS or SSS 111 (63.8%), apart from a tablet called zinc; some other important drugs can be given to a child with frequent watery stooling 133 (76.4%). There is a need to combine some drugs with ORS or SSS in childhood frequent watery stooling. 102 (58.6%) and feeding or breastfeeding a child with frequent watery stooling will increase it to 124 (71.3%). A similar trend was observed at post-intervention, as a high percentage disagreed that ORS or SSS is not all that effective in treating frequent watery stooling 141 (86.0%). It is not all cases of frequent watery stooling that require ORS or SSS 124 (75.6%), apart from a tablet called zinc, some other important drugs can be given to a child with frequent watery stooling 91 (55.5%), and specifically at post-intervention 2 the responses to there is a need to combine some drugs with ORS or SSS in childhood frequent watery stooling and feeding or breastfeeding a child with frequent watery stooling will increase it are 76 (46.3%) and 133 (81.1%) respectively. The item-based descriptive result showed a significant positive attitude toward mothers' care of children' diarrhoea, p=0.001.

Table 4.6 Mothers' attitude towards home management of childhood diarrhoea pre- and post-nurse-led intervention (N=174)

Variable	Pre-intervention					Post- intervention 1					Post-test 2					χ^2	p-value
	SA	A	U	D	SD	SA	A	U	D	SD	SA	A	U	D	SD		
ORS or SSS is not all that effective in treating frequent watery stooling	17 (9.8)	6 (3.4)	96 (55.2)	42 (24.1)	13 (7.5)	5 (2.9)	0 (0.0)	1 (0.6)	68 (39.1)	100 (57.5)	1 (0.6)	1 (0.6)	0 (0.0)	141 (86.0)	21 (12.8)	379.23	<0.001
It is not all cases of frequent watery stooling that require ORS or SSS	74 (42.5)	37 (21.3)	55 (31.6)	8 (4.6)	0 (0.0)	2 (1.1)	3 (1.7)	1 (0.6)	57 (32.8)	111 (63.8)	0 (0.0)	1 (0.6)	1 (0.6)	124 (75.6)	38 (23.2)	534.55	<0.001
Apart from a tablet called zinc, some other important drugs can be given to a child with frequent watery stooling	84 (48.3)	25 (14.4)	59 (33.9)	2 (1.1)	4 (2.3)	10 (5.7)	3 (1.7)	3 (1.7)	25 (14.4)	133 (76.4)	3 (1.8)	21 (12.8)	2 (1.2)	91 (55.5)	47 (28.7)	487.59	<0.001
Childhood frequent watery stooling is best treated with natural herbs	10 (5.7)	19 (10.9)	57 (32.8)	79 (45.4)	9 (5.2)	6 (3.4)	1 (0.6)	3 (1.7)	60 (34.5)	104 (59.8)	1 (0.6)	5 (3.0)	5 (3.0)	82 (50.0)	71 (43.3)	191.96	<0.001

Variable	Pre-intervention					Post- intervention 1					Post-test 2					χ^2	p-value
	SA	A	U	D	SD	SA	A	U	D	SD	SA	A	U	D	SD		
There is a need to combine some drugs with ORS or SSS in childhood frequent watery stooling	70 (40.2)	38 (21.8)	51 (29.3)	11 (6.3)	4 (2.3)	8 (4.6)	36 (20.7)	0 (0.0)	28 (16.1)	102 (58.6)	14 (8.5)	10 (6.1)	7 (4.3)	57 (34.8)	76 (46.3)	288.66	<0.001
ORS or SSS is not all that important in the treatment of frequent watery stooling in children	9 (5.2)	10 (5.7)	51 (29.3)	93 (53.4)	11 (6.3)	1 (0.6)	2 (1.1)	1 (0.6)	28 (16.1)	142 (81.6)	2 (1.2)	1 (0.6)	1 (0.6)	62 (37.8)	98 (59.8)	251.96	<0.001
Feeding or breastfeeding a child with frequent watery stooling is optional	49 (28.2)	44 (25.3)	51 (29.3)	21 (12.1)	9 (5.2)	3 (1.7)	2 (1.1)	0 (0.0)	45 (25.9)	124 (71.3)	1 (0.6)	0 (0.0)	0 (0.0)	57 (34.8)	106 (64.6)	374.56	<0.001
Feeding or breastfeeding a child with frequent watery	24 (13.8)	67 (38.5)	52 (29.9)	21 (12.1)	10 (5.7)	1 (0.6)	39 (22.4)	1 (0.6)	14 (8.0)	119 (68.4)	1 (0.6)	0 (0.0)	0 (0.0)	30 (18.3)	133 (81.1)	313.45	<0.001

Variable	Pre-intervention					Post- intervention 1					Post-test 2					χ^2	p-value
	SA	A	U	D	SD	SA	A	U	D	SD	SA	A	U	D	SD		
stooling will increase it.																	

4.3.7 Summary of mothers' attitude level of home management of childhood diarrhoea pre- and post-nurse-led intervention

Table 4.7 presents the mothers' attitude level towards HMCD pre-and post-nurse-led intervention. The pre-intervention mean attitude score was M=20.99, SD=4.25, indicating a low baseline attitude. Following intervention, the immediate post-intervention (T1) mean score increased to M=35.71, SD=3.57 and at one-month follow-up (T2), the mean score was M=34.60, SD=3.29. The findings indicate a significant difference and improvement in the respondents' attitude scores towards HMCD p=<0.001.

Table 4.7 Descriptive statistics (Summary) of attitude mothers' towards home management of childhood diarrhoea pre- and post-nurse-led intervention (N=174)

Variable	N (%)	Mean	SD	SE
Pre-intervention	174 (100.0)	20.99	4.25	0.322
Post-intervention 1	174 (100.0)	35.71	3.57	0.270
Post-intervention 2	164 (100.0)	34.60	3.29	0.257
SD-Standard deviation, Se-Standard error				

4.3.8 Comparison of mothers' attitude level of home management of childhood diarrhoea pre- and post-nurse-led intervention

Table 4.8 reveals the repeated measures ANOVA and post-hoc comparisons of mothers' attitude scores on HMCD pre- and post-nurse-led intervention. The mean score on HMCD increased from 20.99 ±SD 4.25 pre-intervention to 35.99 ±SD 3.57 at immediate post-intervention and slightly decreased to 34.60 ±SD 3.29 at one-month follow-up. The repeated measures ANOVA revealed a statistically significant difference in attitude scores across the three time points, F=833.35, p < 0.001.

Post-hoc comparisons showed that the mean attitude score was significantly higher at post-intervention 1 compared to pre-intervention (14.71, 95% CI;13.77-15.65, p<0.001, Cohen's d = 3.94) very large effect and at post-intervention 2 compared to pre-intervention (mean difference=13.61, 95% CI: 12.66-14.56, p< 0.001, Cohen's d = 3.65) very large effect. Improvement in attitude was largely sustained one month, with only a minimal reduction from post-intervention 1.

Post 1 and post-intervention 2 (mean difference = - 1.10, 95% CI: - 2.06 - 0.14, p< 0.019, Cohen's d = 0.30), suggesting that the effect of the intervention was largely sustained over one month (small effect). There was slight decrease in attitude scores between immediate post-intervention and one-month follow-up, but it remained substantially higher than baseline.

Table 4.8 Comparison of mothers' attitude scores of home management of childhood diarrhoea pre- and post-nurse-led intervention (N=174)

Variable	N (%)	Mean	SD	SE	F-statistics	p-value
Pre-intervention	174 (100.0)	20.99 (20.34, 21.63)	4.25	0.322	833.35	<0.001†
Post-intervention 1	174 (100.0)	35.99 (35.17, 36.24)	3.57	0.270		
Post-intervention 2	164 (100.0)	34.60 (34.60, 35.11)	3.29	0.257		
Post-Hoc						
	Difference	Lower	Upper	p-value	Cohen's d	
Pre-intervention vs Post-intervention 1	14.71	13.77	15.65	<0.001	3.94 (3.62, 4.27)	
Pre-intervention vs post-intervention 2	13.61	12.66	14.56	<0.001	3.65 (3.34, 3.96)	
Post-intervention 1 vs Post-intervention 2	-1.10	-2.06	-0.14	0.019	0.30 (0.08, 0.51)	
SD-Standard deviation, Se-Standard error †<0.017						

4.3.9 Socio-demographic factors associated with mothers' attitude level of home management of childhood diarrhoea

Table 4.9 presents the association between respondents' attitudes and demographic characteristics. At baseline, respondents' sociodemographic data having an association with attitude includes educational status, occupation and number of children. A significantly higher proportion of individuals with no formal education had negative attitudes 84 (49.7%), p=0.006. Similarly, there was a significant association between respondents' occupation and attitudes (p=0.017). There was a significant shift at the post-intervention, where individuals with higher education (primary, secondary, and tertiary) show positive attitudes (p=0.005 for post-intervention 1). However, at post-intervention 2 the difference diminishes p=0.633.

Table 4.9 Socio-demographic factors associated with mothers' attitude level of home management of childhood diarrhoea (N=174)

Variable	Pre-intervention		p-value	Post-intervention 1		p-value	Post-intervention 2		p-value
	Negative attitude	Positive attitude		Negative attitude	Positive attitude		Negative attitude	Positive attitude	
Age mean									
18-24 years	46 (27.2)	3 (60.0)	0.273	6 (66.7)	42 (25.5)	0.023	2 (14.3)	36 (24.0)	0.017
25-34 years	54 (32.0)	1 (20.0)		2 (22.2)	54 (32.7)		1 (7.1)	54 (36.0)	
≥35 years	69 (40.8)	1 (20.0)		1 (11.1)	69 (41.8)		11 (78.6)	60 (40.0)	
Marital status									
Married	142 (84.0)	4 (80.0)	0.501	7 (77.8)	140 (84.8)	0.095	12 (85.7)	124 (82.7)	0.615
Separated/divorced	13 (7.7)	0 (0.0)		0 (0.0)	13 (7.9)		1 (7.1)	12 (8.0)	
Single	9 (5.3)	1 (20.0)		2 (22.2)	7 (4.2)		0 (0.0)	10 (6.7)	
Widowed	5 (3.0)	0 (0.0)		0 (0.0)	5 (3.0)		1 (7.1)	4 (2.7)	
Education									
No formal education	84 (49.7)	0 (0.0)	0.006	1 (11.1)	78 (47.3)	0.005	7 (50.0)	80 (53.3)	0.633
Primary education	37 (21.9)	1 (20.0)		1 (11.1)	37 (22.4)		4 (28.6)	27 (18.0)	
Secondary education	39 (23.1)	2 (40.0)		4 (44.4)	40 (24.2)		3 (21.4)	33 (22.0)	
Tertiary education	9 (5.3)	2 (40.0)		3 (33.3)	10 (6.1)		0 (0.0)	10 (6.7)	
Religion									

Variable	Pre-intervention		p-value	Post-intervention 1		p-value	Post-intervention 2		p-value
	Negative attitude	Positive attitude		Negative attitude	Positive attitude		Negative attitude	Positive attitude	
African traditional religion	10 (5.9)	0 (0.0)	0.283	0 (0.0)	11 (6.7)	0.639	2 (14.3)	12 (8.0)	0.452
Christianity	95 (56.2)	5 (100.0)		5 (55.6)	98 (59.4)		6 (42.9)	89 (59.3)	
Islam	63 (37.3)	0 (0.0)		4 (44.4)	56 (33.9)		6 (42.9)	49 (32.7)	
Others	1 (0.6)	0 (0.0)		0 (0.0)	0 (0.0)		0 (0.0)	0 (0.0)	
Tribe									
Igbo	20 (11.8)	0 (0.0)	0.631	2 (22.2)	18 (10.9)	0.316	0 (0.0)	15 (10.0)	0.156
Yoruba	130 (76.9)	4 (80.0)		5 (55.6)	128 (77.6)		14 (100.0)	118 (78.7)	
Others	19 (11.2)	1 (20.0)		2 (22.2)	19 (11.5)		0 (0.0)	17 (11.3)	
Occupation									
Unemployed	12 (7.1)	1 (20.0)	0.017	3 (33.3)	11 (6.7)	0.011	0 (0.0)	13 (8.7)	0.410
Self-employed	146 (86.4)	2 (40.0)		5 (55.6)	142 (86.1)		14 (100.0)	124 (82.7)	
Employed	4 (2.4)	1 (20.0)		1 (11.1)	4 (2.4)		0 (0.0)	5 (3.3)	
Others	7 (4.1)	1 (20.5)		0 (0.0)	8 (4.8)		0 (0.0)	8 (5.3)	
Income median (IQR)	15,000 (9000-20,000)	15,000 (6,250 - 27,500)	0.99	17,500 (6,500-21,250)	15,500 (10,000-25,000)	0.72	20,000 (8750-21,250)	15,000 (10,000-20,000)	0.95
<30,000	136 (86.6)	3 (75.0)	0.50	6 (100.0)	129 (83.8)	0.28	12 (85.7)	118 (86.1)	0.97
≥30,000	21 (13.4)	1 (25.0)		0 (0.0)	25 (16.2)		2 (14.3)	19 (13.9)	
Number of children									
1	20 (11.8)	4 (80.0)	<0.001	4 (44.4)	20 (12.1)	0.021	1 (7.1)	21 (14.0)	0.814
2-3	95 (56.2)	0 (0.0)		4 (44.4)	93 (56.4)		8 (57.1)	83 (55.3)	
4-5	54 (32.0)	1 (20.0)		1 (11.1)	52 (31.5)		5 (35.7)	46 (30.7)	
Number of children under-five									
1	131 (77.5)	5 (100.0)	0.487	8 (88.9)	128 (77.6)	0.721	12 (85.7)	118 (78.7)	0.805
2-3	38 (22.5)	0 (0.0)		1 (11.1)	37 (22.4)		2 (14.3)	32 (21.3)	

Variable	Pre-intervention		p-value	Post-intervention 1		p-value	Post-intervention 2		p-value
	Negative attitude	Positive attitude		Negative attitude	Positive attitude		Negative attitude	Positive attitude	
Age of younger child in months									
<13	114 (67.5)	3 (60.0)	0.502	8 (88.9)	109 (66.1)	0.333	8 (57.1)	81 (54.0)	0.396
13-24	36 (21.3)	2 (40.0)		1 (11.1)	37 (22.4)		6 (42.9)	52 (34.7)	
>24	19 (11.2)	0 (0.0)		0 (0.0)	19 (11.5)		0 (0.0)	17 (11.3)	
Sources of drinking water									
Borehole	88 (52.1)	4 (80.0)	0.345	9 (100.0)	76 (9.7)	0.019	6 (42.9)	72 (48.0)	0.510
Personal well	15 (8.9)	1 (20.0)		0 (0.0)	0 (0.0)		3 (21.4)	14 (9.3)	
Public well	63 (37.3)	0 (0.0)		0 (0.0)	69 (41.8)		5 (35.7)	60 (40.0)	
Stream	3 (1.8)	0 (0.0)		0 (0.0)	4 (2.4)		0 (0.0)	4 (2.7)	

4.3.10 Mothers' practice of home management of childhood diarrhoea pre- and post-nurse-led intervention

Table 4.10 presents the analysis of the practice of HMCD pre-intervention, post-intervention 1, and post-intervention 2 phases. At pre-intervention, 95 (54.6%) respondents stated that one of their children had frequent stooling recently. This figure decreased slightly to 84 (48.3%) post-intervention 1 and increased to 126 (76.8%) by post-intervention 2. Of these categories, about 93 (53.4%) took the child first to the health center during episode of diarrhoea while only 2 (1.1%) used ORS/SSS at pre-intervention. At post-intervention 1 and 2, 79 (45.45%) and 21 (12.8%) took the child first to health center during episode of diarrhoea while 5 (2.9%) and 105 (64.0%) administered ORS/SSS. None of the respondents gave the child ORS/SSS at onset of watery stooling at pre-intervention and post-intervention 1, this increased to 45.7% at post-intervention 2. Furthermore, at preintervention only 1 (0.6%) of the respondents gave ORS/SSS to replace lost fluids, though no significant improvement at post-intervention 1 2 (1.1%), this increased to 81 (49.4%) at post-intervention 2. Majority of the mothers 88 (50.6%) used wrong approaches in preparing ORS/SSS, and 90 (51.7%) did not give zinc tablets along with ORS/SSS. Furthermore, only 6 (3.4%) of the respondents identified that the child's health improves with the treatment received at home at pre-intervention, but a larger proportion 105 (64.0%) had improved health at post-intervention. Other information is in Table 4.10.

Table 4.10 Mothers' practice of home management of childhood diarrhoea pre- and post-nurse-led intervention (N=174)

Variable	Pre-intervention	Post-intervention 1	Post-intervention 2
Did any of your children under the age of five years have frequent watery stooling recently			
No	79 (45.0)	90(51.7)	39 (23.6)
Yes	95 (54.6)	84 (48.3)	126 (76.8)
If yes, what did you do first			
Took the child to health center/went to buy drugs	93 (53.4)	79 (45.4)	21 (12.8)
Treated the child at home with ORS	2 (1.1)	5 (2.9)	105 (64.0)

Variable	Pre-intervention	Post-intervention 1	Post-intervention 2
Did you give ORS or SSS			
No	32 (18.4)	90 (51.7)	38 (23.2)
Yes	92 (52.9)	84 (48.3)	126 (76.8)
When did you give it?			
Onset of watery	0 (0.0)	0 (0.0)	75 (45.7)
A day after watery stooling started	56 (32.2)	42 (24.1)	16 (9.8)
After a prescription by healthcare worker	36 (20.7)	45 (25.9)	36 (22.0)
Why did you give the child ORS/SSS?			
Not to replace lost fluid	91 (52.3)	83 (47.7)	45 (27.4)
To replace lost fluid	1 (0.6)	2 (1.1)	81 (49.4)
If you didn't give your child ORS, why			
Wrong response	7 (4.0)	1 (0.6)	0 (0.0)
Measurements for preparing ORS			
1 Litre, 1 ORS	90(51.7)	84 (48.3)	126 (76.8)
1 Litre, 1 level teaspoon salt, 1 level teaspoon sugar	2(1.1)	0 (0.0)	0 (0.0)
Step in preparing ORS or SSS			
Wrong Approach	88 (50.6)	82 (47.1)	39 (23.8)
ONE litre(s) of water and ONE sachet of ORS /ONE litre(s) of water 6 cubes/teaspoons of sugar 1/2 teaspoon(s)of salt	0 (0.0)	2 (1.1)	87 (53.0)
Did you give zinc tablets alongside ORS/SSS?			
No	90 (51.7)	82 (47.1)	25 (15.2)
Yes	1 (0.6)	1 (0.6)	101 (61.6)
If YES, for how many days did you give the zinc tablets to the child			
Not the standard	5 (2.9)	1 (0.6)	0 (0.0)
14 as standard	0 (0.0)	0 (0.0)	101 (61.6)
How many of the tablet(s) of zinc did you give the child			
Not half tablet less than 6 months/one tablet above 6 months	2 (1.1)	0 (0.0)	0 (0.0)
Half tablet less than 6 months/one tablet above 6 months	0 (0.0)	1 (0.6)	101 (61.6)
Did the child improve with the treatment you gave at home?			
No	84 (48.3)	77 (44.3)	21 (12.8)
Yes	6 (3.4)	7 (4.0)	105 (64.0)
Did you stop feeding the child during the frequent watery stooling			
Yes	8 (4.6)	0 (0.0)	1 (0.6)
No	78 (44.8)	11 (6.3)	101 (61.6)

Variable	Pre-intervention	Post-intervention 1	Post-intervention 2
If the child is still breastfeeding, did you breastfeed the child during the frequent watery stooling			
No	13 (7.5)	8 (4.6)	15 (9.1)
Yes	79 (45.4)	76 (43.7)	111 (67.7)
Did you give more water than usual during episode of frequent watery stooling			
No	31 (17.8)	98 (56.3)	53 (32.3)
Yes	91 (52.3)	76 (43.7)	111 (67.7)

4.3.11 Hands-on practice of mother on home management of childhood diarrhoea pre- and post-nurse-led intervention

Table 4.11 reveals the respondents' hands-on practice of HMCD. The practice of HMCD consists of 7 items (with 3 responses: not done, partially done, and done) to assess if the mothers had good or poor practice in HMCD. Before intervention was carried out 168 (96.6%) did not Wash their hands before the procedure with soap and water, 171 (98.3%) did not Wash all utensils such as a jar, bowl, bottle, spoon, kettle or pot required for the procedure, 136 (78.2%) had wrong measurement of 1 litre of the boiled or treated/bottled water correctly into the washed bowl, and 137 (78.8%) did not mix ORS/salt and sugar together with a spoon. But this was not the case at post-intervention 1 and 2, washed hands before the procedure with soap and water 75 (43.1%) and 77 (47.0%), wash all utensils such as a jar, bowl, bottle, spoon, kettle or pot required for the procedure 155 (89.1%) for both post-interventions 1 and 2, and Boil water to 100^{O} C before procedure or get treated/get bottle water ready 174 (100%) and 155 (94.5%). All the respondents poured all the ORS powder from one packet (or correct amount for packet used) or measure the right amount of salt and sugar into a clean container such as a jar or bowl at post-interventions 1 and 2. Significantly, the practice of HMCD significantly improved at post-intervention compared to pre-intervention $p<0.001$ other information is in Table 4.11

Table 4.11 Hands-on practice of mothers' on home management of childhood diarrhoea pre- and post-nurse-led intervention (N=174)

Variable	Pre-intervention			χ^2	p-value
	Pre-intervention	Post-intervention 1	Post-intervention 2		
Wash hands before the procedure with soap and water					
Not done	168 (96.6)	94 (54.0)	84 (51.2)	102.25	<0.001
Partially done	1 (0.6)	5 (2.9)	3 (1.8)		
Done	5 (2.9)	75 (43.1)	77 (47.0)		
Wash all utensils such as a jar, bowl, bottle, spoon, kettle or pot required for procedure					
Not done	171 (98.3)	7 (4.0)	7 (4.3)	449.08	<0.001
Partially done	1 (0.6)	12 (6.9)	24 (14.6)		
Done	2 (1.1)	155 (89.1)	155 (89.1)		
Boil water to 100^{O} C before procedure or get treated/get bottled water ready					
Not done	80 (46.0)	0 (0.0)	0 (0.0)	430.16	<0.001
Partially done	83 (47.7)	0 (0.0)	9 (5.5)		
Done	11 (6.3)	174 (100.0)	155 (94.5)		
Pour all the ORS powder from one packet (or correct amount for packet used) or measure the right amount of salt and sugar into a clean container such as a jar or bowl					
Not done	76 (43.7)	0 (0.0)	0 (0.0)	481.43	<0.001
Partially done	91 (52.3)	0 (0.0)	0 (0.0)		
Done	7 (4.0)	174 (100.0)	164 (100.0)		
Measure 1 litre of the boiled or treated/bottled water correctly into the washed bowl					
Not done	136 (78.2)	0 (0.0)	0 (0.0)	450.05	<0.001
Partially done	30 (17.2)	0 (0.0)	0 (0.0)		
Done	8 (4.6)	174 (100.0)	164 (100.0)		
Mix ORS/salt and sugar together with a spoon					
Not done	137 (78.8)	0 (0.0)	0 (0.0)	385.43	<0.001
Partially done	6 (3.4)	0 (0.0)	0 (0.0)		
Done	31 (17.8)	174 (100.0)	164 (100.0)		

Pour the solution into a covered container for administration					
Not done	137 (78.7)	0 (0.0)	0 (0.0)	370.63	<0.001
Partially done	2 (1.1)	0 (0.0)	0 (0.0)		
Done	35 (20.1)	174 (0.0)	164 (100.0)		

4.3.12 Summary of mothers' practice level of home management of childhood diarrhoea pre- and post-nurse-led intervention

Table 4.12 presents the summary of mothers' practice level of HMCD. The mean score of pre-intervention practice of HMCD was 2.37, and the post-intervention 1 and 2 practice on HMCD was M=12.74 SD=1.20 and M=12.62. SD=1.40 The findings indicate a significant difference in the respondents' the hands-on practice of HMCD p=<0.001.

