Kamuzu College of Nursing

MANAGEMENT OF DEHYDRATION IN UNDER-FIVE CHILDREN WITH ACUTE GASTROENTERITIS BY NURSES AND MIDWIVES IN SELECTED HEALTH CENTRES IN LUSAKA, ZAMBIA,

MASTER OF SCIENCE (CHILD HEALTH) THESIS

BY

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Submitted to the Faculty of Nursing, Kamuzu College of Nursing, University of Malawi, in Partial Fulfilment of the Requirements for the Master of Science Degree in Child Health Nursing
Blantyre, Malawi

2nd July, 2018

Declaration

I, Rodgers Gift Benkele, declare that this dissertation on "Management of dehydration in under-five children with acute gastroenteritis by nurses and midwives in selected Health Centres in Lusaka, Zambia", is entirely my own work except for sources, which I have specifically acknowledged. I have not presented the thesis for any award at any University within or outside Africa.

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CERTIFICATE OF APPROVAL

We, the undersigned, hereby certify that we have read and hereby recommend for acceptance by the University of Malawi a thesis titled, *'Management of dehydration in Under-Five Children with Acute Gastroenteritis by nurses and midwives in Selected Health Centres in Lusaka, Zambia'*.

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Dedication

I dedicate this dissertation to my dear wife Emma and our dear sons and daughters; Chipego,

Mazuba, Matimba and Natasha respectively for their support, understanding and perseverance.

To my beloved father – Robert Siabeka Benkele, my late mother – Esnart Mutinta Munamoonga

Benkele, brothers and sisters.

Acknowledgements

God has been gracious to me throughout my studies. I thank Him for his blessings. I have been successful because of Him. I am greatly indebted to the Government of the Republic of Zambia through the Ministry of Health for the paid study leave and sponsorship. I also extend my gratitude to ELMA Philanthropies through the African Paediatric Fellowship Program for supporting my attachment to University of Cape Town. I would like to convey my sincere heartfelt gratitude to the following persons for their support during this study:

- Dr. Angela Chimwaza, my main supervisor, her comments, suggestions and feedback helped me to write logically.

- Dr. Mathews Ngwale, the statistician for his experience in sample size calculation and management of statistical data.

- Mrs Maureen J. Majamanda my second supervisor for guidance and timely feedback.

- I am also grateful to my local supervisor Dr. Concepta Namukolo Kwaleyela for accepting the challenge and her support through and through.

- I'm indebted to all the research respondents from Kanyama, Chawama, Kamwala and Kalingalinga health centres for the information given.

- I would also like to thank my classmates 2014 intake, the faculty and members of staff at Kamuzu College of Nursing and my work mates from Lusaka College of Nursing for their support.

- Finally, I thank my wife, children and family members for their support and understanding. God bless you all abundantly.

Abstract

Dehydration is a major cause of child mortality in sub-Saharan Africa. In Zambia child mortality rate from diarrhoea is 68 deaths per 1,000 live births despite implementation of child survival interventions. A descriptive quantitative study with triangulation of data collection methods and guided by Donabedian's Quality of Health Care Framework was conducted to assess management of dehydration in under-five children with Acute Gastroenteritis (AGE) in selected health centres in Zambia. The specific objectives were; to assess availability of resources (structure) in the management of dehydration in under-five children with Acute Gastroenteritis; to examine the process of management of dehydration in under-five children with Acute Gastroenteritis; to evaluate caretaker satisfaction (outcome) with care given during the management of dehydration due Acute Gastroenteritis; and to analyse associations between healthcare provider characteristics, caretaker satisfaction and case management.

Simple random sampling method was used to recruit 155 nurses who answered a self-administered questionnaire and 58 who were observed; and 58 caretakers who participated in exit interviews. Data were analysed using the Statistical Package for Social Sciences (SPSS) version 24.0. Chi-square tests were used to determine significant relationships between healthcare provider characteristics, caretaker satisfaction and case management.

Quality of management of dehydration due to AGE in under-five children was inadequate. Structurally, nurses and midwives had inadequate knowledge on dehydration management. Only 25.8% had knowledge that age is used to determine duration of rehydration. On process measure, only approximately 40% of the cases were well managed. Significantly in-service training improved case management (CI 95%, p=0.000). Caretaker satisfaction was significantly

associated with interaction with nurses and midwives (CI 95%, p=0.000).