Table 4.12 Descriptive statistics (Summary) of mothers' practice of home management of childhood diarrhoea pre- and post-nurse-led intervention (N=174)

Variable	N (%)	Mean	SD	SE
Pre-intervention	174 (100.0)	2.37	3.16	0.239
Post-intervention 1	174 (100.0)	12.74	1.20	0.091
Post-intervention 2	164 (100.0)	12.62	1.40	0.110
SD-Standard deviation, Se-Standard error				

4.3.13 Comparison of mothers' practice scores of home management of childhood diarrhoea pre- and post-nurse-led intervention (N=174)

Table 4.13 shows the comparison of mothers' mean practice of home management of childhood diarrhoea at pre-intervention, post-intervention 1, and post-intervention 2 assessments. The mothers' mean practice score increased markedly from 2.37 ± 3.16 at baseline to 12.74 ± 1.20 immediately after the intervention, and 12.62 ± 1.40 at one-month follow-up. The repeated-measures ANOVA revealed a statistically significant difference in practice scores across the three time points ($F = 1355.07$, $p < 0.001$). Post-hoc analysis further showed a significant improvement from pre-intervention to post-intervention 1 (mean difference = 10.37, $p < 0.001$) and from pre-intervention to post-intervention 2 (mean difference = 10.25, $p < 0.001$), with very large effect sizes (Cohen's $d = 4.89$ and 4.83, respectively). However, there was no significant difference between post-test 1 and post-post-intervention 2 (mean difference=–0.13, p=0.850), indicating that the improvement in mothers' practice was sustained over one month. These findings

demonstrate that the nurse-led intervention was highly effective in enhancing and maintaining mothers' practice of home management of childhood diarrhoea.

Table 4.13 Comparison of mothers' mean practice of home management of childhood diarrhoea pre- and post-nurse-led intervention (N=174)

Variable	N (%)	Mean	SD	SE	F-statistics	p-value
Pre-intervention	174 (100.0)	2.37	3.16	0.239	1355.07	<0.001†
Post-intervention 1	174 (100.0)	12.74	1.20	0.091		
Post-intervention 2	164 (100.0)	12.62	1.40	0.110		
Post-Hoc						
	Difference	Lower	Upper	p-value	Cohen's d	
Pre-intervention vs Post-intervention 1	10.37	9.83	10.91	<0.001	4.89 (4.52, 5.25)	
Pre-intervention vs Post-intervention 2	10.25	9.70	10.80	<0.001	4.83 (4.46, 5.19)	
Post-intervention 1 vs Post-intervention 2	-0.13	-0.67	0.42	0.850	0.06 (0.16, 0.27)	
SD-Standard deviation, Se-Standard error †<0.017						

4.3.14 Socio-demographic factors associated with mothers' practice of home management of childhood diarrhoea

Table 4.14 presents the association between respondents practice in managing childhood diarrhoea at home and most sociodemographic characteristics at baseline and post-intervention. At baseline, there was no significant association between most of the sociodemographic variables and practice of HMCD $p>0.05$. Though 4 (50.0%) of the respondents with good practice were 18-24 years old, and 7 (87.5%) were self-employed. Most respondents, 6 (75.0%) of the respondents with one child, and those who source of drinking water is borehole 4 (50.0%) had good practice than other categories in terms of number of children and source of water. At post-intervention 1 and 2 there was no statistically significant association between the practice and most sociodemographic characteristics $p>0.05$. However, there was a bit shift in the prevalence of good practice among the age category, mothers that were <35 years (100.0%) practiced HMCD than others. Also, respondents that were married 147 (84.5%), and with one child, 136 (78.2%) had good practice of HMCD than their counterparts. Furthermore, those with or without education, and those in the different employment categories had a high percentage of good practice. Other information is in Table 4.14.

Table 4.14 Socio-demographic factors associated with mothers' practice of home management of childhood diarrhoea (N=174)

Variable	Pre-intervention		p-value	Post-intervention 1		p-value	Post-intervention 2		p-value
	Poor practice	Good practice		Poor practice	Good practice		Poor practice	Good practice	
Age mean									
18-24 years	45 (27.1)	4 (50.0)	0.364	0 (0.0)	48 (27.6)		0 (0.0)	38 (23.3)	0.517
25-34 years	53 (31.9)	2 (25.0)		0 (0.0)	56 (32.2)		0 (0.0)	55 (33.7)	
≥35 years	68 (41.0)	2 (25.0)		0 (0.0)	70 (40.2)		1 (100.0)	70 (42.9)	
Marital status									
Married	138 (83.1)	8 (100.0)	0.658	0 (0.0)	147 (84.5)	1.00	1 (100.0)	135 (82.8)	0.976
Separated/divorced	13 (7.8)	0 (0.0)		0 (0.0)	13 (7.5)		0 (0.0)	13 (8.0)	
Single	10 (6.0)	0 (0.0)		0 (0.0)	9 (5.2)		0 (0.0)	10 (6.1)	
Widowed	5 (3.0)	0 (0.0)		0 (0.0)	5 (2.9)		0 (0.0)	5 (3.1)	
Education									
No formal education	81 (48.8)	3 (37.5)	0.641	0 (0.0)	79 (45.4)	1.00	1 (100.0)	86 (52.8)	0.828
Primary education	35 (21.1)	3 (37.5)		0 (0.0)	38 (21.8)		0 (0.0)	31 (19.0)	
Secondary education	39 (23.5)	2 (25.0)		0 (0.0)	44 (25.3)		0 (0.0)	36 (22.1)	
Tertiary education	11 (6.6)	0 (0.0)		0 (0.0)	13 (7.5)		0 (0.0)	10 (6.1)	
Religion									
African traditional religion	9 (5.4)	1 (12.5)	0.482	0 (0.0)	11 (6.3)	1.00	0 (0.0)	14 (8.6)	0.369
Christianity	94 (56.6)	6 (75.0)		0 (0.0)	103 (59.2)		0 (0.0)	95 (58.3)	
Islam	62 (37.3)	1 (12.5)		0 (0.0)	60 (34.5)		1 (100.0)	54 (33.1)	
Others	1 (0.6)	0 (0.0)		0 (0.0)	0 (0.0)		0 (0.0)	0 (0.0)	
Tribe									
Igbo	18 (10.8)	2 (25.0)	0.019	0 (0.0)	20 (11.5)	1.00	0 (0.0)	15 (9.2)	0.885
Yoruba	131 (78.9)	3 (37.5)		0 (0.0)	133 (76.4)		1 (100.0)	131 (80.4)	
Others	17 (10.2)	3 (37.5)		0 (0.0)	21 (12.1)		0 (0.0)	17 (10.4)	
Occupation									
Unemployed	12 (7.2)	1 (12.5)	0.822	0 (0.0)	14 (8.0)	1.00	0 (0.0)	13 (8.0)	0.979
Self-employed	141 (84.9)	7 (87.5)		0 (0.0)	147 (84.5)		1 (100.0)	137 (84.0)	
Employed	5 (3.0)	0 (0.0)		0 (0.0)	5 (2.9)		0 (0.0)	5 (3.1)	
Others	8 (4.8)	0 (0.0)		0 (0.0)	8 (4.6)		0 (0.0)	8 (4.9)	
Income median (IQR)	15,000	20,000	0.94	0.0 (0.0-0.0)	15,500	#	20,000	15,000	0.70

Variable	Pre-intervention		p-value	Post-intervention 1		p-value	Post-intervention 2		p-value
	Poor practice	Good practice		Poor practice	Good practice		Poor practice	Good practice	
	(9,500-20,500)	(5,000-20,000)			(10,000-25,000)		(20,000-20,000)	(10,000-20,000)	
<30,000	132 (85.7)	7 (100.0)	0.28	0 (0.0)	135 (84.4)	0.69	1 (100.0)	129 (86.0)	0.93
≥30,000	22 (14.3)	0 (0.0)		0 (0.0)	25 (15.6)		0 (0.0)	21 (14.0)	
Number of children									
1	22 (13.3)	2 (25.0)	0.724	0 (0.0)	24 (13.8)	1.00	0 (0.0)	22 (13.5)	0.485
2-3	90 (54.2)	5 (62.5)		0 (0.0)	97 (55.7)		0 (0.0)	91 (55.8)	
4-5	54 (32.5)	1 (12.5)		0 (0.0)	53 (30.5)		1 (100.0)	50 (30.7)	
Number of children under-five									
1	130 (78.3)	6 (75.0)	0.945	0 (0.0)	136 (78.2)	1.00	1 (100.0)	129 (79.1)	0.877
2-3	36 (21.7)	2 (25.0)		0 (0.0)	38 (21.8)		0 (0.0)	34 (20.8)	
Age of younger child in months									
<13	0 (0.0)	117 (67.2)	0.598	0 (0.0)	89 (54.6)	1.00	111 (66.5)	212 (61.4)	0.013
13-24	0 (0.0)	38 (21.8)		0 (0.0)	58 (35.6)		36 (21.6)	98 (28.4)	
>24	0 (0.0)	19 (10.9)		1 (100.0)	16 (9.8)		20 (12.0)	35 (10.1)	
Sources of drinking water									
Borehole	88 (53.0)	4 (50.0)	0.436	0 (0.0)	85 (48.9)	1.00	0 (0.0)	78 (47.9)	0.034
Personal well	14 (8.4)	2 (25.0)		0 (0.0)	16 (9.2)		1 (100.0)	16 (9.8)	
Public well	61 (36.7)	2 (25.0)		0 (0.0)	69 (39.7)		0 (0.0)	65 (39.9)	
Stream	3 (1.8)	0 (0.0)		0 (0.0)	4 (2.3)		0 (0.0)	4 (2.5)	

4.4 OVERVIEW OF RESEARCH FINDINGS

A total of 174 mothers participated in the study, with a mean age of 32.7 ±9.75 years. Overall, 70 respondents (40.2%) were aged 35 years and above, 146 (83.9%) were married, and 84 (48.3) had no formal education. More than half of the respondents' (54.6%) had between two and three children, and majority depend on public wells as their major source of drinking water. The mean scores for the respondent's knowledge, attitude, and practice of HMCD before intervention are 10.31, 20.99 and 2.37 respectively which are below the average. However, after the first and second follow-up assessments (post-intervention), the mean scores for these variables increased significantly ($p<0.001$), thus providing support for the research hypotheses. This indicates that there were significant differences in the knowledge, attitude, and practice of HMCD pre- and post-intervention.

At pre-intervention, age, education, and occupation were significantly associated with respondents' knowledge of HMCD. Mothers below the age 35 years demonstrated better knowledge, with 95 (57.6%) showing good knowledge compared to 70 (42.6%) of mothers aged 35 years and above. Educational status also had strong influence, the majority of respondents with no formal education, 84 (50.9%) had poor knowledge, and none in this category demonstrated good knowledge. In contrast, respondents with at least a tertiary education showed displayed better knowledge, with 6 (66.7%) exhibiting good knowledge. After the second intervention, there was no significant association between knowledge of HMCD and age, education and employment categories ($p>0.05$).

While the findings on association between respondents' attitude and demographic characteristics found out that, at baseline, respondents educational and occupational status were significantly associated with their attitudes. A large proportion of respondents with no formal education (84; 49.7%, $p=0.006$) and those who were self-employed (146; 86.4%, $p=0.017$) exhibited negative attitudes more than their counterparts. Following the intervention, a significant shift was observed, individuals with higher education (primary, secondary, and tertiary) showed positive attitudes ($p=0.005$ for post-intervention 1). However, a slight reduction in positive attitudes occurred at post-intervention 2 ($p=0.633$).

The association between respondents' practice of HMCD and most sociodemographic characteristics at baseline indicates that there was no significant association between most of the sociodemographic variables and practice of HMCD ($p>0.05$). Nevertheless, certain groups demonstrated relatively appropriate HMCD practices; respondents aged 18-24 years old 4 (50.0%) and self-employed respondents 7 (87.5%) had good practice than their other groups at pre-intervention. Additionally, respondents (75.0%) with one child and those whose source of drinking water was a borehole 4 (50.0%) had good practice than others. Following the intervention, there was substantial improvement in the prevalence of good practice. Mothers aged below 35 years (100.0%), married respondents 147 (84.5%), and those with one child 136 (78.2%) displayed high levels of good practice. Moreover, respondents across all education and employment categories showed notably improved practice levels. Despite these improvements, there was no significant statistically association between the practice of HMCD and most sociodemographic characteristics at post-intervention 1 and 2 ($p>0.05$), indicating the intervention enhanced practice across demographic groups.

4.5 SUMMARY

Childhood diarrhoea remains a major public health concern and is a leading cause of rapid mortality among children under five. The World Health Organization (WHO) recommends immediate management of diarrhoea at home, the following rules should be followed: giving of extra fluid, administration of zinc supplements, continuing feeding and reporting to health facilities if danger signs are noticed. Home Management of Childhood Diarrhoea (HMCD) is targeted at reducing under-five morbidity and mortality related to childhood diarrhoea. Although widely promoted globally, the practice of HMCD practices remain low in many developing countries.

The study highlights how the health educational programme contributed to promoting desired appropriate health behaviours. The findings revealed that respondents' baseline mean scores for knowledge (10.31), attitude (20.99) and practice (2.37) were below average. Following the intervention, significant improvements were observed in all domains during both immediate and one-month follow-up (post-intervention p=<0.001). These results show that health educational programme positively influenced mothers' KAP.

Some of the sociodemographic characteristics that were significantly associated with mothers' knowledge of HMCD pre-intervention are age, educational status, and employment status. Majority of mothers with no formal education had poor knowledge and those with at least tertiary education had good knowledge of HMCD. Most of the respondents, 143 (86.7%), who were self-employed, had poor knowledge than others. After the second intervention, there was no significant association between the knowledge of HMCD and age, education and employment categories (p>0.05). Likewise, there was significant difference between mothers' level of education and their attitude pre- and post-intervention. Higher proportion of the mothers with no formal education had negative attitudes than others at pre-intervention. At post-intervention mothers with higher education displayed positive attitude at post-intervention 1 with no significant different across the educational status at post-intervention 2.

Meanwhile, there was no significant association between sociodemographic characteristics and mothers' practice of HMCD at both pre- and post-intervention. However, there was a noticeable shift in the prevalence of good practice across certain groups, among different age groups, marital status, and mothers with varying numbers of children.

CHAPTER 5

NURSE-LED HEALTH EDUCATIONAL PROGRAMME (MODULE)

5.1 INTRODUCTION

In this chapter, the researcher discusses the how the empirical findings were linked to programme development, module KAP mapping, and the development of nurse-led health educational programme to improve HMCD among mothers with under-five children in a rural community in Ogun state, Nigeria. This programme was validated by experts to achieve the fifth objective of the study; to develop and validate health educational programme to improve mothers' knowledge, attitude and practice of HMCD.

5.2 LINKING EMPIRICAL FINDINGS TO PROGRAMME DEVELOPMENT

The findings presented in chapter 4 revealed substantial deficiencies in mothers' knowledge, attitude, and practice regarding home management of childhood diarrhoea. Specifically, the pre-intervention mean knowledge (10.31), attitude (20.99), and practice (2.37) scores were below average, indicating limited understanding of the importance of ORS/SSS, poor attitude and practices of HMCD. These gaps formed the empirical foundation for developing the nurse-led educational programme described in chapter 5. Guided by the knowledge, attitude, and practice (KAP) framework, the programme was deliberately structured to address the specific deficiencies identified in the baseline data. At the post-intervention, results demonstrated statistically significant improvements ($p < 0.001$) across all KAP domains, confirming that the educational intervention had a positive effect on behavioural outcomes.

Walker and Avant (2019) concept analysis approach helps in clarifying constructs by defining the key attributes, antecedents, and consequences of constructs. This process guides the operational definition of identified constructs. Walker and Avant, described process of concept analysis has involving the following steps selecting a concept, determining the aims of the analysis, identifying the uses of the analysed concept, determining its defining attributes, identifying a model case, identifying borderline and related issues, and identifying the antecedents, consequences and empirical referents of

the concept. An understanding of the derivation strategies and concepts analysis process described by Walker and Avant, informed how the study's constructs were derived based on past evidence, synthesised, analysed, and defined. It also clarified the relationships among the constructs and established the linkage between theory and practice (Tang, Klunklin, Lirtmunlikaporn & Wang 2024:2067-2075; Thoun & Kabigting 2022: 385-387; Zeydani, Atashzadeh-shoorideh, Hosseini & Zohari-anboohi 2023:2-3). According to Walker and Avant (2019), concept analysis provides a systematic method for clarifying and defining key constructs that form the foundation of a theory. Guided by this approach, the constructs for this study were identified and derived, which subsequently guided the selection of the KAP model. The KAP model further clarified the constructs and their interrelationship, thereby guiding the development of both the research instruments and the intervention programme. This process illustrates the connection between theory and practice.

Furthermore, the Chinn and Kramer (2022:1-82) Conceptual–Theoretical–Empirical (CTE) framework describes knowledge development in nursing. It provides the theoretical linkage between constructs/concepts (Knowledge, Attitude, Practice), their theoretical propositions (improved knowledge, leads to positive attitude and correct practice), their empirical indicators measured through pre- and post-test questionnaires and observations), and the actions (nurse-led educational modules) taken to produce behavioural change. The knowledge development concept proposed by Chinn and Kramer explains the study constructs and relationship among the constructs (Knowledge, Attitude, Practice), justifying the appropriateness of the KAP framework. It also demonstrates how nursing knowledge is developed by translating theoretical constructs into practical, measurable components that guided the nurse-led intervention. Thus, the CTE framework underscores how nursing knowledge is developed, organised, and applied in practice, highlighting the relationship between theory, research and practice in nursing.

Importantly, Logic (theory-of-change) model grounded in KAP framework was used to show how the identified KAP gaps in chapter four informed the content of the programme and how the intervention sessions brought about expected change in KAP. A logic model is a graphical representation that shows the relationships among the elements of a designed programme. There are different types of logic model, the appropriate type depends on what the designed programme aimed at achieving. The logic model serves as a map that guides all stakeholders in understanding the sequence of activities and

how the activities are expected to lead to desired result (Smith, Li & Rafferty 2020 [2-12]). Therefore, the programme logic model for the nurse-led health educational intervention was anchored on the KAP framework. The development of the programme was, not generic but grounded in baseline evidence. Each module directly addressed the identified KAP gaps and was mapped to a logical sequence of expected outcomes. The logic model presented below illustrates how the empirical findings informed the intervention design and how the nurse-led programme was expected to influence mothers' knowledge, attitudes, and practices towards sustainable improvements in child health.

Below table shows, showing the flow from findings → intervention → outcomes

Table 5.1 Application of Logic model table

Inputs	Activities	Outputs	Short-term outcomes	Long-term impact
-Baseline KAP data (chapter 4) -Established guidelines -Expert validation	Three nurse-led modules: -understanding diarrhoea -home management (ORS, SSS, zinc, feeding) -demonstration & role play	-mothers trained -leaflet distributed -skills demonstration completed	- knowledge on HMCD (pre → post) -positive attitudes (confidence, perception of ORS/zinc) -correct practices (ORS preparation, zinc use, continued feeding)	-to reduce Under-five morbidity & mortality -sustained behaviour change among mothers

If mothers of under-five children are equipped with correct knowledge through a contextually tailored, nurse-led educational intervention, their understanding (knowledge) will improve; this will in turn foster positive beliefs and confidence (attitude), which will ultimately translate into correct health actions (practice) in managing diarrhoea at home. Over time, these improved practices are expected to reduce preventable complications and deaths associated with childhood diarrhoea.

The defensible new knowledge emerging from this study is a context-specific programme theory demonstrating how nurse-led educational interventions, guided by KAP model, can effectively improve mothers' practices of HMCD. This theory-driven logic model provides a replicable framework for designing and evaluating similar community-based health interventions in low-resource settings.

Module – KAP mapping

The gaps identified in chapter 4 directly informed the module design. For instance, poor knowledge of ORS preparation (71.3%) and zinc duration (100% unaware) guided the inclusion of demonstration-based learning (module 3). Similarly, negative attitudes toward feeding during diarrhoea influenced the attitudinal reorientation elements of module 2.

Table 5.2 Explicit description on how each module is linked to KAP components

Module	Content focus	KAP element addressed	Empirical gap addressed from chapter 4
Module 1 – understanding diarrhoea	Causes, symptoms, prevention, signs of dehydration	Knowledge	Poor understanding of causes and consequences of diarrhoea
Module 2 – home management	ORS/SSS preparation, zinc use, continued feeding	Attitude & practice	Misbeliefs about feeding and drug use; poor ORS/zinc utilisation
Module 3 – demonstration & role play	Practical sessions on preparation and administration of ORS/SSS; and peer discussion	Practice	Incorrect ORS preparation and hygiene steps

5.2 PURPOSE OF THE PROGRAMME

The purpose of the health educational programme is to empower the mothers with under-five children with the knowledge and skills in effective HMCD among under-five children to reduce morbidity and mortality among children and promote their optimal well-being.

5.3 SCOPE OF THE PROGRAMME

The scope of the programme includes mothers with under-five children in a rural community in Ogun State (Ibogun community). This programme can be adopted by health authorities at local, state and national levels in health educating mothers on HMCD.

5.4 DEVELOPMENT OF THE PROGRAMME

In developing the content of the programme, the researcher adapted guidelines from the Federal Ministry of Health & Nigeria Centre of Disease Control (2017), two World Health

Organization manuals (WHO 2011:58-62; WHO 2014a:8-38). In addition, a training guide developed by the Child Health Division, Ministry of Health and Family Welfare, Government of India (2017:6-19), was also utilised.

Consequently, the programme consists of three modules addressing diarrhoea, home management of diarrhoea, and demonstration on the preparation of ORS/SSS, including role play. The researcher further incorporated local contextual factors that were not captured in the existing guidelines and programmes. Thus, the educational programme developed for this study is original in both its content and delivery approach. Moreover, it was specifically designed based on the identified gaps in mothers' knowledge and practices regarding home management of diarrhoea using ORS and SSS during the pre-intervention phase. The contributions of the experts during the validation process further strengthened the programme.

Unlike existing general health education materials, this programme was tailored to the local context, addressing myths about the disease that influence its management. It was developed using simple and clear language for easy comprehension by the users, and incorporated visual aids, and demonstrations relevant to the participants' environment. Its interactive format – featuring hands-on practice, group discussions, and role-play, - distinguished it from conventional lecture-based health education. A Leaflet summarising the health education programme was also given to the mothers to reinforce the intervention, further contributing to the uniqueness of the programme. Hence, the educational package represents a context-specific innovation aimed at improving knowledge retention and practical skills among mothers of under-five children.

The Knowledge, Attitude, and Practice (KAP) model, which serves as the theoretical framework for this study, guided the sequential steps involved in the programme development. It encompasses the three main variables identified as problems among the target population - knowledge, attitude and practice. The KAP model was utilised both to assess these study variables an to inform the design of a health education programme aimed at improving mothers' knowledge, fostering positive attitudes, and promoting desirable practices. Furthermore, the model guided the programme implementation as well as the evaluation of its effects after intervention (Andrade, Menon, Ameen & Praharaj 2020:1-2; Maroof, Ahmed & Hadi 2021:3; Liao et al 2022:41).

The application of KAP to the development of the educational programme followed four major steps:

Assessment: The study focused on the three concepts; are knowledge, attitude and practice which were assessed, with the aid of a questionnaire and observation checklist. The past findings, particularly within the study setting, revealed significant gap in these variables, highlighting the need for targeted intervention.

Programme development: this phase involved the design and validation of a nurse-led health education programme tailored to address the identified gaps in mothers' knowledge, attitudes, and practices related to HMCD.

Implementation: The programme was Implemented using various teaching methods such as lecture, demonstration, and role play, all targeted at improving mothers' knowledge, attitudes, and practices regarding HMCD.

Evaluation: This final step focused on assessing the effectiveness of the intervention. Post-intervention assessment measured changes in mothers' knowledge, attitudes, and practices regarding HMCD to determine the overall effectiveness of the nurse-led educational programme.

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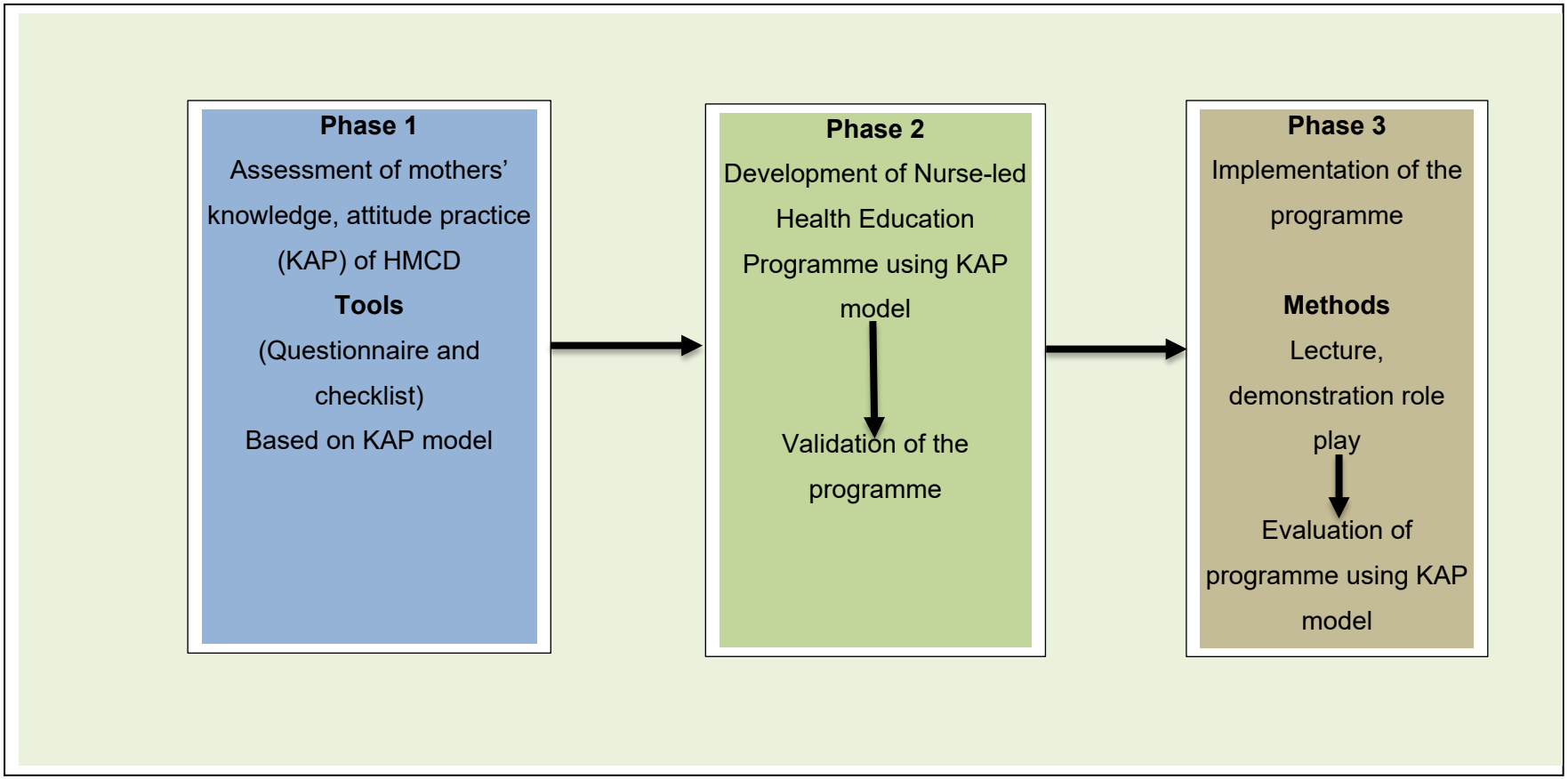

Figure 5.1 Development of programme guided by KAP framework

After the development of the programme, it was submitted to experts for review and validation. The Delphi technique was adapted for this purpose to ensure a systematic validation process. A panel of four experts was selected for the Delphi technique based on their availability and relevant expertise in health education, community health nursing, and research. Although the panel size was small, the iterative process ensured systematic review and refinement of the programme. In addition, a facilitator was invited to moderate the entire exercise. The purpose of the exercise was explained to them, and they were informed that the process was an adaptation of the Delphi technique. The developed programme, along with the validation criteria, was sent to experts for assessment. Each expert independently reviewed the programme and submitted their feedback anonymously to the facilitator to minimise bias. The facilitator compiled all the responses and forwarded them to the researcher. Between the first and second rounds, items that did not reach consensus were revised according to panel feedback, and in the second round, the items were re-rated , achieving full consensus on all key components.

Consensus was predetermined as an interquartile range (IQR) of less than 1. By the second round, consensus was achieved, with all experts agreeing that the programme had been adequately validated. The experts rated the set criteria and provided their final feedback on the programme. The facilitator then forwarded the final validated version and all related documentation to the researcher. These ratings were analysed using the Intraclass Correlation Coefficient (ICC) model to determine the level of agreement.

5.5 VALIDATION OF THE HEALTH EDUCATIONAL PROGRAMME – DELPHI TECHNIQUE

The health educational programme was validated using the Delphi technique. This technique is a method used in health-related fields to find consensus. It assesses the expert's judgment about a set of questions with the aim that the combination of perspectives of experts in the same field will produce a more valid result (Nierderberger & Spranger 2020:1). The Delphi technique was considered appropriate because it allows for systematic, iterative consultation among experts to achieve consensus on complex issues such as programme validation.

The questionnaire used in assessing this programme is in two sections: the Sociodemographic data section, eliciting the basic information about the experts and the other section is a tabular section containing set of criteria to evaluate the validity and reliability of the developed programme with a rating scale of 1 - Programme not acceptable, need major changes, 2 - Programme recommended changes and 3 - Programme acceptable and ascribed.

Table 5.3 presents the socio-demographic characteristics of the four experts who participated in the validation of the research instrument. The results show that three of the experts (75%) were female, while one (25%) was male. Regarding educational attainment, the majority of the experts held a PhD degree (75%), whereas one expert (25%) had an MSc qualification, indicating a panel with strong academic standing. In terms of professional experience, three experts (75%) had more than 20 years of experience, demonstrating extensive expertise in their respective fields, while one (25%) had 20 years or fewer. The experts also occupied senior professional and academic positions, including Associate Professor, Deputy Director of Nursing Services (Public Health), Health Education Specialist, and Head of Department, Community Health Nursing, each representing 25% of the panel. This distribution reflects a diverse and highly experienced group of professionals, thus enhancing the credibility and rigour of the validation process.

Table 5.3 Socio-demographic data of the experts (N=4)

Variable	Frequency	Percentage
Sex		
Male	1	25
Female	3	75
Educational level		
MSc	1	25
PhD	3	75
Years of experience		
>20 years	3	75
≤20 years	1	25
Position		
Associate Professor	1	25
Deputy Director of Nursing Services, Public Health Nursing Department	1	25
Health Education Specialist	1	25
Head of Department, Community Health Nursing	1	25

Table 5.4 reveals that all the experts that reviewed the programme accepted that the programme. In addition, all the team accepted that the developed programme could achieve the set objectives (Effectiveness) and that it is cost effectiveness in terms of time, money and personnel (Efficiency). Meanwhile none of them considered it being fair (Equity) and appropriate to the targeted audience at first round of their review. All the reviewers accepted that it would permit participants and stakeholders' engagement (acceptability). Notably, 75% accepted that the programme will measure changes in health outcomes and behaviours (Impact). All the experts considered it as having the potential to be replicated, scaled up and adapted to other settings and population (Transferability), to be monitored, and evaluated for feedback (Accountability) and can be executed by the targeted health care facilities (Achievability).

Table 5.4 Evaluating the nurse-led health educational programme by the experts: First round (N=4)

	Validating criteria for guidelines/programme	1	2	3	Full acceptance of programme %
1	**Relevance:** Is the programme in alignment with community needs and consistency with national or international goals/standards.	0	0	4	100
2	**Effectiveness:** Achievement of programme objectives.	0	0	4	100
3	**Efficiency:** Is the developed programme cost effectiveness (time, money and personnel).	0	0	4	100
4	**Equity:** Fairness and justice in programme access and delivery.	0	4	0	0
5	**Appropriateness:** Is it suitable to the targeted audience.	0	4	0	0
6	**Acceptability:** Will it permit participant engagement and will be acceptable by stakeholders.	0	0	4	100
7	**Impact:** Measurable changes in health outcomes and behaviours. Can it Influence policy and practice.	0	1	3	75
8	**Transferability:** The potential to be replicated and scaled up. To be adapted to other settings and population.	0	0	4	100
9	**Accountability:** Can the programme be monitored and evaluated for feedback.	0	0	4	100
10	**Achievability:** Can the programme be executed by the targeted health care facilities.	0	0	4	100

It is worth noting that in the second round of the review, all the experts accepted the developed programme based on the set criteria. They all accepted that it is relevance, effective, efficient, fair, and appropriate. Also, that it permits participants/stakeholders engagement, and measurable for impact, and transferable. Furthermore, they accepted that it can be

monitored and evaluated for feedback (Accountability) and can be executed by the targeted health care facilities (Achievability) Table 5.5.

Table 5.5 Evaluating the nurse-led health educational programme by the experts: Second round (N=4)

	Validating criteria for guidelines/programme	1	2	3	Full acceptance of programme %
1	**Relevance:** Is the programme in alignment with community needs and consistency with national or international goals/standards.	0	0	4	100
2	**Effectiveness:** Achievement of programme objectives.	0	0	4	100
3	**Efficiency:** Is the developed programme cost effectiveness (time, money and personnel).	0	0	4	100
4	**Equity:** Fairness and justice in programme access and delivery.	0	0	4	100
5	**Appropriateness:** Is it suitable to the targeted audience?	0	0	0	100
6	**Acceptability:** Will it permit participant engagement and will be acceptable by stakeholders.	0	0	4	100
7	**Impact:** Measurable changes in health outcomes and behaviours. Can it Influence policy and practice.	0	0	4	100
8	**Transferability:** The potential to be replicated and scaled up. To be adapted to other settings and population.	0	0	4	100
9	**Accountability:** Can the programme be monitored and evaluated for feedback.	0	0	4	100
10	**Achievability:** Can the programme be executed by the targeted health care facilities.	0	0	4	100

The raters' ratings were highly consistent, with a high level of agreement and an ICC of 0.78 ($p<0.05$), Table 5.6

Table 5.6 Intraclass correlation coefficient (ICC) analysis: First round

Estimate	Number of raters	ICC		95% ICC	Df	F-test	P-value
	4	0.78	0.48	0.98	3	36	<0.0001

The raters' ratings were highly consistent, with a high level of agreement and an ICC of 0.89 ($p<0.05$) Table 5.5.

Table 5.7 Intraclass correlation coefficient (ICC) analysis: Second round

Estimate	Number of raters	Number of times rated	ICC	95% ICC	F-test	P-value
	4	2	0.885		12.5	0.034

Based on the experts' reviews and analysis, the developed nurse-led health educational programme has been validated for utilisation, reflecting its effectiveness and readiness for implementation.

The developed program is original and has been specifically designed for mothers and guardians of under-five children in Ogun State, Nigeria. It focused on home management of diarrhoea, an important aspect of a child's care where locally relevant interventions are scarce. The program incorporates evidence-based strategies, practical guidance, and culturally appropriate approaches tailored to the resource context of the study area. Furthermore, the program was validated by a panel of experts in child health, public health education, and community health, and feedback from this process was incorporated into the final version, strengthening its applicability in real-world settings.

By addressing gaps in mothers' knowledge and home care practices, this program represents a novel and context-specific intervention that complements existing health strategies. Its structured approach and focus on local needs make it a valuable contribution to improving child health outcomes and supporting nurse-led initiatives in community home care.

A standard protocol was developed prior to the commencement of the study. The developed protocol outlined the session duration, sequence of topics, teaching methods, group arrangement, teaching materials and evaluation method. This provided a structured framework for uniform implementation across all the established groups.

Intervention Session

The intervention consisted of three modules, delivered over three consecutive Saturdays, with each session lasting an average of one hour.

Sequence of topics: The module comprised of three sessions:

- The first module addressed, causes and transmission of childhood diarrhoea. Method: teaching and discussion
- The second module focused on: home management of childhood diarrhoea including preparation of ORS/SSS and continued feeding practices. Method: teaching and discussion
- The third module: steps of hand washing, preparing ORS/SSS and administering zinc. Method: Role-play and group guided discussion.

Teaching methods

- Teaching
- Demonstration and return demonstration
- Role play

Group Arrangement

- Participants were divided into nine groups/units, each containing approximately 19 participants. The larger group sizes were due to limited availability of trained nurses to facilitate smaller units.

Materials Used

- Leaflets
- ORS, sachets
- Measuring cups&spoons
- Bottled water, and covered
- Covered bowls/jugs.

All sessions were delivered by trained nurses using the same instructional approach, with leaflets provided in English and explained in Yoruba as necessary.

Delivery procedures:

- Researcher greets the participants
- Introduces the topic and objectives
- Delivers the teaching
- Conducts the role play
- Demonstrates ORS preparation and return demonstration
- Answer questions
- Shared leaflets
- Reminds participants of follow-up assessments

Evaluation method:

An evaluation will be conducted to assess the participants' understanding and skills acquired during the training session. The evaluation will take place at the end of each module. This will be done to ensure objectives were achieved, ascertain comprehension,

clarify any area of misunderstanding and support fidelity of the intervention. Evaluation methods include

- Asking of questions based on the module objectives
- Return demonstration following the facilitator's demonstration

Fidelity monitoring was conducted using an observer checklist by the principal researcher to confirm adherence to the protocol. Any deviations in content, method or procedures were documented and addressed to ensure consistent delivery across all the sessions. This approach helped in strengthening the internal validity of the study and ensured that observed changes in mothers' knowledge, attitudes, and practices could be confidently attributed to the nurse-led educational intervention.

5.6 HEALTH EDUCATIONAL PROGRAMME

This developed programme contains modules on how to improve mothers' knowledge and practice of HMCD**.** Diarrhoea is a prevalent illness among children below five years, potentially leading to complications such as dehydration and malnutrition if left untreated or inadequately managed. It is a disease that easily claims the lives of children under the age of five years. This module was developed to train mothers on how to manage diarrhoea at home among children under-five. This module was adapted from two documents by the WHO (2011:58-63; 2014a:8-38); and a training guide by Child Health Division, Ministry of Health and Welfare Government of India (2017:6-19).

The module is divided into three parts: the first part contains information on diarrhoea, types of diarrhoea, mode of transmission, complications and signs and symptoms of dehydration. The second aspect of the module addressed home management of children's diarrhoea, while the third module addressed demonstration on HMCD. This module should be communicated both in English and Yoruba language to the mothers.

This health education programme was reviewed and validated by experts before utilising it for the interventional programme among mothers in a rural community in Ogun State, Nigeria. The module can be adopted by local and state health authorities for utilisation by healthcare providers, especially Nurses, in health education of mothers on HMCD so as to improve their knowledge and practice of HMCD across the state. The introduction will take an average of 10 minutes.

5.7 MODULE 1

5.7.1 Introduction

Diarrhoea remains one of the major killer diseases among children under-five in most developing countries. It is highly preventable and easy to manage. The first five years of a child's life are a crucial period in their growth and development. Behaviours common in children during this stage of life include crawling, exploring the environment, and picking up objects to eat, which exposes them to the ingestion of microorganisms. The signs and symptoms the infected child present during this critical stage of child development are culturally given different interpretations in most African communities, including Nigeria. This interpretation informed the manner and approach of care.

Duration: 1 hour

5.7.2 Learning objectives

At the end of the training, mothers should be able to:

- Define diarrhoea
- State the types of diarrhoea
- Explain the mode of transmission of diarrhoea
- List the complications of diarrhoea
- Identify the signs and symptoms of dehydration

5.7.3 Module organisation

This module follows the major steps of the Integrated Management of Childhood Illness (IMICI) process:

- Understanding diarrhoea and its major types
- Understanding mode of transmission of diarrhoea
- Understanding dehydration; a major complication of diarrhoea

5.7.3.1 What is diarrhoea?

Diarrhoea is the passage of three or more loose or watery stools in a day. It is common between children of ages 6 months and 2 years in environments where there is poor sanitation and poor source of water. The normal frequent or loose stool of a breastfed baby is not diarrhoea.

5.7.3.2 What are the types of diarrhoea in children?

There are several types of diarrhoea that can result to dehydration. Most cases of diarrhoea involve passage of loose or watery stool. Cholera is an example, though it is only responsible for a small percentage of all diarrhoea cases.

- *Acute diarrhoea*: Is a type of diarrhoea that lasts less than 14 days. It can lead to dehydration and malnutrition. The death of a child with acute diarrhoea is usually due to dehydration.
- *Persistent diarrhoea*: This type of diarrhoea lasts 14 days or more. This often leads to malnutrition in children and contributes to death. Approximately 20% diarrhoea cases progress to persistent diarrhoea.
- *Dysentery*: This is diarrhoea that presents with blood in the stool, with or without mucous.

5.7.3.3 Mode of transmission of diarrhoea

Diarrhoea is majorly transmitted through contaminated food and/or water. It is a faecal-oral disease. For instance, faecal microbes near a well can contaminate the water source and be drunk by a child, unwashed hands after defecating or cleaning a child who defecated to cook or eat, flies perch on faeces and can drop it on uncovered food, drinking or using contaminated water to cook, all these can make someone or another person to have diarrhoea.

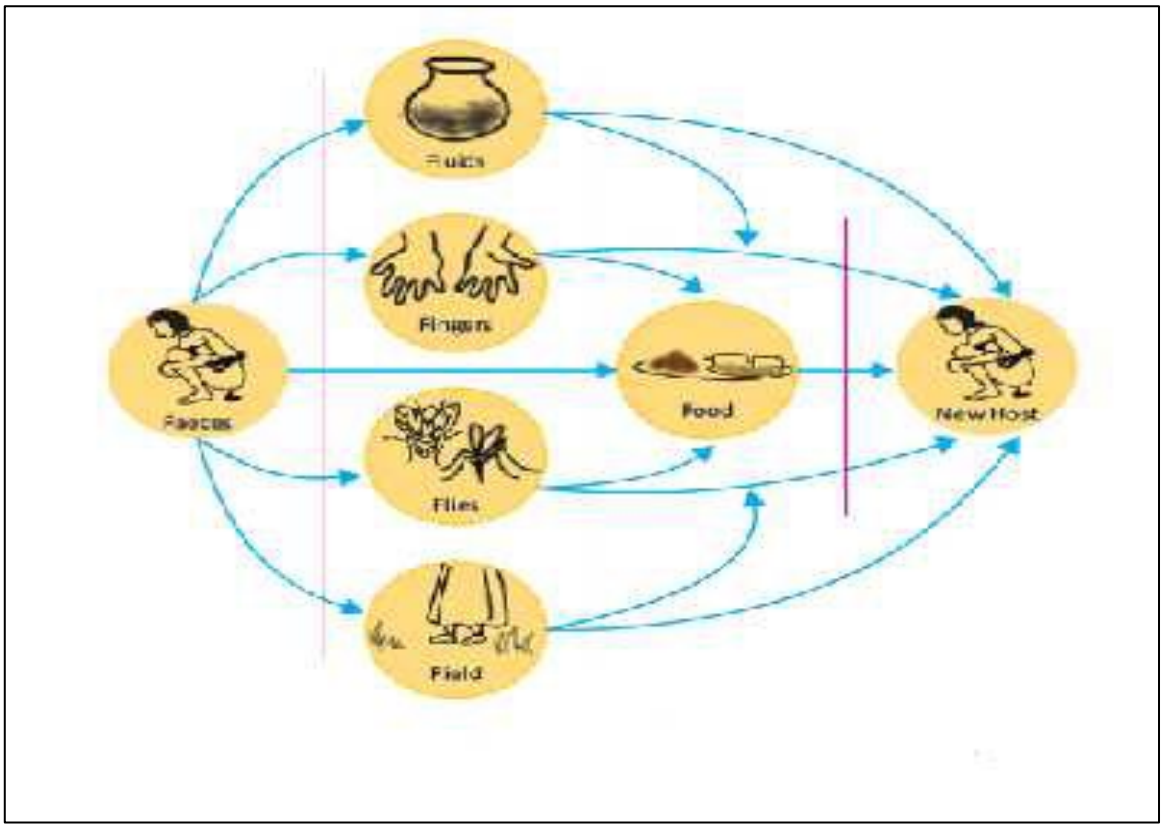

Figure 5.1 Mode of transmission of diarrhoea

(Child Health Division, Ministry of Health and Family Welfare of India 2017:7)

5.7.3.4 Complications of diarrhoea

Complications of diarrhoea include:

- Dehydration
- Malnutrition
- Lead to death

5.7.3.5 Definition of dehydration and its signs and symptoms

Dehydration is a major complication of diarrhoea, and it can easily lead to death. It is a state in which a child loses more water and electrolytes from the body than they consume. Prompt treatment is crucial for a dehydrated child to replenish the lost water and electrolytes.

- **Degrees of dehydration**

There are three degrees of dehydration: no dehydration, mild/moderate dehydration and severe dehydration.

➢ *No dehydration*

No dehydration is a situation in which a child does not show any sign of dehydration.