Inclusion, management of dehydration was affected by structural factors which had a negative impact on the process measures of quality.

Key words: Quality, dehydration management, nurses and midwives, children, acute gastroenteritis, diarrhoea.

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Abbreviations and Acronyms

AGE   Acute Gastroenteritis

ART   Anti-Retroviral Therapy

CCP   Critical Care Pathways

CIDRZ   Centre for Infectious Disease Research Zambia

CSO   Central Statistics Office

DMO   District Medical Officer

ECF   Extracellular Fluid

ENs   Enrolled Nurses

ETAT   Emergency, Triage, Assessment and Treatment.

HMIS   Hospital Management Health Information System

ICF   Intracellular Fluid

IMAM   Integrated Management of Acute Malnutrition

IMCI   Integrated Management of Childhood Illness

IRT   Intravenous Rehydration Therapy

IV   Intravenous

IVI   Intravenous Infusion

LDCHO   Lusaka District Community Health Office

NGT   Nasogastric Tube

NS   Normal Saline

ORS   Oral Rehydration Solution

RL   Ringer's Lactate

RNs   Registered Nurses

SAM   Severe Acute Malnutrition

SD	Standard Deviation
SOPs	Standard Operation Procedures
SPSS	Statistical Package for Social Sciences
UNDP	United Nations Development Program
UNICEF	United Nations International Children Emergency Fund
WHO	World Health Organisation
YIF	Young Infant Feeding
ZDHS	Zambia Demographic Health Survey

Operational Definitions

Under five children: From birth up to 5 years (0-59months).

Healthcare provider: Nurses and midwives working with under five children.

Dehydration: Loss of body fluid due to AGE clinically classified as "some" or "severe".

Caretaker: Biological parents, foster parents, adoptive parents, grandparents, older brothers and sisters, and other relatives providing significant and/or primary care for the child.

Quality: Conformity with requirements for dehydration management.

Chapter 1

Introduction and Background

Introduction

Dehydration is a common fluid disturbance in infants and children. It occurs when the total output of fluids exceeds the total intake, regardless of the cause (Westwood, 2011). There are many causes of dehydration. Some of the causes of dehydration in children are: lack or inadequate intake of oral fluids in elevated environmental temperatures, abnormal losses during vomiting and diarrhoea when oral intake partially compensates for abnormal losses, diabetic ketoacidosis in which the child passes a lot of urine, and extensive burns because of increased fluid loss through the broken skin (Hockenberry & David, 2015). Among all these causes, the commonest cause is Acute Gastroenteritis (AGE) or diarrhoea (Westwood, 2011). If the condition is not well managed, it can lead to complications such as hypoglycaemia (low blood sugar levels), hypovolaemia (decrease in the circulating blood volume), shock, organ failure and eventually death (Potts & Mandleco, 2012). Therefore, thorough assessment and accurate grading of degree of dehydration is the foundation for prompt and effective prevention, control and management of dehydration and its better outcome.

Diarrhoea is among the top three most important childhood illnesses and that it is also among the leading contributors to the high under five mortality rate in Zambia (Central Statistical Office [CSO], Ministry of Health [MoH], & ICF International, 2014). The Zambia National Strategic Plan of 2017 – 2021 shows that non-bloody diarrhoea continues to be a major cause of childhood morbidity and mortality (Ministry of Health, 2017). Absolute Return for Kids (2017) estimates that 40 children die every day due to dehydration in Zambia and United Nations Development

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Program (UNDP) (2013) estimated an under-five mortality rate (U5MR) of 137.6 deaths per 1000 live births worldwide. The majority of these deaths are as a result of diarrhoea. Similarly, United Nations International Children Emergency Fund (UNICEF) (2014) estimated that 11.6% of deaths in children aged 1 to 59 months were due to diarrhoea. In 2015, Lusaka had 15.5% of children under age five who had diarrhoea in the two weeks preceding the demographic survey and 12.5% of these children did not receive any treatment (CSO , MOH, & ICF International, 2014).