➢ *Mild/moderate dehydration*

Dehydration is classified as mild/moderate dehydration if the affected child presents at least two out of the following signs – restless, irritable; drinks eagerly, thirsty; sunken eyes; skin pinch goes back slowly.

➢ *Severe dehydration*

Dehydration is classified as severe when a child exhibits at least two signs of the following signs: lethargic or unconscious, not able to drink or drink poorly, sunken eyes, or very slow skin pinch.

Table 5.8 Summary of the degrees of dehydration

Green: **NO DEHYDRATION**	Not enough signs to classify as some or severe dehydration	• Give fluid, zinc supplements, and food to treat diarrhoea at home (Plan A) • Advice mother when to return immediately • Follow-up in 5 days if not improving
Yellow: **MILD/MODERATE DEHYDRATION**	Two of the following signs: • Restless, and irritable • Sunken eyes • Drinks eagerly • Thirsty • Skin pinch goes back slowly	• Give fluid and breast milk for some dehydration (Plan B) *If an infant has any severe classification:* *Refer URGENTLY to hospital with mother giving frequent sips of ORS on the way. Mother should continue to breastfeed.*

		• Advise mother when to return immediately • Follow-up in 2 days if not improving
Red: **SEVERE DEHYDRATION**	Two of the following signs: • Lethargic or unconscious • Sunken eyes • Not able to drink or drink poorly • Skin pinch goes back very slowly	*If a child has no other severe classification:* • Give fluid for severe dehydration (Plan C) OR *If a child also has another severe classification:* • Refer URGENTLY to hospital with mother giving frequent • Sips of ORS on the way • Advice the mother to continue breastfeeding *If a child is 2 years or older and there is cholera in your area, give antibiotic for cholera.*

(WHO 2014:17)

5.7.4 Questions

1. What is diarrhoea?
2. List the complications of diarrhoea.
3. List the signs of dehydration.

5.8 MODULE 2

5.8.1 Introduction

Diarrhoea if not treated promptly can result into dehydration, malnutrition and poor development. Relationship between dehydration and malnutrition is bidirectional. Diarrhoea reduces child's appetite, altered feeding practices and also food absorption process resulting into malnutrition. Malnutrition reduces under-five children resistance to infection, putting such at risk of diarrhoea. Poor development is one major long-lasting

indirect effect of diarrhoea through malnutrition. Early home management of diarrhoea is recommended for prevention of these complications.

Duration: 1-2 hours

5.8.2 Learning objectives

At the end of the training, mothers should be able to:

1. List the rules of home management of diarrhoea.
2. State the steps of treating diarrhoea with no dehydration.
3. State the steps of treating diarrhoea with mild/moderate dehydration.

5.8.3 Module organisation

This module follows the major steps of the IMCI process:

- Outline rules of home management of diarrhoea
- Explain different Plans for home management of diarrhoea

5.8.3.1 Rules of home management of diarrhoea

- Give extra fluid
- Give zinc supplements
- Continue feeding
- Take the child to hospital if the child is very weak, drinks poorly or has blood in the stool

5.8.3.2 Plans for home management of diarrhoea

❖ **PLAN A: No dehydration (green)**

Plan A describes the pattern of managing diarrhoea with no dehydration. It follows the four rules of home treatment listed above. A child with no dehydration will require Plan A. Mothers/ caregivers should be informed that all children with any type of diarrhoea will

need Plan A. Children with more serious dehydration will first require plan B and C, after which such should be placed on Plan A. Mother/caregiver should master these rules.

- **Rule 1: Give extra fluid**

  - Once diarrhoea begins, mother/caregiver should offer the child much fluid than usual.
  - The goal is to restore lost fluid thereby preventing dehydration.
  - The mother/caregiver should administer ORS and water to the child.
  - In addition to this, the mother should keep breastfeeding if the child is still on breast milk. The child needs to breast feed more often to compensate for fluid loss.
  - However, if the child i*s no longer on breast milk*, the child should still receive ORS solution and should be placed on locally available food-based fluids e.g yoghurt drinks and clean water.
  - In case of vomiting, wait 10 minutes, before offering the ORS again but at a slower pace.

Table 5.9 Summary of feeding and extra fluid administration in PLAN A

If child is less than 6 months age	**If child is more than 6 months age**
Breast feeding frequently + ORS	Give home fluids e.g yoghurt drink, milk, pap, + plain clean water ORS
If child is up to 2 years	50-100 ml after each loose
If child is 2 years or older	100-200 ml after each loose stool

- **Rule 2: Give zinc supplements**

  - Zinc supplements come in tablet form, and this should be given for 14 days.
  - It plays a crucial role in reducing the severity and the length of diarrhoea.
  - It is has also being proven that it decreases stool output and decreases the need for child hospitilisation.
  - The recommended age group for zinc supplementation is children aged 2 months to 5 years. Use the table below for further explanation.

Table 5.10 Summary of Zinc supplements administration in PLAN A

Age	Dose
2-6 months	10mg (half tablet) in breast milk in spoon
6 months-5 years	20mg (one tablet) for 14 days in clean water in a spoon or cup

- **Rule 3: Continue feeding**

  - Mother should continue to breast feed the child if on breast milk.
  - If the child is no longer on breast milk such should be given locally available fluid-based foods.

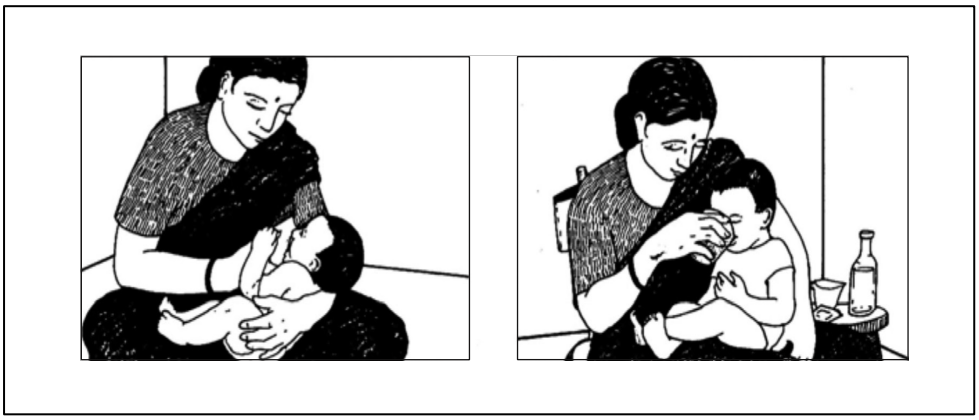

Figure 5.2 Feeding patterns (WHO 2014:31)

- **Rule 4: Take the child to the hospital**

  When to visit hospital:

  - Child becomes sicker
  - Drink poorly
  - Blood in the stool
  - Develops fever

- **PLAN B: Mild or moderate dehydration (yellow)**

Home management of diarrhoea with mild/moderate dehydration.

- Plan B is for a child that has diarrhoea with mild & moderate dehydration with any of the two signs below:
  - restless
  - irritable

- sunken eyes
- drinks eagerly or thirsty (not applicable to less than 2 months age)
- skin pinch goes back slowly

- Plan B should commence at the health facility, where the mother will be asked to slowly give a recommended amount of ORS solution and water and zinc supplements.
  - In addition to fluid, it is essential to offer food to children with mild/moderate dehydration. Breastfed children should continue breastfeeding without interruption.
  - Four hours later, the nurse should conduct a follow-up assessment and classify the child's degree of dehydration.
  - Once the child's condition has improved with no more signs of dehydration, they can commence Plan A for home treatment, however, If there is still mild/moderate dehydration, the child will have to repeat Plan B.

❖ **PLAN C**: **Severe dehydration (red)**

It is important mothers know signs of severe dehydration such as:
- Lethargic or unconscious.
- Sunken eyes.
- Not able to drink or drink poorly.
- Skin pinch goes back very slowly.
- The child will need fluid replacement especially if such is not tolerating fluids and diarrhoea continues.
- Plan C can only be implemented at the health facility.
- The child will be placed quickly on intravenous (IVF) fluids.

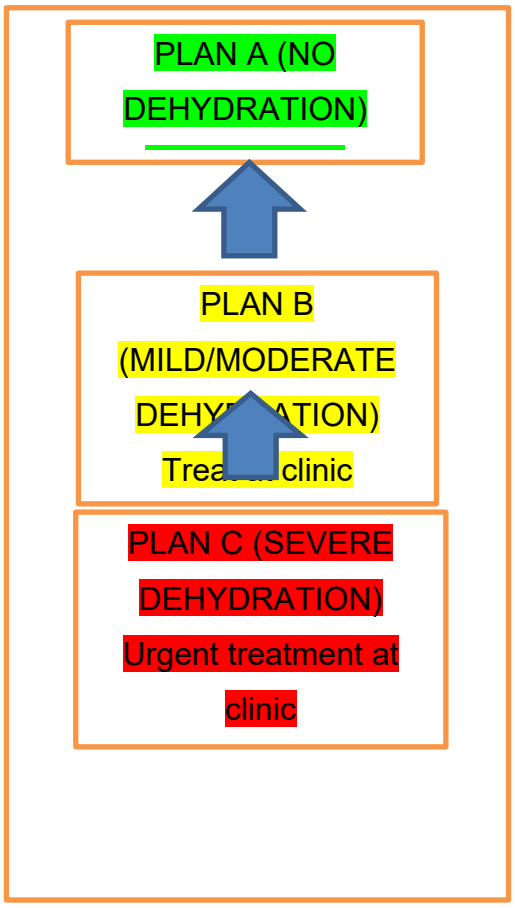

Figure 5.3 Summary of the PLANS

❖ PLAN for PERSISTENT DIARRHOEA

Treatment plan for PERSISTENT DIARRHOEA is in two parts: persistent diarrhoea and severe persistent diarrhoea.

- Persistent diarrhoea (yellow)
  - A child with diarrhoea lasting 14 days or more, without signs of dehydration is considered to have PERSISTENT DIARRHOEA.
  - It is important to give the child special food, such as boiled potatoes, mashed bananas, local made yogurt etc.

- Severe persistent diarrhoea (red)
  - Diarrhoea lasting for 14 days or more *with* mild/moderate or severe form of dehydration, is considered to have SEVERE PERSISTENT DIARRHOEA.
  - When mothers observed this, such a child should be taken to the hospital.

- Mothers should note that these categories of children require extra care to avoid dehydration.
- Also, they may need a change in diet and further investigations to identify the cause of diarrhoea.

❖ **PLAN for DYSENTERY**

- A child with dysentery should be taken to the hospital for further investigation.
- The first treatment is replacement of lost fluids and electrolytes.
- In most cases the nurses will place the child on antibiotic.

Common myths influencing attitudes towards HMCD that need to be addressed

Discourage mothers on the following misconceptions:

- Food should be reduced in diarrhoea
- Breastfeeding should be reduced or stopped during diarrhoea
- Feeding during diarrhoea can worsen the case
- Some diarrhoea cannot be treated only with medical knowledge because some are caused by teething, or evil spirit while some comes with weaning and eating too much.
- Anitimotility, anti-diarrhoea, antibiotics of any type can be used for a child with diarrhoea.

5.8.4 Questions

1. List the four rules of treating diarrhoea.
2. Which of the plans, can a mother use at home?
3. What are the steps to be taken if a child has persistent diarrhoea or dysentery?

5.9 MODULE 3

5.9.1 Introduction

HMCD is simple, cheap and easy. It helps treat and prevent dehydration, malnutrition and poor development in children.

Duration: 1-2 hours

5.9.2 Learning objectives

At the end of the training, mothers should be able to:

- List the steps of hand washing, preparing ORS/SSS and administering zinc.
- Carry out the steps: for handwashing, in preparing ORS/SSS, administering zinc and hand washing.

5.9.3 Module organisation

This module follows the major steps of the IMICI process:

- Demonstrate how to prepare ORS/SSS
- Roleplay

5.9.4 Demonstration guide

Demonstration of the steps: In hand washing, preparing ORS/SSS and administering zinc

The nurse should demonstrate each of the above steps to the mother or mothers after health education. After this, allow mother or mothers to carry out each of the tasks.

❖ **Steps of hand washing**

- Proper hand washing means washing your hands for at least 30 seconds with soap and water. The constant rubbing action helps soap break down the grease and dirt that carry most germs. This way, your hands don't just smell fresh but also reduce germ count on your hands to 99 percent.
- When to wash hands.
- Make sure you wash your hands whenever you do the following.

Table 5.11 Summary of timing for hand washing

Before	After
Handling or preparing food Eating meals Attending to a child or sick person Feeding a child	Using the toilet Wiping or blowing your nose Coughing or sneezing Changing baby's diapers

Figure 5.4 Diagram of hand washing

(Child Health Division, Ministry of Health and Family Welfare of India 2017:17)

❖ Preparation of ORS

The nurse is to teach the mother/caregiver how to mix and administer ORS. The mother/caregiver should be given the opportunity to practice following the nurse demonstration of the entire process. The nurse should inform the mother/caregiver that fresh ORS should be prepared every day, in a clean container. Also, that the remaining ORS should be discarded after 24 hours of use. Meanwhile, she is to keep the container covered.

The steps for making ORS are as follows:

- Following hand washing with soap and water as in above illustration
- Empty all the powder from one packet of ORS into a clean container.
- Any clean container such as a jar, bowl or bottle can be used

- Measure 1 litre of clean boiled and cooled water or purchased bottled water
- Pour the water into the container.
- Mix well until the powder is completely dissolved.
- Taste the solution so you know how it tastes.

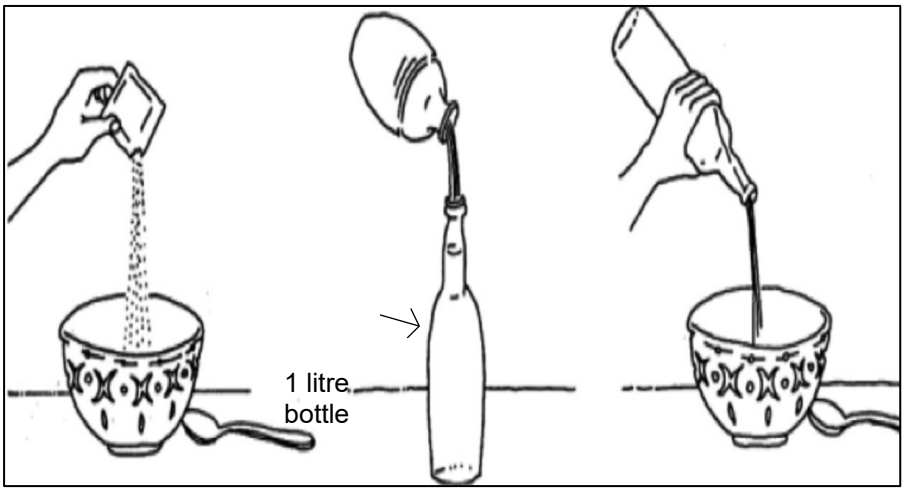

Figure 5.5 Summary of ORS preparation steps

(WHO 2014 a:30)

❖ **Steps of administering zinc**

➢ **For age 2-6 months of age**

- Mother's is to break the zinc tablet into two parts (i.e 10mg), making use of the division line.
- The remaining half should be discarded immediately.

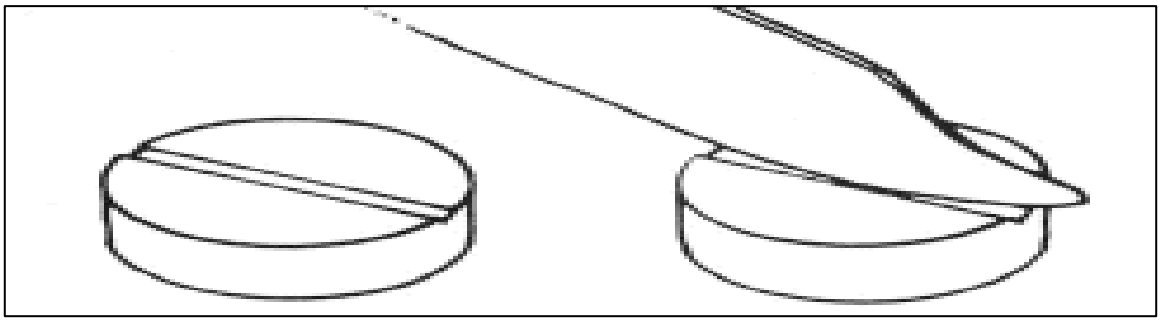

Figure 5.6 How to divide zinc supplement

(WHO 2011:71)

Steps:

- Take a clean teaspoon
- Express breast milk directly into the spoon and then add half the tablet

- **For age 6 months to 5 years of age**

  - Do not break the tablet into two since this category of children will require a complete 2mg tablet.
  - Place one tablet on a clean spoon.
  - Pour clean water carefully on the tablet avoid it not spilling over.
  - Shake the spoon slowly till the tablet dissolves completely.
  - Avoid using fingertips or any object in dissolving it.
  - Mothers are to hold the child carefully and comfortably when feeding the child with the solution.
  - Tell mother that If the powder remains in the spoon, the child should lick it or add little more breast milk or water to dissolve it and give it again.
  - It is important that mother give the child zinc supplements once a day for 14 days.

5.9.5 Role-play practice: Prepare and give ORS and zinc supplement

Role play will help in reinforcing health education.

Role-play practice: The trained nurse should work with a partner who will play the role of a mother. Get a doll or roll up a towel in the form of a baby.

1. Follow the steps described in this manual to teach the mother how to wash hands, and how to prepare and administer ORS and zinc supplements.
2. The caregiver should do all the tasks, and the nurse should guide her in each of the steps.
3. Help the caregiver administer the prepared ORS and zinc supplement.

5.10 SUMMARY

This module was developed to improve mothers' understanding of; diarrhoea and its major types**,** mode of transmission of diarrhoea**,** dehydration a major complication of diarrhoea**,** home management of diarrhoea**,** and also for mothers to be able to demonstrate how to prepare and administer ORS/SSS and zinc supplementation.

5.11 REPLICATION-READY IMPLEMENTATION TOOLKIT

This toolkit provides details on the nurse-led health education intervention programme that can serve as a guide when addressing related health issues in other similar settings

1. Overview

Purpose: To improve mothers' knowledge, attitudes, and practices regarding Home Management of Childhood Diarrhoea
Target audience: Mothers or guardian in community settings.
Format: Group sessions, practical demonstrations
Duration: 3 sessions, 60 minutes each
Delivery team: Trained Nurses

2. Intervention Materials

- Training Module for Facilitators
- Session-by-session guide
- Learning objectives per session
- Key contents
- Questions

3. Participant Materials

- Leaflets
- ORS sachets

4. Visual Aids

- Posters
- Role play
- Demonstration

5. Assessment Tools

- Pre- and post-session questionnaires for knowledge, attitude, practice
- Observation checklist for practical skills

6. Delivery Protocol
- Introduction
- Intervention session
- Teaching methods
- Group Arrangement
- Materials Used
- Delivery procedures:
- Evaluation method
- Fidelity Monitoring
- Observer checklist to track adherence to protocol
- Documentation form for deviations and corrective actions
7. Adaptation Guidelines
- Contextualisation
- Modify language to local culture
- Consider educational status
8. Translation
- Confirm translation equivalence if using local language
9. Session Timing
- Adjust duration of sessions based on participants' availability
10. Measurement and Evaluation
- Pre- and Post-Intervention Assessment
- Paired or repeated measures
- Report effect sizes and 95% confidence intervals
11. Outcome Domains
- Knowledge: true/false questions
- Attitude: Likert-scale items
- Practice: Observational checklist, closed and open-ended questions
12. Data Management
- Secure storage, coding, and entry procedures
13. Implementation Checklist for Replication
- Confirm facilitator training is complete
- Review session materials and module
- Prepare visual aids
- Schedule sessions and recruit participants
- Conduct pre-assessment

- Deliver intervention following the session guidelines
- Conduct post-assessment and calculate effect sizes
- Document deviations and participant feedback
- Compile data and report outcomes

CHAPTER 6

DISCUSSION, CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

6.1 INTRODUCTION

This chapter addresses the discussion of research findings from the data analysis presented in chapter four. The key findings from the study objectives which include to, assess the knowledge of HMCD among mothers with under-five children in a rural community in Ogun state, Nigeria pre- and post-intervention, assess the attitude of mothers with under-five children towards HMCD in a rural community in Ogun state, Nigeria pre- and post-intervention, assess the practice of diarrhoea HMCD among mothers with under-five children in a rural community in Ogun state, Nigeria pre- and post-intervention and identify socio-demographic factors associated with knowledge, attitude and practice of HMCD among mothers with under-five children in a rural community in Ogun state, Nigeria pre- and post-intervention were discussed and compared with previous studies on HMCD. This section also highlights the study recommendations, limitations, and contributions to nursing profession.

6.2 RESEARCH DESIGN AND METHOD

The research method employed in this study is quantitative, utilising quasi-experimental, one group study research design. This approach was used to assess the changes in mothers Knowledge, Attitude, and Practice (KAP) regarding Home Management of Diarrhoea (HMCD) following a health educational intervention on the in a rural community Ogun State, Nigeria.

6.3 SUMMARY AND INTERPRETATION OF THE RESEARCH FINDINGS

The present study recruited 174 mothers at baseline, with 164 completing all follow-up assessments, giving an attrition rate of 5.7%, which is considered acceptable since attrition below 10% is regarded as satisfactory in intervention studies. The mean age of participants was 32.7 ± 9.75 years, indicating that most respondents were young to

middle-aged mothers. This age distribution aligns with findings from similar studies conducted in Nigeria, where the majority of mothers of under-five children fall within the reproductive age range of 20–35 years (Momoh et al's 2021:[1]; West & Okari's 2023:547). These studies similarly highlighted that younger mothers are often the primary caregivers and are central to home management of childhood diarrhoea (HMCD). In addition, in the present study, 83.9% of mothers were married, consistent with Ajayi et al's (2019:36), who also observed a high proportion of marital stability among mothers of under-five children. Marriage has been identified as a protective factor influencing caregiving responsibilities and decision-making regarding child health.

Notably, almost half of the respondents (48.3%) had no formal education. This finding mirrors the educational distribution reported in several Nigerian studies, particularly those conducted in rural and semi-rural communities. Studies by Oji and Okafor's (2020:92) Ogunmiluyi & Ayodele's (2021:50), Oluseye & Oluwatosin (2019), similarly documented low mothers' educational levels, which have consistently been associated with inadequate knowledge and suboptimal home management practices of diarrhoea. Studies conducted in Ethiopia and Tanzania also support this observation, showing that low education negatively influences HMCD knowledge and decision-making (Terefe et al's, 2022:5-6; Kheir et al's 2021:4).

6.3.1 Knowledge of home management of childhood diarrhoea among mothers with under-five children pre- and post-intervention

Childhood diarrhoea is a disease of significant public health important. Despite its impact, its management is simple and cost-effective when appropriate measures are implemented (Udoh, Adesina, Utomi, Igri & Udoh's 2022:1). Effective HMCD requires adequate maternal knowledge and positive attitudes toward recommended practices (Omole et al's 2019:20). The main aim of the HMCD is restoration of lost fluids and nutrients (Fufa et al's 2019:2). The recommended HMCD centered on administration of ORS, Zinc supplement, continuous administration of fluids, and feeding of the children under the age of five years (West & Okari's 2023:1). The study findings provide answer to the research question on mothers' knowledge of HMCD in a rural community in Ogun State, Nigeria pre- and post-intervention. The results also directly address hypotheses 1, which stated there is no significant difference in the pre- and post-intervention knowledge of HMCD among mothers of under-five children in a rural community Ogun State, Nigeria.

The results from Tables 4.3 and 4.4 reveal that pre-intervention mean knowledge score was (10.31 ± 6.84), however, after the nurse-led educational intervention, the mean knowledge scores increased substantially to 21.68 at the first post-intervention assessment and 21.37 at the second (one-moth follow-up). These results reflect a significantly improvement in knowledge during the post-intervention phase. Therefore, in relation to hypothesis 1, the results provide evidence to reject the null hypothesis, which state that there is no significant difference in the pre- and post-intervention knowledge of HMCD among mothers of under-five children. The results clearly show a statistically significant improvement in knowledge of HMCD following the intervention.

The findings show that mothers' baseline knowledge of the home management of childhood diarrhoea (HMCD) was below-average knowledge, reflecting the widespread gaps previously reported in Nigerian and international studies. Although 71.3% of respondents before the intervention correctly acknowledged that ORS/SSS helps stop frequent watery stooling, replaces lost water, and is simple to prepare, substantial gaps existed in their knowledge of its correct use. However, a large proportion of mothers incorrectly believed that ORS or SSS is not the first thing to give a child with diarrhoea (80.5%), and many also believed that ORS should only be given if instructed by a health worker (87.9%) or only when the child becomes weak (89.1%).

The study highlights a significant knowledge gap regarding Oral Rehydration Solutions (ORSs) / Salt Sugar Solutions (SSSs) before intervention, despite respondents' familiarity with their benefits and simplicity in preparation. Notably, more than 70% had misconceptions about its ability to stop diarrhoea and preparation method, and none of the respondents knew the correct duration of zinc administration. These findings align with some evidence. For instance, Alghadeer et al's (2021:4-8) study among mothers in Saudi Arabia, revealed that many mothers lacked confidence in administering ORS without guidance, showing a consistent trend of dependency on healthcare providers for treatment options.

Similar baseline deficiencies have been documented by Momoh et al's (2021:[6]), West & Okari's (2023:548549), and Ogunmiluyi & Ayodele's (2021:54-55), who found that many caregivers lacked adequate understanding of diarrhoea management, particularly regarding ORS, zinc supplementation, and early initiation of treatment. Studies

conducted in Ethiopia and Tanzania also highlighted widespread misconceptions regarding ORS usage and timing, attributing such gaps to low maternal literacy and inadequate health education (Terefe et al's 2022:5-6; Kheir et al's 2021:4). Likewise, the complete lack of knowledge regarding zinc supplementation in this study corresponds with earlier findings from Ajayi et al. (2019:36), Ogunmiluyi & Ayodele's (2021:55), and Raiz et al's (2019:136-137), who reported that zinc use remains poorly understood and underutilised among mothers in many rural Nigerian communities.

While after intervention there was substantial and statistically significant improvement in mothers' knowledge of HMCD. All the mothers demonstrated correct understanding of the benefits, preparation, and use of ORS/SSS, and more than 90% demonstrated adequate knowledge across all measured domains. The mean knowledge score increased sharply to 21.68 ± 1.51 at first post-intervention and remained high at 21.37 ± 2.03 at one-month follow-up. The repeated measures ANOVA confirmed a highly significant difference across the three time points ($F(2,172) = 401.56$, $p < 0.001$), indicating that the intervention had a strong effect on improving knowledge. The post-hoc Bonferroni tests further revealed that knowledge scores were significantly higher at both first and second post-intervention assessments compared to baseline, with very large effect sizes (Cohen's $d = 2.68$ and 2.60, respectively). These effect sizes indicate an exceptionally strong intervention impact. The absence of a significant difference between the first and second follow-up assessments (mean difference = –0.32, $p = 0.77$, Cohen's $d = 0.07$) suggests that the improvement in knowledge was sustained over the one month, demonstrating retention of learning. The near-perfect post-intervention scores in the recent study indicate that the nurse-led educational strategy was effective and may serve as a model for future public health campaigns. Overall, the extent of improvement observed in the recent study underscores the potential of targeted interventions to close knowledge gaps that have persisted in past research.

This substantial improvement aligns with the outcomes of similar nurse-led or community-based educational interventions. Oduntan et al's (2020:7-8) documented similar increases in knowledge levels among mothers of under-five children after exposure to a nurse-led diarrhoea education programme in Oyo State. Likewise, Oji & Okafor's (2020:93-94) found a significant post-intervention increase in knowledge of ORS preparation, dehydration signs, and early treatment practices. Said, Elhawy and Abd El-Sattar's (2024:193) and Mesiobi-Anene et al's (2023:4-5) studies also identified an

improvement in knowledge of mothers pre- and post-intervention. This retention of knowledge in the recent findings indicates a potentially more robust and lasting educational impact, distinguishing this study from previous studies that lacked a second post-intervention evaluation. Overall, the present study reinforces the growing body of evidence that nurse-led educational interventions are highly effective in improving and sustaining maternal knowledge of HMCD, particularly in rural and underserved communities where misinformation and low health literacy are prevalent.

6.3.2 Attitude of mothers with under-five children towards home management of childhood diarrhoea pre- and post-intervention

The second research question is, what is the attitude of mothers with under-five children towards HMCD in a rural community in Ogun State, Nigeria pre- and post-intervention? was adequately addressed by the study findings. The results showed that mothers' attitudes toward HMCD were generally negative at pre-intervention but improved significantly at post-intervention 1 and 2. These marked improvements in attitude provide sufficient evidence to reject the second null-hypothesis, indicating that the nurse-led educational intervention had a positive and statistically significant effect on mothers' attitudes toward HMCD.

At baseline, mothers demonstrated generally negative attitudes toward recommended home management of childhood diarrhoea. Only a few respondents strongly disagreed with negative attitudinal statements such as "ORS/SSS is not effective," "Not all diarrhoea requires ORS/SSS," "Other drugs should be combined with ORS/SSS," or "Feeding during diarrhoea will worsen the stooling." This reflects the persistence of misconceptions and culturally held beliefs about diarrhoea management, which have also been widely reported in earlier studies. For example, Momoh et al's (2021:[7]) found that many mothers believed that drugs such as antibiotics or anti-diarrhoea were more effective than ORS, while breastfeeding during diarrhoea was perceived as unsafe. Similarly, studies conducted in Ethiopia (Keto et al's 2020:343) and Tanzania (Kheir et al's 2021:4-5) reported that mothers often held negative attitudes toward continued feeding and zinc use during diarrhoea episodes. In addition, Terefe et al's (2022:4-6) study among guardians in Ginchi town Ethiopia, revealed that only about 40% of the caregivers preferred ORS over traditional medicine for diarrhoea home management. Furthermore, the attitude of mothers towards the use of zinc in relation to other drugs was also quite

negative. Nearly 50% of the respondents at pre-intervention strongly agreed that, apart from the zinc tablet, some other important drugs could be given to a child with frequent watery stooling, further highlighting the degree of misconceptions regarding appropriate treatment.

Furthermore, attitudes towards the use of zinc were also unfavourable at pre-intervention. Almost 50% of respondents strongly agreed that, apart from the zinc tablet, other drugs should be given to a child experiencing frequent watery stools, further demonstrating the high level of misconception regarding appropriate diarrhoea management. Immediately after the intervention (T1), the mean attitude score increased markedly to 35.71 ± 3.57, and although there was a slight decline at the one-month follow-up (T2 = 34.60), the score remained significantly higher than the pre-intervention level.

Immediately after the intervention (T1), the mean attitude score increased markedly to 35.71 ± 3.57, and although there was a slight decline at one-month follow-up (T2 = 34.60 ± 3.29), the scores remained significantly higher than baseline. The repeated measures ANOVA confirmed a statistically significant difference across the three time points ($F = 833.35$, $p < 0.001$). Post-hoc comparisons further showed large improvements from baseline to post-intervention 1 and post-intervention 2, with very large effect sizes (Cohen's $d = 3.94$ and 3.65, respectively). These effect sizes show exceptionally strong intervention impact. The small reduction observed between immediate and one-month follow-up (Cohen's $d = 0.3$) suggests that while attitudes slightly declined over time, the overall improvement was largely sustained, indicating good retention.

The significant improvements across all attitude items ($p = 0.001$) in the present study further indicate that attitudinal change was not only positive but also statistically meaningful, suggesting that the intervention successfully addressed deeply rooted misconceptions about diarrhoea management. The present study, therefore, reinforces existing evidence that nurse-led educational interventions can reshape mothers' attitudes, particularly in communities where cultural beliefs, low literacy, and misinformation influence child health practices. It likewise strengthens the evidence that nurse-led educational programmes are capable not only of producing immediate changes in caregivers' attitudes, but also in maintaining these improvements over time.

6.3.3 Practice of diarrhoea home management among mothers with under-five children pre- and post-intervention

Fluid therapy replacement in the HMCD entails the administration of ORS or SSS or increase intake of water or any fluid diet (Abate, Zemariam, Wondimagegn, Abebe, Araya, Kassie & Molla 2024:2). For effective therapeutic action, ORS should be combined with zinc supplement (Udoh et al 2022:1). This treatment will be incomplete if the lost nutrients are not replaced because of the bidirectional relationship that exists between dehydration and malnutrition (Momoh et al 2021:6-7). Answering the third research question - what is the practice of HMCD among mothers with under-five children in a rural community in Ogun state, Nigeria pre- and post-intervention? The study highlighted that before the training, most of the respondents had poor practice mechanisms in managing child diarrhoea at home. After the first post-nurse-led intervention, the entire population had good practice, and at second post nurse-led intervention there was just a slight insignificant drop. Similarly, same finding provides answer to the second hypothesis, which stated that there would be no significant difference in the pre- and post-intervention practice of HMCD among mothers with under-five children in a rural community Ogun State, Nigeria. The results revealed a statistically significant improvement, with a p-value less than 0.05, indicating that the intervention improved the mothers practice of HMCD.

It is surprising that there was no marked difference in the practice of HMCD among this study population, a finding that aligns with the first survey conducted among the same population (Oluseye & Oluwatosin's 2019:81, 84). Similarly, studies by Jagadeesh et al (2024:326) in India and Ndayisaba et al's (2022:4) in selected primary health care centres, Rwanda, reported above-average levels of poor HMCD practices among mothers, which is consistent with the present findings. However, studies in some other parts of Nigeria present contrasting results. Research from the Federal Medical Centre, Owo, and Kosofe LGA, Lagos State showed that approximately 60% of respondents practiced HMCD appropriately (Momoh et al 2021:6-7; Ogunmiluyi & Ayodele's 2021:43,49-54). In addition, another study in Kaduna State, Nigeria, reported that at least about two-thirds of the respondents practiced one form of HMCD or another (Omole et al's 2019:21). The disparities in these findings compared to the present study findings may be attributed to differences in the geographical and residential settings of the mothers. The respondents in the current study were predominantly rural dwellers. This observation aligns with the findings of Fufa et al's (2019:4-7) among caregivers of under-

five children in Doba Woreda, Ethiopia, where the HMCD differed across the residence settings. Although most of the caregivers in that study practiced HMCD inappropriately, the levels of practice differed notably between rural and urban populations.

The pre- and post-intervention findings identified that more than 50% of the mothers indicated that one of their children under the age of five years had frequent watery stooling recently. This finding reflects the frequent incidence of diarrhoea in developing countries, particularly in rural settings. It is important for family members to act promptly when a child experience diarrhoea and typically, mothers are the first category of people that often take up this task (Shafizadeh et al's 2019:343; Oji & Okafor's 2020:90; Momoh et al's 2022:1). In the present study, more than half of the mothers reported taking their children to health center or purchasing drugs as their first line of action**,** while less than 5% initiated home management using ORS. More than 40% approached it differently. Although there was no significant change after the first post-intervention, this may be due to the short interval, during which mothers might not yet have had a practical opportunity to apply what they learned. However, by the second post-intervention assessment, more than 60% of the mothers reported administering ORS first at home when their children had diarrhoea.

West and Okari's (2023:549) study revealed that although most mothers commenced the treatment at home when their children had diarrhoea, only a few mothers administered the correct treatment. Additionally, Onasoga et al's (2019:108) study among mothers at University Teaching Hospital, Ilorin, Kwara State showed that more than 80% used ORS sachets to manage diarrhoea at home and likewise employed other methods such as salt/water solution, SSS, coconut juices and local flakes "garri" water. These findings reflect the diverse approaches mothers made use of in managing diarrhoea at home.

The use of ORS seems popular among mothers in developing countries. Yusuf et al's (2022:315) study among mothers of Kambaza town, Kebbi State and Udoh et al's (2022:1) study among mothers attending Uyo Teaching Hospital, Nigeria, observed that among approximately 60% of respondents who used home-made fluids to manage childhood diarrhoea, ORS was the most frequently used option, with almost one-third also using SSS. Likewise, Oji and Okafor's (2020:1-10) findings among caregivers in Emohua revealed a 36% increase in ORS use following an intervention. Similarly, the pre-intervention study among Ibogun mothers revealed that most mothers gave their children

ORS or SSS when their children had diarrhoea, and this increased by 40% at the second post-intervention.

The timing of ORS/SSS administration is a critical component of effective HMCD. In this study, majority of respondents gave ORS or SSS to their children a day after watery stooling, some administered it after prescription by healthcare workers, and none gave it at onset of watery stool. This finding aligns with Terefe et al's (2022:4-6) study in Ginchi town, Ethiopia, where more than half of the mothers administered ORS on the second day after commencement of diarrhoea and only about 30% initiated it on the first day. Pre-intervention, most respondents didn't use ORS/SS to replace lost fluid; however, at post-intervention, a significant shift occurred, with more than 50% of the mothers correctly identified the replacement of lost fluids as the main reason for administering ORS/SS.

Understanding the correct measurement and steps required in preparation of ORS or SSS is key to achieving the desired result of ORS or SSS administration. It is worth noting that more than half, equivalent to the majority, identified the standard ORS preparation, one ORS sachet dissolved in 1litre of clean water. In contrast, approximately 1% of respondents could correctly state the standard SSS formula **(**1 litre of water, 1 level teaspoon salt, 1 level teaspoon sugar). Likewise, among the mothers who had recently utilised ORS, more than 50% approaches in preparing ORS/SSS were poor. On the contrary, Terefe et al's (2022:4-6) reported that more than half of the caregivers correctly prepare ORS for their under-five children to prevent dehydration. Encouragingly, following the intervention in the present study, there was a notable improvement in mothers' ability to preparate ORS correctly.

Evidence from several studies supports the use of zinc supplement for 10-14 days alongside with ORS, for reduction of diarrhoea duration (Okafor et al's 2022:2). At preintervention, only one mother indicated that using zinc supplements in combination with ORS/SSS when the youngest child recently had diarrhoea, and none of the mothers were able to state the standard WHO recommended dosage and duration for zinc supplementation. Momoh et al's (2021:6-7) observed that although ORS use was high among mothers in Lagos State, less than 40% administered zinc. Similarly, Udoh et al's (2022:1) reported that only about one-tenth of caregivers gave low osmolality ORS with Zinc tablets as recommended by WHO. However, the present study reveals that the use of zinc supplements improved significantly to an average of 60% at the second post-

intervention among the mothers in Ibogun community, which reflects a positive change following the nurse-led intervention.

Home management of diarrhoea is not complete if caregivers fail to pay close attention to feeding patterns during episodes of diarrhoea. The present study reveals that there was an increase in the percentage of mothers who fed and offered their children food and water during diarrhoea after the one-month follow-up (post-intervention 2) compared with the pre-intervention data, although practices were already moderately encouraging at pre-intervention. In the current study, approximately 70% of the mothers reported serving their children normal quantities of food and water, like any other day. Comparable findings have been reported in Tanzania and Ethiopia, where most mothers increased the rate of feeding, breastfeeding and gave more fluid during diarrhoea episodes (Kheir et al 2021:4; Terefe et al 2022:4-6). In addition, Ashraf et al's (2019:16-17) study noted that about 45% of mothers gave the same amount of fluids to children, about 41% offered more fluids, and only 38% offered more food during diarrhoea. Likewise, Momoh et al (2021:6-7) reported that mothers who increased breast milk, water and food intake were more than those that either reduced or maintained the use of same quantity.

Importantly, the practice level of HMCD among respondents in present study exceeded 90% following the nurse-led interventions. This is consistent with findings from Oji and Okafor's (2020:94) and Said et al's (2024:197) among caregivers/mothers in Emohua and outpatient clinic in Zagazig, Egypt, demonstrating that education helps in enhancing knowledge and practical application. Before the intervention, hands-on practice of HMCD among most of the mothers was quite poor, but it improved significantly post-intervention, highlighting the importance of the nurse-led health education programme.

6.3.4 Socio-demographic factors associated with knowledge, attitude and practice of home management of childhood diarrhoea among mothers with under-five children pre- and post-intervention

Childhood diarrhoea disproportionately affects rural communities with low socio-economic status characterised by low income and limited education (Okafor et al 2022:2; Wolde 2022:2). These factors can influence mothers' knowledge, attitude and practice of HMCD. The study found out that significant number of mothers lacked formal education

and belonged to lower socio-economic backgrounds, which are critical factors in the prevention and management of diarrhoea.

In answering the last research question, “What are the socio-demographic factors associated with knowledge, attitude and practice of HMCD among mothers with under-five children in a rural community in Ogun state, Nigeria pre- and post-intervention?” the findings from Table 4.5 show that, at baseline, mothers’ knowledge of HMCD was significantly associated with age, educational level, and occupation ($p < 0.05$).

It is worth noting that at pre-intervention, mothers below 35 years had good knowledge than those above 35 years. Similarly, mothers with at least tertiary education had higher knowledge levels compared to those with no formal education. In addition, the majority of self-employed respondents exhibited poor knowledge compared to other occupational groups. These patterns may reflect greater exposure to health information, increased health-seeking behaviours, and more frequent interactions with health services, especially during antenatal and immunisation visits. Education emerged as a strong determinant of knowledge in this study, mothers without formal education were more likely to have poor knowledge, whereas those with tertiary education demonstrated the highest levels of knowledge. This finding aligns with extensive literature identifying maternal education as one of the most influential predictors of knowledge and appropriate home management practices of childhood diarrhoea.

However, after the second intervention, no significant association was observed between knowledge and any of the demographic variables ($p > 0.05$). This suggests that the nurse-led educational programme was effective in bridging socio-demographic disparities in knowledge. The reduction of differences across age, education, and occupation categories in mothers’ knowledge post-intervention indicates that the programme produced a levelling effect. This outcome is supported by findings from Oji & Okafor’s (2020) and Oduntan et al’s (2020:7-8), both of whom reported that health education interventions significantly reduced inequities in HMCD knowledge among caregivers. Overall, the results of the present study strengthen the evidence that well-designed, nurse-led educational interventions can effectively overcome socio-demographic barriers, ensuring equitable improvement in knowledge among all groups of mothers, regardless of age, education, or occupational status.

The current study shows that at baseline, educational status, occupation and number of children were significantly associated with mothers' attitude towards HMCD. A significantly higher proportion of individuals with no formal education had negative attitudes. Following the intervention, there was a significant shift, with mothers possessing primary, secondary, and tertiary education demonstrating improved attitudes. Ajayi et al's (2019:37), Momoh et al's (2021:7), and Terefe et al's (2022:5-6) similarly reported that mothers with low or no education tend to have poor attitudes toward ORS use, zinc supplementation, and continued feeding during diarrhoea episodes. Comparable results have been found outside Nigeria, for instance, the study by Gathogo et al's (2020:2451-2453) among caregivers of children below 5 years with diarrhoea in Ngandu community, Kenya, revealed that among the sociodemographic data, only the mother's level of education was significantly associated with mothers' knowledge of HMCD. Likewise, Raiz et al's (2019:135) reported that literate mothers with a minimum of secondary school certificate and within the age group of 22-31 years, had better awareness of ORS than their counterparts. Furthermore, West and Okari's (2023:551) identified age, parity, marital status, mother's level of education, father's level of education and socio-economic status of the family as factors associated with respondents' attitude. While a study conducted in selected private and public hospitals of Peshawar reveals educational status, hospital type and nationality as significant determinants of mothers' attitude towards home management of diarrhoea (Ashraf et al's 2019:17).

Educational attainment enhances exposure to health information and improves mothers' confidence in evidence-based practices, which likely explains the more positive attitudes observed among mothers with formal education in the present study.

Regarding hands-on practice on HMCD, the result of the association between the hands-on practice of HMCD and most sociodemographic characteristics showed no significant relationship at pre-intervention and at both post-intervention 1 and 2. This indicates that the practice of HMCD was unaffected by any of the mothers' sociodemographic status across all time points. However, notable exceptions emerged, necessitating community health nurses' action. Younger mothers (18-24 years old) demonstrated superior HMCD at preintervention compared to older mothers, probably due to their active caregiving roles and direct involvement in childcare. Though the practice of HMCD improved across age groups at post-intervention, this finding suggests that age-specific strategies may be beneficial. Community health nurses should make effort to consider age specific health

education strategies during health education programmes, recognising that younger mothers are highly receptive to health information. In addition, there is a need for more assessment of health literacy disparities among older mothers to ensure equal access to health information.

Furthermore, it was observed that mothers with only one child exhibited better HMCD practices at baseline, possibly due to focused attention and care. It was also noted that mothers who consumed borehole water exhibited good practice of HMCD than other categories, suggesting a basic understanding of diarrhoea prevention and management through accessing safe water. These findings emphasised the need for thorough assessment of mothers' knowledge and HMCD practices, particularly in the context where consumption of unsafe water is prevalent, to inform the development of targeted and effective nurse-led intervention. Meanwhile, several studies support the influence of socio-demographic factors on HMCD practices. For instance, Ndayisaba et al's (2022:6), reported a significant association between HMCD and the age of a child's caretaker in Rwanda. Said et al's (2024:196-197) found that younger age, unemployment, middle/low-income status, non-working, and being of medium or low social class were predicting factors for inappropriate HMCD. Likewise, West and Okari's (2023:547-552) study identified parity and socio-economic status as significant socio-demographic factors influencing mothers' home management. Additionally, a study in India identified that the level of education was significantly associated with HMCD practice (Jagadeesh et al's (2024:327). Other factors contributing to poor home management practices include inadequate knowledge and difficulty in preparing oral rehydration therapy (ORT) (Fufa et al's 2019:6-7).

These variations in the sociodemographic factors across countries demonstrate the diversity that exists and emphasise the importance of understanding local contexts when designing and implementing health education interventions. In the present study, hands-on practice of HMCD among the mothers improved to 100% after the intervention, revealing the importance of health education.

6.4 CONCLUSION

In conclusion, childhood diarrhoea remains a pressing health concern requiring prompt approach upon detection by mothers with under-five children. Fortunately, HMCD is

simple and cost effective, making it essential for mothers to possess adequate knowledge and skills. Health education interventions have consistently shown effectiveness in improving mothers' knowledge, attitude and practice of HMCD as evidenced in Ibogun community. Despite the initial deficiencies in the mothers' knowledge, attitude and practice of HMCD, the nurse-led health education using validated programme and multifaceted strategies such as role-playing and demonstration in a simple language and clear language significantly improved the mother's knowledge, attitude and practice in HMCD.

6.5 RECOMMENDATIONS

The study revealed that mothers exhibited poor knowledge, negative attitudes and inadequate practices regarding HMCD before the health education programme. The significant improvements observed after the nurse-led health education programme highlight the need for sustained, structured, and culturally appropriate health education. Based on these findings, the following recommendations are made.

- To sustain and reinforce the knowledge acquired, nurses should provide continuous HMCD education at every clinic visit to help mothers retain and apply the knowledge gained.
- This health education model used in this study should be scaled up and replicated across other villages in the community and Local Government Areas (LGAs) to maximise community-level impact.
- Health authorities should integrate the nurse-led HMCD programme into the existing community health initiatives to strengthen diarrhoea prevention and management.
- Nurses and other healthcare providers should adopt multifaceted teaching strategies such as demonstrations, role-play, and practical sessions on ORS and zinc administration, including steps in preparing ORS when implementing this programme during health education activity to improve understanding and long-term retention among mothers.
- Healthcare providers, especially nurses, should tailor the health education to mothers' cultural backgrounds and language preferences to enhance comprehension.

- Healthcare managers should facilitate ongoing training for nurses and other healthcare providers to refine their health education skills in delivering effective HMCD education.
- Healthcare authorities, managers, stakeholders and policymakers at local, state, and national levels should adopt the validated nurse-led HMCD education programme for use across various healthcare delivery settings.

6.6 CONTRIBUTIONS OF THE STUDY

The study has contributed significantly to the body of knowledge on HMCD. It has revealed the current knowledge, attitude and practice of HMCD among mothers with under-five. The gaps in this practice of care for under-five children has necessitated the need to develop guidelines that can be utilised by all health care providers, especially nurses in health educating mothers with under-five children on how to care for children at home during the episodes of diarrhoea. The effectiveness of the nurse-led health education intervention programme can be attributed in part to the use of varied teaching methods highlighting the importance of tailored educational strategies. Beyond the use of the guidelines in teaching mothers in health care facilities and communities, it can be used included into curriculum for teaching students on HMCD and can be adopted/adapted for use by future researchers.

6.7 LIMITATIONS OF THE STUDY

The major strength of this study lies in its continuity with the initial research conducted in the same community providing opportunity for further rapport with the people and health education intervention. In addition, the community characteristics make it a suitable setting for this study, providing sociodemographic features typical of rural communities. However, there are also several limitations to the study that must be recognised. Notably:

- Time constraints posed challenges in coordinating the research assistants, and respondents in recruitment and data collection.
- Another limitation of this study is the absence of published data on the exact number of households and women in each village. To address this the researcher and research assistants conducted physical house counting and also collected verbal

information from village representatives. The sample size was evenly distributed across the four villages used for the study, to ensure fairness.

- There are limited recent past studies and literatures on this topic in Nigeria, hindering extensive discussion of the findings. Additionally, limited available literature on some of the study variables restrict comprehensive discussion of findings.
- Another limitation is the potential risk of contamination between the pre-intervention and intervention phase, despite the researcher's efforts to implement the intervention within a two-week timeframe. The contamination might have occurred through social interactions or media exposure thus influencing their knowledge, attitudes or behaviour.
- The study inability to draw causal conclusions due to the absence of a comparator group is another limitation. The findings can only be viewed as evidence of improvement within the cohort over time, rather than proof of effectiveness compared to usual care.
- Another significant limitation is the testing effects inherent in one-group pre-test-post-test study design. Improvements in KAP may partly reflect participants familiarity with the questionnaire following repeated testing

6.8 CONCLUDING REMARKS

This study highlights the effectiveness of the nurse-led health education intervention in improving mothers with under-five children's knowledge, attitude and practice regarding HMCD. This study underscores the importance of a targeted nurse-led intervention in reducing diarrhoea related morbidity and mortality and promoting sustainable behavioural change in developing countries.

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LIST OF ANNEXURES

ANNEXURE A: Ethical clearance from the University of South Africa (UNISA)

UNISA university of south africa

COLLEGE OF HUMAN SCIENCES RESEARCH ETHICS REVIEW COMMITTEE

19 January 2024

NHREC Registration # :
Rec-240816-052
CREC Reference # :
17618622_CREC_CHS_2024

Dear Mrs Olabisi Mary Oluseye

Decision:
Ethics Approval from 19 January 2024 to 19 January 2025

Researcher(s): Name: Mrs. O. M. Oluseye
Contact details: 17618622@mylife.unisa.ac.za
Supervisor(s): Name: Prof. M. G. Makua
Contact details: makuamg@unisa.ac.za

Title: Development of Nurse-led Health Educational Guidelines to improve Home management of Childhood diarrhoea among mothers in Ogun State, Nigeria
Degree Purpose: PhD

Thank you for the application for research ethics clearance by the Unisa College of Human Science Ethics Committee. Ethics approval ***is conditionally granted for one year, subject to ethical approval from the study country's local ethics committee. DATA CANNOT BE COLLECTED UNTIL A FINAL ETHICS CERTIFICATE IS ISSUED BY CREC.***

The ***low-risk application*** *was reviewed by* College of Human Sciences Research Ethics Committee, in compliance with the Unisa Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment.

The proposed research may now commence with the provisions that:

1. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.
2. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the College Ethics Review Committee.

University of South Africa
Preller Street, Muckleneuk Ridge, City of Tshwane
PO Box 392 UNISA 0003 South Africa
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150
www.unisa.ac.za

3. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
4. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the confidentiality of the data, should be reported to the Committee in writing, accompanied by a progress report.
5. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003.
6. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data require additional ethics clearance.
7. No fieldwork activities may continue after the expiry date **(19 January 2025).** Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.

Note:

*The reference number **17618622_CREC_CHS_2024** should be clearly indicated on all forms of communication with the intended research participants, as well as with the Committee.*

Yours sincerely,

Signature: 

Prof. KB Khan
CHS Research Ethics Committee Chairperson
Email: khankb@unisa.ac.za
Tel: (012) 429 8210

Signature: PP

Prof ZZ Nkosi
Exécutive Dean: CHS
E-mail: nkosizz@unisa.ac.za
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ANNEXURE B: Permission letter to conduct the research at Ibogun Community, Ifo LGA Ogun State

Research title:

DEVELOPMENT OF NURSE-LED HEALTH EDUCATIONAL GUIDELINES TO IMPROVE HOME MANAGEMENT OF CHILDHOOD DIARRHOEA AMONG MOTHERS IN OGUN STATE, NIGERIA

Researcher

(OLUSEYE OLABISI MARY)

3rd June 2024

The Chairman
Ifo Local Government Area
Ifo
Ogun State

Dear Hon (Mrs) Kikelomo Aridunnu Delano

I, OLUSEYE Olabisi Mary am doing research with Prof MG Makua, a lecturer/professor in the Department of Health Studies towards a Doctor in Philosophy at the University of South Africa. We are inviting you to participate in a study entitled “Development of Nurse-led Health Educational Guidelines to improve home management of Childhood diarrhoea among mothers in Ogun state, Nigeria”.

The aim of the study is to contribute to the existing body of knowledge on the research topic and also to develop a guideline for local health authorities that can be used in effective home management of childhood diarrhoea in the entire Local Government Area and can as well be adopted by national and international health bodies.

Your Local Government Area has been selected because of the previous research finding of the researcher among the study population on subject matter.

The study is an interventional research study that will entail offering of pre-test questions on the research topic, followed by administration of an intervention in form of health education to the mothers and thereafter carrying out another post-test to assess the impact of the interventional programme.

The major benefit of this study is the guidelines that will be developed which will be useful for community decision makers, local health authorities and decision makers in promoting the health of children under-five.

The research will incur no potential risks to the participants.

Feedback procedure will entail publication of the findings and submission of a copy of the publication to local health authorities.

Yours sincerely

OLUSEYE Olabisi Mary
Principal Researcher

ANNEXURE C: Ethical approval from Ogun State Health Research Ethics Committee

OGUN STATE HEALTH RESEARCH ETHICS COMMITTEE

MINISTRY OF HEALTH, BLOCK A, ROOM A131, OKE-MOSAN, ABEOKUTA.
e.mail: ogunstatehrecdeskofficer@gmail.com, ogunstatehrecchairman@gmail.com.

OUR REF. NO:NHREC/25/01/OGSHREC/23A..... Date: 27/05/2024

YOUR REF. NO: OGHREC/467/223/APP.....

Re: 'IMPACT OF HEALTH EDUCATIONAL GUIDELINES TO IMPROVE THE PRACTICE OF HOME MANAGEMENT OF CHILDHOOD DIARRHOEA AMONG MOTHERS IN OGUN STATE, NIGERIA.".

Name of Principal Investigator: Mrs. Oluseye Olabisi Mary
Email: oluseye.mary@gmail.com
Tel: 08052079518

NOTICE OF ETHICAL APPROVAL.

This is to inform you that the Ogun State Health Research Ethics Committee has approved your research protocol and other attached materials after the necessary review and corrections.

The National Code for Health Research Ethics requires that you comply with all institutional guidelines, rules and regulations and with the tenets of the code. All informed consent forms and questionnaire must carry the assigned OGHREC number. Changes to the research are not permitted without the prior approval by the Committee.

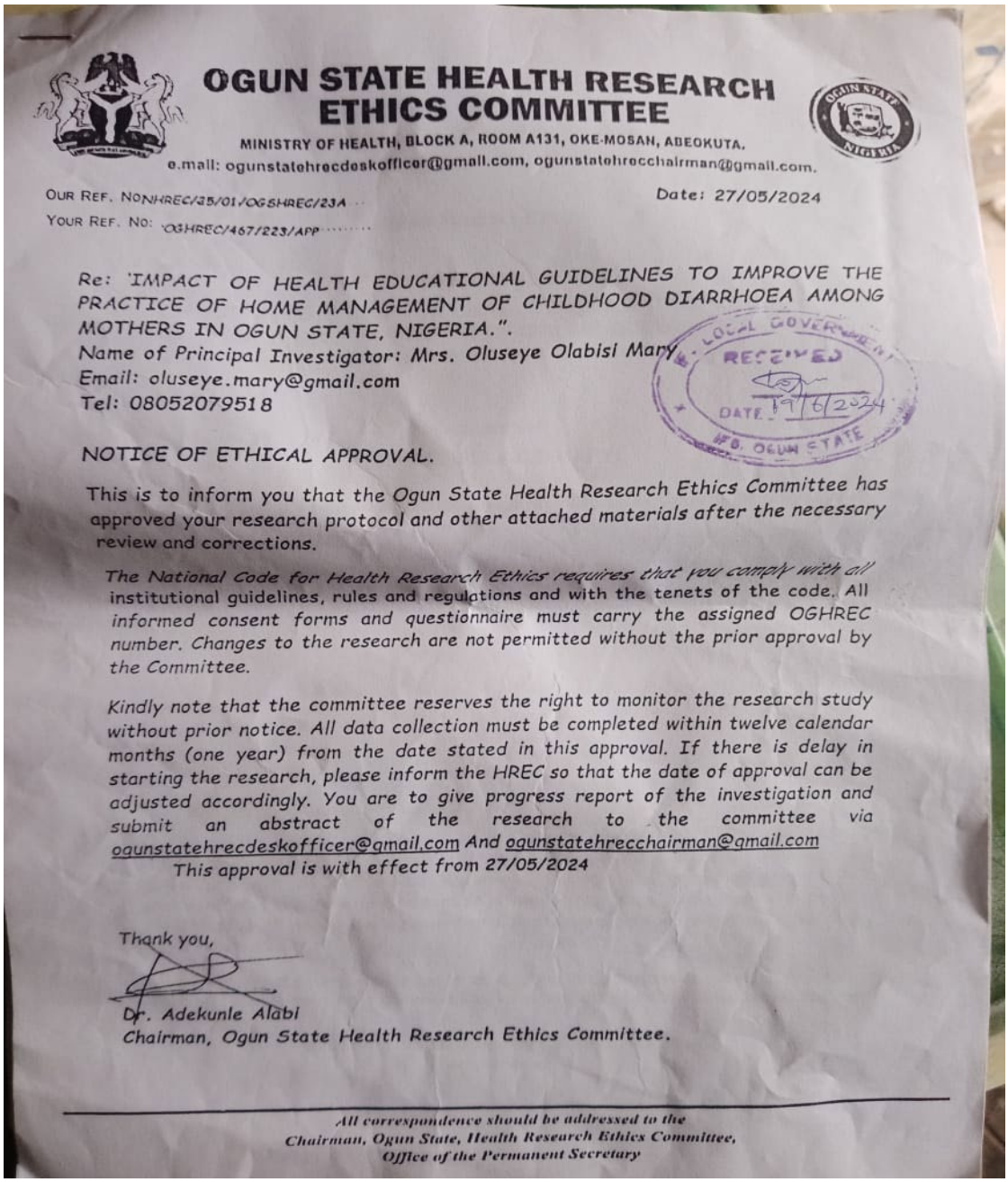
Kindly note that the committee reserves the right to monitor the research study without prior notice. All data collection must be completed within twelve calendar months (one year) from the date stated in this approval. If there is delay in starting the research, please inform the HREC so that the date of approval can be adjusted accordingly. You are to give progress report of the investigation and submit an abstract of the research to the committee via ogunstatehrecdeskofficer@gmail.com And ogunstatehrecchairman@gmail.com

This approval is with effect from 27/05/2024

Thank you,

Dr. Adekunle Alabi
Chairman, Ogun State Health Research Ethics Committee.

ANNEXURE D: Approved/stamped permission letter to conduct research



OGUN STATE HEALTH RESEARCH ETHICS COMMITTEE

MINISTRY OF HEALTH, BLOCK A, ROOM A131, OKE-MOSAN, ABEOKUTA.
e.mail: ogunstatehrecdeskofficer@gmail.com, ogunstatehrecchairman@gmail.com.

OUR REF. NO: NHREC/35/01/OGSHREC/23A
YOUR REF. NO: OGHREC/467/223/APP

Date: 27/05/2024

Re: 'IMPACT OF HEALTH EDUCATIONAL GUIDELINES TO IMPROVE THE PRACTICE OF HOME MANAGEMENT OF CHILDHOOD DIARRHOEA AMONG MOTHERS IN OGUN STATE, NIGERIA.".
Name of Principal Investigator: Mrs. Oluseye Olabisi Mary
Email: oluseye.mary@gmail.com
Tel: 08052079518

LOCAL GOVERNMENT RECEIVED DATE 19/6/2024 M.O. OGUN STATE

NOTICE OF ETHICAL APPROVAL.

This is to inform you that the Ogun State Health Research Ethics Committee has approved your research protocol and other attached materials after the necessary review and corrections.

The National Code for Health Research Ethics requires that you comply with all institutional guidelines, rules and regulations and with the tenets of the code. All informed consent forms and questionnaire must carry the assigned OGHREC number. Changes to the research are not permitted without the prior approval by the Committee.

Kindly note that the committee reserves the right to monitor the research study without prior notice. All data collection must be completed within twelve calendar months (one year) from the date stated in this approval. If there is delay in starting the research, please inform the HREC so that the date of approval can be adjusted accordingly. You are to give progress report of the investigation and submit an abstract of the research to the committee via ogunstatehrecdeskofficer@gmail.com And ogunstatehrecchairman@gmail.com

This approval is with effect from 27/05/2024

Thank you,

Dr. Adekunle Alabi
Chairman, Ogun State Health Research Ethics Committee.

All correspondence should be addressed to the Chairman, Ogun State, Health Research Ethics Committee, Office of the Permanent Secretary

ANNEXURE E: Researcher acknowledgement form

RESEARCHER ACKNOWLEDGEMENT

Research title

DEVELOPMENT OF NURSE-LED HEALTH EDUCATIONAL GUIDELINES TO IMPROVE HOME MANAGEMENT OF CHILDHOOD DIARRHOEA AMONG MOTHERS IN OGUN STATE, NIGERIA

Researcher

(OLUSEYE OLABISI MARY)

Hereby, I OLUSEYE Olabisi Mary,ID number 17618622, in my personal capacity as a researcher, acknowledge that I am aware of and familiar with the stipulations and contents of the:

- Unisa Research Policy
- Unisa Ethics Policy
- Unisa IP Policy

and that I shall conform to and abide by these policy requirements.

Signature: 

Date: 12/11/2022

ANNEXURE F: Request to participate in the study

(English version)

Research title

DEVELOPMENT OF NURSE-LED HEALTH EDUCATIONAL GUIDELINES TO IMPROVE HOME MANAGEMENT OF CHILDHOOD DIARRHOEA AMONG MOTHERS IN OGUN STATE, NIGERIA

Researcher:

(OLUSEYE OLABISI MARY)

Ethics clearance reference number: CREC:176186_CREC_CHS_2024
State clearance reference number: OGHREC/467/223/APP

20 June 2024.

Dear Prospective Participant

My name is Oluseye Olabisi Mary and I am doing a research study with Prof Prof MG Makua, a professor in the Department of health studies towards a Doctor of Philosophy at the University of South Africa. We are inviting you to participate in a study entitled "**Development of Nurse-led health educational guidelines to improve home management of Childhood diarrhoea among Mothers in Ogun state, Nigeria".**

WHAT IS THE PURPOSE OF THE STUDY?

This study is expected to collect important information that could contribute to the existing body of knowledge on the research topic. Also, to improve mothers with under-five children knowledge, attitude and practice of childhood diarrhoea home **management through well-designed nurse-led health educational guidelines**. This health educational guidelines can be adopted by local, state and national health bodies for the home management of childhood diarrhoea.

WHY AM I BEING INVITED TO PARTICIPATE?

You are chosen for this research because you live in this study setting (community). Similar study has been done on this study some years back and findings reveals some gaps which this present study aims to bridge.

WHAT IS THE NATURE OF MY PARTICIPATION IN THIS STUDY?

The study involves filling of questionnaires and participating in health education intervention sessions. The questionnaire contains four sections, Section A – socio-demographic data, Section B – questions on knowledge on home management of childhood diarrhoea, Section C – questions on attitudes of mothers towards home management of childhood diarrhoea and Section D – questions on practice of home management of childhood diarrhoea. Answering the questions will not take more than 20 minutes.**The intervention sessions will be conducted on two Saturdays consecutively and it will not take more than an hour for each module**.

CAN I WITHDRAW FROM THIS STUDY EVEN AFTER HAVING AGREED TO PARTICIPATE?

Participating in this study is voluntary and you are under no obligation to consent to participation. There is no penalty for not participating. If you do decide to take part, you will be given this information sheet to keep and be asked to sign a written consent form. Writing of names or any means of identification will not be required. You are free to withdraw at any time and without giving a reason. There is no negative consequence for withdrawing from participating. It will not be possible to withdraw from the study once questionnaire have been submitted.

WHAT ARE THE POTENTIAL BENEFITS OF TAKING PART IN THIS STUDY?

This study will help in improving your knowledge on the topic and also will improve your practice of home management of childhood diarrhoea home management. The developed guidelines will be useful for local health care system authority in providing health education to mothers in your local government area.

ARE THEIR ANY NEGATIVE CONSEQUENCES FOR ME IF I PARTICIPATE IN THE RESEARCH PROJECT?

Participating in this study will not in any way cause you any harm. You will only be inconvenient by taking 20 minutes – 60 minutes out of your time during course of participating in the research.

WILL THE INFORMATION THAT I CONVEY TO THE RESEARCHER AND MY IDENTITY BE KEPT CONFIDENTIAL?

All information will be kept confidential. It is only the identified members of the research team that will have access to the information collected in this research. Writing of names will not be required. Your answers will be given a code number that you will be referred to in the data collected, any publications, or other research reporting methods such as conference proceedings. This data will remain anonymous all through the research and in other purposes such as a research report, journal articles and/or conference proceedings. A report of the study may be submitted for publication, but individual participants will not be identifiable in such a report.

HOW WILL THE RESEARCHER(S) PROTECT THE SECURITY OF DATA?

Hard copies of your answers will be stored by the researcher for a minimum period of five years in a locked cupboard/filing cabinet at researcher home for future research or academic purposes; electronic information will be stored on a password protected computer. Future use of the stored data will be subject to further Research Ethics Review and approval if applicable. On completion of the research process, all hard copies related to study will be shredded and/or electronic copies will be permanently deleted from the hard drive of the computer through the use of a relevant software programme.

WILL I RECEIVE PAYMENT OR ANY INCENTIVES FOR PARTICIPATING IN THIS STUDY?

Participant will be given ORS and Zinc supplement as a form of incentives for participating in the study and also be served refreshment during the intervention session.

HAS THE STUDY RECEIVED ETHICS APPROVAL

This study has received written approval from the College Research Committee (CREC), College of Human Sciences, University of South Africa (UNISA). A copy of the approval letter can be obtained from the researcher if you so wish.

HOW WILL I BE INFORMED OF THE FINDINGS/RESULTS OF THE RESEARCH?

If you would like to be informed of the final research findings, please contact Oluseye Olabisi Mary on 08052079518 or olubim4real@yahoo.com. The findings are accessible for period of five years.

Should you require any further information or want to contact the researcher about any aspect of this study, please contact <Oluseye Olabisi Mary, olubim4real@yahoo.com, +2348052079518 >.

Should you have concerns about the way in which the research has been conducted, you may contact < Prof. MG Makua, +27723726573>. Contact the research ethics chairperson of the <insert name of the committee, the name of the research ethics chairperson and contact details here, including email, internal phone number and fax number> if you have any ethical concerns.

Thank you for taking time to read this information sheet and for participating in this study.

Thank you.

OLUSEYE Olabisi Mary

(Yoruba version)

EBE LATI KO PA NINU ETO ẸKỌ IWADI

Akọle Eto Ẹkọ Iwadi

SÍ SE ÀGBÉKALẸ̀ ÌLÀNÀ ÈTÒ ẸKỌ́ ILÉRÁ TÍ ÀWỌN ÓLÙTỌ́JÚ NỌ́ỌSÌ SE ADARÍ RẸ̀ LÁTI MÚ ÌLỌSÍWÁJÚ BÁ BÍ ÀWỌN ÌYÁ ỌLỌ́MỌ SE MA ÚN SE ÌTỌ́JÚ ÌGBẸ́-GBURU LÁÀRIN ÀWỌN ỌMỌDÉ NÍNÚ ILÉGBIGBÈÉ NÍ ÌPÍNLẸ̀ ÒGÙN, ORÍLÈ ÈDÈ NIGERIA

Oluwadi:
OLUSEYE OLABISI MARY

Ethics clearance reference number: CREC:176186_CREC_CHS_2024
State clearance reference number: OGHREC/467/223/APP

20th June, 2024.

Olukopa mi Ọwọn

Orukọ mi ni Oluseye Ọlabisi Mary, mo n se eto ẹkọ iwadi peḷu Professor Sheila Mokoboto-Zwane ti o jẹ Ọjọgbọn ni ẹka ti o n kọ nipa eto Ilera ti yi o fun mi ni anfani lati gba iwe ẹri giga ni ile ẹko giga ni ilu South Africa. A pe ọ lati kopa ninu eto eko iwadi ti akori re n je **Sí Se Ìdásílẹ̀ Ìlànà Èto Ẹ̀kó Ilérá Tí Àwọn Ólùtọ́jú Nọ́ọ̀sì Se Adarí Rẹ̀ Láti Mú Ilosiwaju Bá Bí Àwọn Ìyá Ọlọ́mọ Se Ma Ún Se Ìtọ́jú Ìgbẹ́-Gburu Láàrin Àwọn Ọmọdé Nínú Ilé gbèé Ní Ìpínlẹ̀ Ògùn, Orílè Èdè Nigeria.**

PATAKI ETO EKỌ IWADI YI:

Eto ẹkọ iwadi yi yio se akọsilẹ awọn koko ọrọ ti yi o mu igbega ba imọn ijinlẹ nipa akọle iwadi yi.

Lati mun ayipada rere ba imọn, iwuwasi ati ise awọn iya ti ọjọ ori awọn ọmọ ko ti pe ọdun marun lo ri itọju igbẹ-gburu ti o ma n yọ ọmọde lẹnu pelu agbekalẹ ilana eto ekọ ni pa ilera ti o munadoko ti awọn olutọju nọọsi se adari rẹ.

Gbogbo ijọba ibilẹ, ipinlẹ ati gbogbo ẹka ti o n ri si eto ilera ni orilẹ ede ni yi o se amulo ilana eto ẹkọ ilera yi fun sise itọju igbẹ-gburu ti o ma n yọ ọmọde lẹnu.

KI NI IDI TI AFI PE MI LATI KOPA?

A pe ọ lati kopa ninu eto ẹkọ iwadi yi ni to ripe oun gbe ni agbegbe ti a yan fun eto ẹkọ iwadi yi. Agbekalẹ iwadi yi wa lati se atunse ati igbelaruge fun awon eyi ti won ti se la ti ẹyin wa.

KI NI IPA TI MA A KO NINU IWADI YI?

Eto ekọ iwadi yi ni se pẹlu di dahun awọn ibere ti ati se akọsilẹ wọn, ati ki kopa ninu eto idanilẹkọ lori eto ilera ti a o se agbekalẹ rẹ.

Awọn ibere ti a ti se akọsilẹ wọn jẹ abala mẹrin lapapo, Abala A – Ibere ni pa olukopa, Abala B – Ibere lo ri imo olukopa ni pa bi a se n se itọju igbẹ-gburu ti o ma n yọ awọn ọmọde lẹnu ni ile, Abala C – Ibere lo ri igbagbọ olukopa ni pa bi a se n se itọju igbẹ-gburu ti o ma n yọ awọn ọmọde lẹnu ni ile, Abala D – Ibere ti o da lo ri iwuwasi ati ise olukopa ni pa bi a se n se itọju igbẹ-gburu ti o ma n yọ awọn ọmọde lẹnu ni ile. Didahun awọn gbogbo awọn ibere yi ko ni gba ju ogun iseju lọ. Eto idanilẹkọ ko ni gba ju wakati kan lọ

SE MO LE KỌ LATI MA TẸSIWAJU PẸLU IWADI YI LẸYIN TI MO TI GBA LATI KOPA?

Kikopa ninu eto ẹkọ iwadi yi jẹ atinuwa, a ko fi ipa mu ẹnikẹni. Ko si ijiya fun ẹniti o kọ lati kopa. Ti o ba gba lati ko pa, a o fun ọ ni iwe alaye yi lati fi pamọn, o si ni lati buwọlu iwe akọsilẹ pe alaye ni pa eto ẹkọ iwadi yi ye ọ yekeyeke, o si gba lati kopa. Ko si akọsilẹ orukọ olukopa tabi ohun idanimọ kankan ti o tọka si olukopa. O ni anfani lati ma tẹsiwaju pẹlu eto ẹkọ iwadi yi lai salaye. Ko si si ijiya kankan. Ko ni se e se lati ma kopa mọn lẹyin ti o ba ti dahun gbogbo awọn ibere akọsilẹ fun eto ẹkọ iwadi yi.

KINI AWỌN ANFANI TO WA NINU KIKOPA NINU ETO ẸKỌ IWADI YI?

Eto eko iwadi yi yio mu agbega ba imo re lori akori yi, yi o si je sise itoju igbe-gburu ti o ma n yo awon omode lenu ni ile rorun fun o. Ilana ti a ba gbekale yi o wulo fun awon

alakoso eto ilera alabode lati se idanileko lori eto ilera ti o munandoko fun awon iya olomo ni ijoba ibile re.

SE IJAMBA KANKAN WA FUN MI TI MO BA KOPA NINU ETO ẸKỌ IWADI YI?

Kikopa ninu eto ẹkọ iwadi yi ko ni fa ijamba kankan fun ọ. A o kan gba akoko rẹ fun bi ogun iseju si wakati kan fun eto ẹkọ iwadi yi.

SE ETI MIRAN KO NI GBỌ NIPA GBOGBO IDAHUN MI TI OLUWADI KỌSILẸ?

Gbogbo idahun ni yi o wa ni ipamọ. Awọn akẹgbẹ ti oluwadi jọ n sise po lori eto ẹkọ iwadi yi nikan ni yio ni anfani si awọn idahun ti a kọsilẹ. Orukọ olukopa ko ni je kikọ silẹ. Gbogbo idahun rẹ ni a o so di ami ti a o lo fun idanimo lori gbogbo atẹjade abajade iwadi yi. Gbogbo idahun ni ko ni orukọ olukopa lati da wọn mọ fun gbogbo eto ẹkọ iwadi yi ati fun abajade iwadi, atẹjade abi apejọpọ awọn ọjọgbọn.

BAWO NI OLUWADI YI O SE SE IPAMỌ GBOGBO IDAHUN?

Oluwadi yi o fi gbogbo iwe ibere akọsile ti a ti dahun pamọ si inu apoti ni ile rẹ fun odun marun nitoripe o le wulo fun eto ẹkọ iwadi miran ni ọjọ iwaju. Gbogbo idahun ti a si gba si ori ẹrọ ayarabiasa kọmputa ni oluwadi yi o fi pamọ daada pẹlu agadagodo oroigbaniwole. Oluwadi yi o gba ase lọwọ Ajọ ti o n ri si ayẹwo ati ifọwọsi ise eto ẹkọ iwadi ki o to le lo abayọri iwadi yi fun eto ẹkọ iwadi miran ni ọjọ iwaju. Gbogbo iwe ibere akọsilẹ ti olukopa dahun ni oluwadi yi o fa ya ati gbogbo eyiti o wa lori ẹrọ ayarabiasa kọmputa ni yi o pa rẹ patapata lẹyin ti eto ẹkọ yi ba ti pa ri.

SE MA A GBA ẸBUN OWO ABI NKAN MI TI MO BA KOPA NINU ETO ẸKỌ IWADI YI?

Gbogbo akopa ni yi o gba omi-iye (ORS) ati ogun Zinc lọ fẹ, ipanu yi o si wa fun gbogbo akopa ni akoko asayan idanilẹkọ.

SE ETO ẸKỌ IWADI YI GBA IWE ASẸ TO TỌ?

Iwe aseṣ ti o fọwọ si eto ẹkọ iwadi yi wa lati ọwọ ajọ ti o n ri si ayẹwo ati ifọwọsi iseṣ eto ẹkọ iwadi ti ile eko giga Orile ede South Africa. O le bere fun ẹda iwe aseṣ yi lọwọ oluwadi ti o ba wu ọ.

BA WO NI OLUWADI YI O SE FI ABAJADE ETO ẸKỌ IWADI YI TO MI LETI?

Pe Oluseyẹ Olabisi Mary si ori ẹrọ ibanisọrọ 08052079518 tabi fi ateṣjiseṣ ranseṣ si olubim4real@yahoo.com ti o ba ni feṣ si lati mọn abajade eto ẹkọ iwadi yi. Abajade iwadi yi yio wa fun kika fun ọdun meṭa. Ti o ba ni ibere abi o ni lo alaye lo ri eto ẹkọ iwadi yi, pe 08052079518 tabi fi ateṣjiseṣ ranseṣ si olubim4real@yahoo.com.

Ti ohun ko ohun ba ru ọ lo ju ni pa agbekalẹ eto ẹkọ iwadi yi, pe Professor MG Makua si ori ẹrọ ibaraẹnisọrọ yi +27723726573. O si le kan si alaga ajọ ti o n ri si ayẹwo ati ifọwọsi iseṣ eto ẹkọ iwadi (name of research ethics chairperson) lori ẹrọ ibaraẹnisọrọ (Phone number), ta bi ki o fi ateṣjiseṣ ran si (email address).

. O se pupo fun akoko rẹ ati ifarabalẹ lati ka iwe alaye yi, ati ki kopa ninu eto ẹkọ iwadi yi.

Mo dupe.

OLUSEYE Olabisi Mary

ANNEXURE G: Consent to participate in the study

(English version)

CONSENT TO PARTICIPATE IN THIS STUDY

Research title

DEVELOPMENT OF NURSE-LED HEALTH EDUCATIONAL GUIDELINES TO IMPROVE HOME MANAGEMENT OF CHILDHOOD DIARRHOEA AMONG MOTHERS IN OGUN STATE, NIGERIA

Researcher

OLUSEYE OLABISI MARY

I, _____ (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the questionnaire.

I have received a signed copy of the informed consent agreement.

Participant's name and surname: ……..

Participant's signature: …….. Date: ……

Researcher's name and surname: Olabisi M Oluseye

Researcher's signature  Date: 20th June 2024

(Yoruba version)

IFOWOSI LATI LOWO NINU IWAD IYI

Akori iwadi:
SÍ SE ÀGBÉKALẸ̀ ÌLÀNÀ ÈTÒ ẸKỌ́ ILÉRÁ TÍ ÀWỌN ÓLÙTỌ́JÚ NỌ́ỌSÌ SE ADARÍ RẸ̀ LÁTI MÚ ÌLỌSÍWÁJÚ BÁ BÍ ÀWỌN ÌYÁ ỌLỌ́MỌ SE MA ÚN SE ÌTỌ́JÚ ÌGBẸ́-GBURU LÁÀRIN ÀWỌN ỌMỌDÉ NÍNÚ ILÉGBÈÉ NÍ ÌPÍNLẸ̀ ÒGÙN, ORÍLÈ ÈDÈ NIGERIA

Oluwadi:
OLUSEYE OLABISI MARY

Emi ……(oruko eniti o lowo si) mo ri daju pe eni ti o nwa ifowosi mi ninu iwadi yii so fun mi nipa iseda, igbese, anfaani ti o n waye ati idiwo ti o le waye lasiko iwadi.

Mo ti ka (o tun ti se alaye fun mi) ati pe o ye mi yeke bi ati se se alaye ninu iwe alaye naa.

Mo ti ni anfaani tooto lati beere awon ibeere ati pe mo setan lati kopa ninu iwadi naa.

A je ko ye mi pe ikopa mi ninu iwadi yi je ti mo ba fe, mo si le yo ara mi kuro nigbat ti o ba wu mi laisi ijiya kankan.

A je ko ye mi pe iwadi yi yoo tesiwaju si abayori imo ijinle, iwe iroyin ati/tabi fun itesiwaju awon ipade awon onimo ijinle, sugbon gbogbo ikopa mi yoo je ipamo a fi ti o b a nilo.

Mo faramo akosile awon ibeere ninu iwadi yi.

Mo si ti gba iwe akosile eyi ti a ti fi fowosi.

Oruko olukopa: ……..

Fifo owo si Olukopa: …… Date: ……

Oruko oluwadi:- Olabisi M. Oluseye

Fifo owo si Oluwadi:  Date…20th June 2024

ANNEXURE H: QUESTIONNAIRE

(English version)

QUESTIONNAIRE

DEVELOPMENT OF NURSE-LED HEALTH EDUCATIONAL GUIDELINES TO IMPROVE HOME MANAGEMENT OF CHILDHOOD DIARRHOEA AMONG MOTHERS IN OGUN STATE, NIGERIA

Dear Participant

This study is aimed to develop health educational guidelines to improve mothers' home management of childhood diarrhoea (frequent watery stooling) in Ogun State, Nigeria. The questionnaire will assess the knowledge, attitude and practice of home management of childhood diarrhoea (frequent watery stooling) among mothers. The findings will help provide mothers with information on how to manage childhood diarrhoea (frequent watery stooling) at home. This information will be useful for health professionals to intervene appropriately and contribute effectively towards the reduction of childhood diarrhoea (frequent watery stooling) morbidity and mortality. Please note that your name is not required and that all the information supplied will be treated strictly confidential. Please endeavour to fill the form.

Thank you

Mrs Oluseye OM
Department of Health Studies
University of South Africa
08052079518

College Research Committee (CREC), College of Human Sciences, University of South Africa (UNISA) (17618622_CREC_CHS_2024)

Ogun State Health Research Ethics Committee, Ogun State, Nigeria (OGHREC/467/223/APP)

Please kindly tick either YES ( ) or NO ( ) if you are willing to participate in the study

SECTION A: SOCIO DEMOGRAPHIC DATA

1. Age: [ ] years
2. Marital status: Single [ ] Married [ ] Separated/ Divorce [ ] Widow [ ]
3. Educational level: No Formal education [ ] Primary education [ ] Secondary education [ ] Tertiary [ ]
4. Religion: Christianity [ ] Islam [ ] African traditional religion [ ] Others……..
5. Tribe:…….
6. Occupation……..
7. Estimated income per month…….
8. Number of children……
9. Number of children under-five years……..
10. How old is your youngest child (in months)……
11. What is your source of drinking water: Stream [ ] Public well [ ] Personal well [ ] Borehole [ ]

SECTION B: KNOWLEDGE ON HOME MANAGEMENT OF DIARRHOEA (FREQUENT WATERY STOOLING)

Please indicate Yes or No in front of the following questions on the use of Oral Rehydration Solution popularly known as ORS and Salt Sugar Solution (SSS)

Knowledge on benefits of ORS or SSS (Salt, Sugar Solution)

12. Can ORS or SSS be used in stopping frequent watery stooling?
13. Can ORS or SSS replace water lost from the child's body?

Knowledge on the use of ORS or SSS (Salt, Sugar Solution)

14. Is ORS or SSS simple to prepare?
15. Is ORS or SSS the first thing to give a child with frequent watery stooling?
16. Can ORS or SSS be used more than 24 hours after preparation?
17. Can someone give ORS or SSS to a child who is having frequent water stooling without being told to do so by health care providers?
18. Should ORS or SSS be given only if a child is weak?

19. Should ORS or SSS be stopped completely once a child vomits when serving it?
20. Should ORS or SSS be given only when a child who is having frequent water stooling requests for it?
21. ORS or SSS should be given in small amounts to children with frequent water stools at small intervals
22. The age of a child will determine the amount of ORS or SSS to give
23. If a child vomits when serving such with ORS/SSS, one should wait for some minutes before recommencing.

Knowledge on how to prepare ORS or SSS (Salt, Sugar Solution)

Please indicate Yes or No in front of the following questions and fill in the available spaces

24. Do you know how to prepare ORS or SSS
    The following are needed to prepare ORS/SSS
25. Cleaned bowl, cup and spoon
26. Sterilised or boiled water or sealed bottle water of ……..litres
27. ……..……sachet of ORS
28. One can also use ……..table spoon(s) of sugar together with…….table spoon(s) of salt for SSS

Knowledge on other aspects of home management of diarrhoea (frequent watery stooling)

29. Is there any other drugs to use together with ORS/SSS for a child with frequent water stooling?
30. Please state examples of such drugs …….
31. For how many days can we give a child with frequent water stooling Zinc tablet ……..
32. Is it good to continue feeding a child during frequent water stooling?
33. Is it good to continue breastfeeding a child during frequent water stooling?
34. Is it good to give water or increase it when a child has frequent water stooling?

SECTION C: ATTITUDE TOWARDS HOME MANAGEMENT OF CHILDHOOD DIARRHOEA (FREQUENT WATERY STOOLING)

Please tick the option you consider appropriate

35. ORS or SSS is not all that effective in treating frequent water stooling
    Strongly Agreed [ ], Agreed [ ], Undecided [ ], Disagreed [ ], Strongly Disagreed [ ]
36. It is not all cases of frequent water stooling that requires ORS or SS
    Strongly Agreed [ ], Agreed [ ], Undecided [ ], Disagreed [ ], Strongly Disagreed [ ]
37. Apart from a tablet called zinc, some other important drugs can be given to a child with frequent water stooling
    Strongly Agreed [ ], Agreed [ ], Undecided [ ], Disagreed [ ], Strongly Disagreed [ ]
38. Childhood frequent water stooling is best treated with natural herbs
    Strongly Agreed [ ], Agreed [ ], Undecided [ ], Disagreed [ ], Strongly Disagreed [ ]
39. There is a need to combine some drugs with ORS or SSS in childhood frequent water stooling
    Strongly Agreed [ ], Agreed [ ], Undecided [ ], Disagreed [ ], Strongly Disagreed [ ]
40. ORS or SSS is not all that important in the treatment of frequent water stooling in children
    Strongly Agreed [ ], Agreed [ ], Undecided [ ], Disagreed [ ], Strongly Disagreed [ ]
41. Feeding or breast feeding a child in frequent water stooling is optional
    Strongly Agreed [ ], Agreed [ ], Undecided [ ], Disagreed [ ], Strongly Disagreed [ ]
42. Feeding or breast feeding a child with frequent water stooling will increase it
    Strongly Agreed [ ], Agreed [ ], Undecided [ ], Disagreed [ ], Strongly Disagreed [ ]

SECTION D: PRACTICE OF DIARRHOEA (FREQUENT WATERY STOOLING) HOME MANAGEMENT

(Note, the first question is the leading question to the remaining questions)

43. Did any of your children under the age of five years have frequent water stooling recently? Yes [ ] No [ ]
44. If Yes what did you do first?
    (a) I treated the child at home with ORS
    (b) I took the child to the health centre
    (c) I went to buy drugs from a chemist
    (d) Others (specify.....
45. Did you give the child ORS/SSS? (a) Yes (b) No
46. If YES to question 45, When did you give it?
    (a) Onset of frequent watery stooling Yes [ ] No [ ]
    (b) A day after frequent watery stooling started Yes [ ] No [ ]
    (c) After prescription by health care worker Yes [ ] No [ ]
    (d) Others(specify.....
47. Why did you give the child ORS/SSS?
    …….
    ……..
48. If NO, to question 45 Why?.....……
    ……
49. Write the measurement you used in preparing ORS/SSS
    a……..litre(s) of water and……. sachet of ORS
    b……..litre(s) of water,……teaspoons of sugar……teaspoon(s)of salt
50. List the steps you took in preparing the ORS/SSS
    …….
    …….
    …….
    ……..
51. Did you give zinc tablets alongside ORS/SSS? (a) Yes (b) No
52. If YES, for how many days did you give the zinc tablets to the child……
53. How many of the tablet(s) of zinc did you give the child?.....

54. If you did not give the child zinc tablets, Why?

    .....

55. Did the child improve with the treatment you gave at home? (a) Yes (b) No

    If YES, go to Question 57

56. If No, what did you do thereafter?

    (a.) Nothing (b.) Took the child to the traditional birth attendant (c.) Took the child to the health centre (d.) Took the child to the chemist (e.) Bought more drugs, state the drugs……(f.) Others (Please specify.....).

57. Did you stop feeding the child during the frequent water stooling?

    (a) Yes (b) No

58. If Yes, why? .....……

    ……..

59. If the child is still breastfeeding, did you breastfeed the child during the frequent watery stooling?

    (a) Yes (b) NO

    If Yes, go to Question 61

60. If No, Why? .....……

    …….

61. Did you give more water than usual during the episode of frequent watery stooling?

    (a) Yes (b) No

THANK YOU FOR YOUR RESPONSES

(Yoruba version)

TRANSLATED VERSION

QUESTIONNAIRE

Olukopa owon, a gbe eto iwadi yi kale lati le se agbekale ilana eto eko ilera ti awon olutoju noosi adari re lati mu ilosiwaju ba bi awon iya lomo se ma un se itoju igbe-gbuuru larin awon omode ninu ile ni ipinle Ogun, Orilede Nigeria. Awon ibeere yi, wa lati se iwadi imo, isesi ati bi awon iyalomo se nse itoju igbe gbuuru ninu awon omo. Esi iwadi yi, a fun awon iyalomo ni imo lori bi a se le se itoju igbe gbuuru ni ile. Esi yi yoo wulo fun awon akose mose eleto ilera lati le gbe ise ti oto lati le sadinku iku awon omode. Ejowo e fun wa ni idahun ti o to lati le fihan pe eni asepo pelu wa ninu iwadi yi. Awon idahun ti e ba fun wa yoo wa laarin awa ati yin, a ko ni gba oruko yii sile. Gbogbo esi ti a ba gba yio je ni asiri laarin wa ati eyin. Ejowo e fi idahun ti o ye si aye ti a pese si isale yii.

E se pupo.
Mrs Oluseye OM
Department of Health Studies
University of South Africa
08052079518

College Research Committee (CREC), College of Human Sciences, University of South Africa (UNISA) (17618622_CREC_CHS_2024)
Ogun State Health Research Ethics Committee, Ogun State, Nigeria (OGHREC/467/223/APP)

E jowo, ese ami si iwaju Beeni tabi Beeko ti e ba setan lati kopa ninu iwadi yii.

IPIN KINNI: SOCIO DEMOGRAHIC DATA

1. E jowo e to omo odun melo ( )
2. Kini ipo lokolaya yin: Koloko tabi laya ( ) loko tabi gbeyawo ( ) Oko ati Iyawo wa lotooto ( ) fi oko sile ( )

3. Iwe melo le ka? Ko kawe ( ) Iwe alakobere ( ) iwe mewa ( ) ile eko giga ( )
4. Esin: Kristieni [ ] Musulumi [ ] Esin abalaye [ ] Omiran…….
5. Eya ……..
6. Iru ise wo ni e nse?.....
7. Elo ni owo ti o nwole fun yin losu…….
8. E jowo omo melo lolorun fi tayin lore……
9. Melo ninu won ni ko to omo odun marun ……
10. Omo odun melo ni omo yin ti o kereju? ……..
11. Nibo ni e ti n pon omi mimu ati eyi ti e fi n dana? odo ( ) kanga gbogbogbo ( ) kanga inu ile ( ) Kanga igbalode ( )

IPIN KEJI: IMO BI A SELE SE ITOJU IGBE GBUURU NI ILE

Ejowo da hun beeni, beeko, tabi n ko mo si iwaju awon gbolohun wonyi.

Imo lori anfani ORS or SSS

12. Se ORS or SSS da igbe gbuuru duro ( )
13. ORS or SSS ma nda omi ara ti o ti padanu ati eroja ara ti a ti padanu pada ( )

Imo lro bi a nse lo ORS or SSS

14. Nje o mo bi a nse lo ORS or SSS
15. A gbodo bere lilo ORS tabi SSS kete ti omo ba bere si ni ya igbe gbuuru ( )
16. A gbodo lo ORS or SSS ni tan larin wakati merinlelogun ti aba pese re ( )
17. Ase lati lo ORS or SSS gbodo wa lati odo dokita ki ato le lo fun omo ti o ba ni igbe gburu ( )
18. Lilo ORS or SSS fun omo to n ya igbe gbuuru gbodo je ti o ba re irufe omo be ( )
19. Lilo ORS or SSS fun omo to n ya igbe gbuuru gbodo je ti omo n bi ( )
20. A lilo lati duro ki omo beere fun ORS or SSS ki a to fun
21. O ye ka fun awon omode ki a ma fun omo ti o ya igbe gbuuru ni ORS/SSS die die lera lera ( )
22. Ojo ori omo ni o mo so eye ORS or SSS ti a ma fun irufe omo be ( )
23. A ni lati duro fun igba die ti omo ba bi nigba ti a ba fun ni ORS or SSS ki a to fun ni omiran ( )

Imo bi a se npese ORS or SSS

Jowo fi idahun si awon ibeere wonyi

24. Nje omo bi a nse pese ORS or SSS ( )
    A lilo awon nkan wonyi lati pese ORS or SSS
25. Abo, ike imumi and sibi ti o mo ( ).
26. Omi sise tabi omi ti ati se itoju ninu ike……..litres.
27. Saseti ORS melo……
28. Tabi sibi tabili sugar melo……pelu sibi tabili iyo melo……ni a nfi pelo SSS (omi iye).

Awon ibeere miran lori Imo bi a se npese ORS or SSS

29. Nje ogun miran wa ti ale lo pelu ORS or SSS fun omo ti o nya igbe gbuuru
30. Se apeere iru ogun na……..
31. Ojo melo ni a le fun omo ti o nya igbe gbuuru ni tabileti zinc lo ( ).
32. Se o dara lati maa fun omo ni ounje lasiko ti o ba ni igbe gbuuru ( ).
33. Se o dara lati maa fun omo ni omu lasiko ti oba ni igbe gbuuru ( ).
34. Se o dara lati maa fun omo ni omi tabi nkan olomi tabi ki a fi kun ni asiko ti omo ba n yagbe gbuuru ( )

IPIN KETA: IHA TI A KO SI ITOJU OMO TI O NYA IGBE GBUURU

Mu eyi ti o faramo ninu awon idahun si awon ibeere won yi

35. Kiise gbogbo igbe gbuuru ni a le lo ORS tabi SSS fun.
    Faramo gidigan [ ], Faramo [ ], Akoleso [ ], Ko faramo [ ], Ko faramo rara [ ]
36. Yato si zinc, awon ogun miiran wa to se Pataki ti a le lo fun omo fun igbe gbuuru.
    Faramo gidigan [ ], Faramo [ ], Akoleso [ ], Ko faramo [ ], Ko faramo rara [ ]
37. Agbo lo dara ju lati wo igbe gbuuru ti o yo omode lenu.
    Faramo gidigan [ ], Faramo [ ], Akoleso [ ], Ko faramo [ ], Ko faramo rara [ ]
38. O se Pataki pe ki a lo awon ogun oyinbo pelu ORS/SSS fun igbe gbuuru omode.
    Faramo gidigan [ ], Faramo [ ], Akoleso [ ], Ko faramo [ ], Ko faramo rara [ ]
39. A le pa egbogi ibile pelu ORS/SSS fun omode to ni igbe gbuuru.

Faramo gidigan [ ], Faramo [ ], Akoleso [ ], Ko faramo [ ], Ko faramo rara [ ]

40. ORS or SSS ko se pataki ni itoju igbe gbuuru

Faramo gidigan [ ], Faramo [ ], Akoleso [ ], Ko faramo [ ], Ko faramo rara [ ]

41. Fifun omo ni ounje tabi omi oyan nigbati o b ani igbe gbuuru ko se dandan.

Faramo gidigan [ ], Faramo [ ], Akoleso [ ], Ko faramo [ ], Ko faramo rara [ ]

42. Ki a maa fun omo ti o b ani igbe gbuuru ni ounje tabi omi omu yoo je ki o posi.

Faramo gidigan [ ], Faramo [ ], Akoleso [ ], Ko faramo [ ], Ko faramo rara [ ]

IPIN KERIN: ITOJU ILE FUN ENI TI O BA NI IGBE GBUURU

43. Se a ri omo yin kan ti o w ani ojo ori odun marun si isale ti o ni aisan igbe gbuuru laipe yi**?** Beeni ( ) Beko ( )
44. Ti o ba je Beeni, Kini o koko se
    (a) mo toju re ni ile
    (b) mo mu lo si ile itoju alaisan
    (c) mo lo ra ogun nibi ita ogun
    (d) ati omiran, so pato
45. Se o fun omo na ni ORS/SSS (omi iye)? (a) Beeni (b) Beeko
46. Ti o ba je beeni, igba wo ni o lo fun omo na?
    (a) Nigba to o bere (a) Beeni (b) Beeko
    (b) Ojo keji leyin ti igbe gbuuru bere (a) Beeni (b) Beeko]
    (c) Leyin itoju onisegun oyinbo (a) Beeni (b) Beeko
    (d) So awon nkan miran.....
47. Kini idi ti ofi fun omo na ni ORS/SSS(omi iye)?……
48. Ti o ba je beko, kini idi……
49. Osun won ti o lo lati seto ORS/SSS(omi iye)?
    a.…… litre omi ati……..saseti ORS(omi iye)
    b. …… litre omi ati……koro/sibi tabili suga,…….sibi tabili iyo

50. So awon igbeese ti a maa ngbe mi ile lati seto ORS/SSS (omi iye)
    ……

……

……

……

51. Se o lo tabileti zinc pelu ORS/SSS (omi iye)?
52. Ti o ba je beeni, ojo melo lo fi fun omo nani tabileti zinc lo……
53. Tabileti zinc melo ni o fun omo na……
54. Ti o ba je beeko, kini idi? .....
55. Se ara omo na ya nigba ti o se itoju re ninu ile? (a) Beeni (b) Beeko

    To ba je beeni, lo si ibeere 56
56. To ba je beeko, kini o se leyin na?

    (a.) Mi o se nkankan (b.) Mo mu losi ile onisegun ibile (c.) Mo mu losi odo onisegun oyinbo (d.) Mo mu losi odo awon to nta ogun oyinbo (e.) Mo ra ogun oyinbo (f.) so omiran.....
57. Se o da ounje duro fun omo naa lasiko to ni igbe gbuuru? (a) Beeni (b) Beeko
58. Bi o ba je beeni? Kini idi .....

    ……..
59. Ti omo naa ba si n mu omu, se o fun ni omu ni asiko ti oni igbe gbuuru? (a) Beeni (b) Beeko

    Ti o ba je beni, lo si ibeere nomba 60
60. Bi o ba je beeko, kini idi? .....
61. Se omo na mu oni daradara ni asiko ti o nya igbe gbuuru? (a) Beeni (b) Beeko

E SE PUPO FUN IDAHUN SI AWON IBEERE WA

ANNEXURE I: Observation checklist to be scored by research/research assistant

DEVELOPMENT OF NURSE-LED HEALTH EDUCATIONAL GUIDELINES TO IMPROVE HOME MANAGEMENT OF CHILDHOOD DIARRHOEA AMONG MOTHERS IN OGUN STATE, NIGERIA

OBSERVATION CHECKLIST TO BE SCORED BY RESEARCHER/RESEARCH ASSISTANT

Ethics clearance reference number: CREC:176186_CREC_CHS_2024

State clearance reference number: OGHREC/467/223/APP

Age …….. Participant's ID …….

	NOT DONE	PARTIALLY DONE	DONE
Wash hands before procedure with soap and water			
Wash all utensils such as a jar, bowl, bottle, spoon, kettle or pot required for procedure			
Boil water to 100^{O} C before procedure or get treated water ready			
Pour all the ORS powder from one packet / (or correct amount for packet used) or measure the right amount of salt and sugar into a clean container such as a jar or bowl.			
Measure 1 litre of the boiled or treated water correctly into the washed bowl			
Mix ORS/ salt and sugar together with a spoon			
Pour the solution into a covered container for administration			

RATE/SCORE

NOT DONE = 0

PARTIALLY DONE = 1

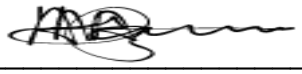
DONE = 2

ANNEXURE J: Confidentiality agreement with research third parties

Hereby, I **Adekunmi Azeez,** in my personal capacity as **transcriber** collaborating with **OLUSEYE Olabisi Mary** on a research titled **DEVELOPMENT OF NURSE-LED HEALTH EDUCATIONAL GUIDELINES TO IMPROVE HOME MANAGEMENT OF CHILDHOOD DIARRHOEA (HMCD) AMONG MOTHERS IN OGUN STATE, NIGERIA,** acknowledge that I am aware of and familiar with the stipulations and contents of the conditions of ethical clearance specific to this study. I shall conform to and abide by these conditions. Furthermore, I am aware of the sensitivity of the information collected and the need for strict controls to ensure confidentiality obligations associated with the study.

I agree to the privacy and confidentiality of the information that I am granted access to in my duties as a **transcriber**. I will not disclose nor sell the information that I have been granted permission to gain access to in good faith, to anyone.

I also confirm that I have been briefed by the research team on the protocols and expectations of my behaviour and involvement in the research as a **transcriber**.

SIGNED: 

Date: 30 June 2023

CONFIDENTIALITY AGREEMENT WITH RESEARCH THIRD PARTIES

Hereby, I **Osahon Jeffery Asowata**, in my personal capacity as a **biostatistician** collaborating with **OLUSEYE Olabisi Mary** on a research titled **DEVELOPMENT OF NURSE-LED HEALTH EDUCATIONAL GUIDELINES TO IMPROVE HOME MANAGEMENT OF CHILDHOOD DIARRHOEA AMONG MOTHERS IN OGUN STATE, NIGERIA**, acknowledge that I am aware of and familiar with the stipulations and contents of the conditions of ethical clearance specific to this study. I shall conform to and abide by these conditions. Furthermore, I am aware of the sensitivity of the information collected and the need for strict controls to ensure confidentiality obligations associated with the study.

I agree to the privacy and confidentiality of the information that I am granted access to in my duties as a **biostatistician** I will not disclose nor sell the information that I have been granted permission to gain access to in good faith, to anyone.

I also confirm that I have been briefed by the research team on the protocols and expectations of my behaviour and involvement in the research as a **biostatistician**.

SIGNED: Osahon Jeffery Asowat
Date: 01/06/2024

ANNEXURE K: Information leaflet

(English version)

HOME MANAGEMENT OF CHILDHOOD DIARRHOEA

Diarrhoea is a common problem among children under the age of five years.

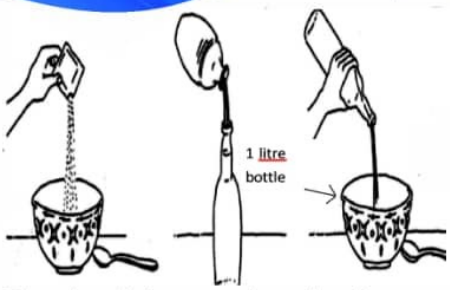
Diarrhoea is the passage of three or more loose or watery stools in a day.
It can lead to dehydration and malnutrition in children

If not treated on time it can lead to death. Home management of diarrhoea is cheap and simple..

- **1. Start home management immediately if Child seems well with NO SIGNS**

- ***Steps in treating diarrhoea at home are:***
- Wash hands with soap and water.
- Wash container and spoon
- Get 1 ORS packet & pour all the powder from one packet into a clean container.
- Measure 1 litre of clean boiled and cooled water or purchased bottled water Pour the water into the container.

Mix well until the powder is completely dissolved.



- Taste the solution so you know how it tastes.
- Keep the mixture safe in a covered bottle
- Give in sips for 24 hours after discard the left over
- Give the child zinc supplements according to prescription alongside with the ORS
- Continue feeding and give water and if on breast milk continue feeding the child

2. If child present with the following moderate signs: restlessness, irritability, drinks eagerly/thirsty, sunken eyes, loss of skin elasticity
GIVE ORS and take to health centre immediately

3. If child present with the following Dangerous signs: unconscious, not able to drink or drinking poorly, sunken eyes, or very slow skin pinch.
TAKE TO HEALTH CENTRE immediately

Reference
World Health Organization. 2014. *Integrated management of childhood illness.* www.who.int › Publications › i › item

BY: Olabisi Oluseye M
Supervisor: Prof. MG Makua
Department of Health Studies
University of South Africa

(Yoruba version)

TITOJU AISAN IGBE GBUURU OMODE LI ILE

Aisan igbe gbuuru je okan ninu aisan ti owopo larin omode ti ojo ori won ko ti to odun marun.

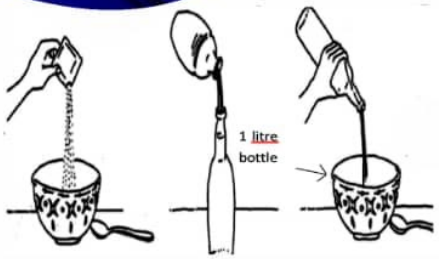
Aisan igbe gbuuru je yiya igbe sisan ni emeta tabi jubelo ni ojo kan.
Ole je ki omode padanu omi ara tabi ki o padanu eroja ase ara lore.

Ti a koba toju aisa igbe gbuuru kiakia, ole yori si iku. Itoju aisan igbe gbuuru ko won rara, o si rorun lati se.

- **1. Bere itoju aisan** igbe gbuuru ni kete to ba bere ni aini fi se boya irufe omobe se ara.

Igbese bi a nse toju aisan igbe gbuuru ni ile.

- Fo owo re pelu omi ati ose.
- Fo abo ti o fe lo pelu sibi.
- Ra ORS paketi kan, da sinu abo ti oti fo.
- O lilo omi litre kan. Se omi tabi ki o ra omi botulu. Da omi yi sinu abo yi.
- Ro omi yi ati ORS yi po dada pelu sibi ti oti fo.



- To omi yi wo, ko to fun omo re.
- Ro omi yi si inu ike oni deri.
- Fun omo re mu diedie fun ojo kan, da eyi ti oba ku nu leyin ojo kan.
- Fun omo yi ni tabileti zinki lo, gege bi ati sope ki a lo, pelu ORS
- Ma da ounje ati omi duro fun omo yi. Omo ti o n mu oyan, gbodo ma mu oyan lo.

2. Ti oba se akiyesi, awon ami wonyi bi aibale ara, arak ikan, oungbe, oju jin koto, ati ara gbigbe ninu omo ti oni igbe gbuuru

Fun irufe omo be ni ORS, ki osi gbe losi ile-iwosan kiakia.

3. Ti oba se akiyesi, awon ami ti olewu wonyi bi, aimo nkan to nsele ni ayika eni, aile momi, oju jin koto, ati ara gbigbe.
Gbe omo yin ni kiakia losi ile-iwosan lai jafara.

Reference
World Health Organization. 2014. *Integrated management of childhood illness*. www.who.int › Publications › i › item

BY: Olabisi Oluseye M
Supervisor: Prof. MG Makua
Department of Health Studies
University of South Africa

ANNEXURE L: Reviewers 1, 2 3 and 4 reports

REVIEWER 1

REPORT ON A REVIEWED EDUCATIONAL GUIDELINES

NURSE-LED HEALTH EDUCATION GUIDELINES TO IMPROVE HOME MANAGEMENT OF CHILDHOOD DIARRHOEA (HMCD) AMONG MOTHERS IN OGUN STATE, NIGERIA

Community Health Nurse/Research Expert: Dr Odetola D Odetola (Associate Professor)

Introduction

This report presents the findings of the validation process for the "**NURSE-LED HEALTH EDUCATION GUIDELINES TO IMPROVE HOME MANAGEMENT OF CHILDHOOD DIARRHOEA (HMCD) AMONG MOTHERS IN OGUN STATE, NIGERIA"**. The guidelines were developed to provide a framework for all stakeholders to improve mothers' knowledge, attitude and practice of HMCD. The validation aimed to ensure that the guidelines are evidence-based, relevant and feasible for implementation in diverse health care settings.

Objectives of validation

- To assess the alignment of the guidelines with recommended standard in the HMCD.
- To identify any gaps or areas for improvement in the guidelines.
- To verify the applicability of the guidelines across diverse health care settings.

Methodology

- The validation process adopted Delphi technique; the views of several experts were put together in the review process.
- Relevant literatures were reviewed on these guidelines.

Findings

- The guidelines were found to be consistent with standard/reviewed documented guidelines in published literatures.
- The guidelines are comprehensive and cover all essential areas of HMCD.
- All correction made were done by the researcher.

Conclusion

The have been validated as a detailed, evidence-based resource for all stakeholders. The guidelines are ready for wider implementation.

Dr Titilayo D Odetola
COMMUNITY HEALTH NURSE/RESEARCH EXPERT
DEPARTMENT OF COMMUNITY HEATH NURSING
FACULTY OF NURSING, UNIVERSITY OF IBADAN, OYO STATE, NIGERIA

REVIEWER 2

REVIEW OF MODULE

DEVELOPMENT OF NURSE-LED HEALTH EDUCATIONAL GUIDELINES TO IMPROVE HOME MANAGEMENT OF CHILDHOOD DIARRHOEA (HMCD) AMONG MOTHERS IN OGUN STATE, NIGERIA

The training module has been modified and completely corrected by the researcher in line with my previous reviewed and corrections few months ago.

This was done in preparation for an interventional study that will involve the training of nursing mothers in the art and act of HMCD world-wide and most especially among nursing mothers in Ogun State, Nigeria.

Having gone through the corrected version of the training module therefore, I hereby validate that the module can be effectively used on the field.

Grace Olayinka Adekoya (FWPCNM)
DEPUTY DIRECTOR OF NURSING SERVICES
PUBLIC HEALTH NURSING DEPARTMENT
UNIVERSITY COLLEGE HOSPITAL, IBADAN, NIGERIA

REVIEWER 3

REVIEW OF A NURSE-LED HEALTH EDUCATION GUIDELINES/MODULE TO IMPROVE HOME MANAGEMENT OF CHILDHOOD DIARRHOEA (HMCD) AMONG MOTHERS IN OGUN STATE, NIGERIA

The guidelines feature a clear and well-organised structure, comprising essential components: introduction, objectives, content section, assessment and conclusion. The purpose and the constituent's parts of the module are thoroughly explained.

Introduction

The introductions before introducing the WHO guidelines are concise, details and it dovetails to the main aspects of the study.

Objectives

- The researcher has carefully used the objective to guide the development of the module.
- The objectives also highlight what is expected of the mothers at the end of the training.
- The set objectives are specific, measurable, relevant and time bound.

Content

The content of this module has been tailored to achieve the set objectives and audience needs. The researcher had paid close attention to the tables.

Assessment/question

The end of the module assessment agrees with the set objectives and is suitable for the targeted audience's comprehension level. Pre- and post-test during the process will help to ascertain the comprehension level also when making use of the modules.

Conclusion

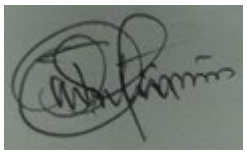
This training module is quite comprehensive, detailed, and suitable for the purpose meant for. it is good as a research instrument aimed at meeting stated goals and objectives, if well utilized it will go a long way in promoting the health of children under-five.

Patricia Olusayo Ogunmola
RN, RM, BSc (ed), M(ed), PhD
Health Education Specialist

REVIEWER 4

REVIEW OF A NURSE-LED HEALTH EDUCATION GUIDELINES/MODULE TO IMPROVE HOME MANAGEMENT OF CHILDHOOD DIARRHOEA (HMCD) AMONG MOTHERS IN OGUN STATE, NIGERIA

Greetings ma, and well done for the job well done. Having gone through the attachment. I attest that the researcher has done a great job though she can still add some diagrams in order to appeal more to the visual learners.



Dr Julius Olatade Maitanmi
RN, RM, RPHN, RPHNE, BNSc., PGDE, MSc, PhD
Nurse/Researcher/Lecturer
Department of Community/Public Health Nursing
Babcock University
+2347038469533

ANNEXURE M: Training certificates

Training Certificate: Module 1

TRREE

Zertifikat
Certificat
Certificado
Certificate

Promouvoir les plus hauts standards éthiques dans la protection des participants à la recherche biomédicale
Promoting the highest ethical standards in the protection of biomedical research participants

Certificat de formation - Training Certificate

Ce document atteste que - this document certifies that

Clinical Trials Centre
The University of Hong Kong

Olabisi Oluseye

a complété avec succès - has successfully completed

Introduction to Research Ethics

du programme de formation TRREE en évaluation éthique de la recherche
of the TRREE training programme in research ethics evaluation

Release Date: 2022/10/24

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[RTV : 20220217]

Training Certificate: Module 2.1

TRREE

Zertifikat
Certificat
Certificado
Certificate

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Promoting the highest ethical standards in the protection of biomedical research participants

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du programme de formation TRREE en évaluation éthique de la recherche
of the TRREE training programme in research ethics evaluation

Release Date: 2022/10/26

Professeur Dominique Sprumont
Coordinateur TRREE Coordinator

APPROVED BY SIWF FMH ISFM

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Training Certificate: Module 3.1

TRREE

Zertifikat

Certificat

Certificado

Certificate

Promouvoir les plus hauts standards éthiques dans la protection des participants à la recherche biomédicale
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du programme de formation TRREE en évaluation éthique de la recherche
of the TRREE training programme in research ethics evaluation

Release Date: 2022/10/30

CID : [illegible]

Professeur Dominique Sprumont
Coordinateur TRREE Coordinator

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[RTV : 20220217]

ANNEXURE N: Letter of statistician

Osahon Jeffery Asowata
Department of Epidemiology and Medical Statistics
College of Medicine
University of Ibadan
January 14, 2024

University of South Africa
South Africa

Dear Sir

I am writing to confirm my involvement in analysing data for OLUSEYE Olabisi Mary, a PhD student at your esteemed institution. As a biostatistician, I assisted with data cleaning, statistical analysis, and interpretation of results for OLUSEYE Olabisi Mary's research project, "Development of Nurse-led Health Educational Guidelines to Improve Home Management of Childhood Diarrhea (HMCD) among mothers in Ogun State, Nigeria."

My contribution to this project was limited to data analysis. I did not contribute to the study's design, data collection, or manuscript writing. However, I am confident that my input helped enhance the quality of the study's findings.

Please accept this letter as confirmation of my involvement in this project. If you require any further documentation or verification, kindly let me know.

Thank you for your time and consideration.

Sincerely,

Osahon Jeffery Asowata
Email: osahonjeffery@gmail.com
Mobile number: +2348138395904

ANNEXURE O: Letter of technical editor

158 Mount Augusta Drive
Midlands
MIDSTREAM
16 January 2025

e-mail: piet.rinacoetzer@gmail.com

TO WHOM IT MAY CONCERN

STUDENT: OLUSEYE OLABISI MARY
STUDENT NUMBER: 17618622

TITLE: DEVELOPMENT OF NURSE-LED HEALTH EDUCATIONAL GUIDELINES TO IMPROVE HOME MANAGEMENT OF CHILDHOOD DIARRHOEA (HMCD) AMONG MOTHERS IN OGUN STATE, NIGERIA

This is to certify that the above thesis has been technically edited according to Tutorial Letter MNUALLL/301/0/2024 of the Department of Health Studies, Unisa.

Mrs EC Coetzer

ANNEXURE P: Originality Turnitin report

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