Despite nurses and midwives receiving child survival intervention training such as Integrated Management of Child hood Illness (IMCI) and Emergency Triage Assessment and Treatment (ETAT), mortality due to diarrhoea still remains high. This study was conducted to understand the factors influencing management of dehydration in under-five children with AGE by nurses and midwives. Little was known about factors influencing management of dehydration in under five children with AGE. In Zambia, there were no published studies conducted in this area. Therefore, the aim of the study was to assess management of dehydration in under-five children with acute gastroenteritis in selected health centres by nurses and midwives.

In order to identify factors influencing quality, Donabedian's Conceptual Model for examining health services and evaluating quality of health care (Donabedian, 2005) was used. The framework guided in identifying factors influencing management of dehydration in under-five children with AGE by nurses and midwives in selected health centres in Lusaka Zambia.

Background

Worldwide, diarrhoea is the second leading cause of death in children under five years old, and it is responsible for killing around 760, 000 children every year (WHO, 2013). Eleven percent of global deaths among children under age five are due to diarrhoea (Boschi-Pinto, Velebit, & Shib, 2008). Most of these deaths occur among children less than two years of age living in South Asia and sub-Saharan Africa (UNICEF, 2016). Unger et al. (2014) report that over 80% of all childhood deaths due to diarrhoea from Asia and sub-Sahara Africa are in low income countries. Deaths due to diarrhoea among children aged five years and below in sub-Saharan Africa in 2010 were 54% (UNICEF, 2012). Children die because of extensive loss of fluids and electrolytes as a result of severe diarrhoea. Therefore, they are at high risk of developing severe dehydration due to AGE because they do not take adequate fluids (Tate et al., 2008). In this regard, under-five children require adults to give them water to drink in order for them to remain well hydrated (Natural Hydration Council, 2017).

Clinical assessment of dehydration can be challenging, especially in infants and toddlers (Tate et al., 2008). At times it could be difficult to ascertain the exact degree of dehydration accurately. Fluids and electrolytes are lost through loose stools and severe vomiting. Water and electrolytes are necessary for normal functioning of body tissues and organs. Hockenberry and David (2015) indicate that distribution of body fluids involves intracellular fluid (ICF) and extracellular fluid (ECF). Intracellular fluid is fluid within cells and ECF is fluid in blood vessels, spaces surrounding cells and in cavities of the body such as cerebral spinal fluids (Westwood, 2011). Fluid content in an infant's body is 50% and in a toddler it is 30% (Symons, 2005).

There are three types of dehydration; isotonic, hypotonic and hypertonic dehydration (Kenefick, 2012). The type of dehydration depends on the ratio of sodium and water loss of the body (Symons, 2005). Isotonic dehydration is the primary form of dehydration in children (Hockenberry & David, 2015). The fluid loss is from the ECF compartments. In this type of dehydration, the amount of sodium loss and water loss are in equal proportion. Isotonic dehydration is common with AGE. The child's body tries to maintain serum sodium level within normal range of 135mEq/L to 145mEq/L (Potts & Mandleco, 2012).

Hypotonic and hypertonic dehydration are less common (Kenefick, 2012). In hypotonic dehydration the loss of sodium is greater than the loss of water. Serum sodium levels fall below 130mEq/L (Hockenberry & David, 2015). This type of dehydration occurs when the child's diarrhoea is severe leading to large losses of sodium and when the child is only given plain water to manage dehydration (Kenefick, 2012). Hypertonic dehydration occurs when the loss of water is higher than the loss of sodium and it is caused by severe diarrhoea and vomiting. The serum sodium levels are greater than 150mEq/L (Hockenberry & David, 2015). There is movement of fluids from extracellular space into blood vessels due to high levels of sodium in order to maintain normal blood pressure (Kenefick, 2012). This is the most dangerous type of dehydration because it requires vigorous rehydration strategy (Potts & Mandleco, 2012).

There are three levels or degrees of dehydration; no/mild dehydration, some/moderate dehydration and severe dehydration (Cooke, 2010; Yu, Lougee, & Murno, 2011). A child with diarrhoea and has no or mild dehydration has early stages of dehydration. The mucous membranes are partially moist and the skin turgor (skin pinch) goes back immediately (Cooke,

2010; Yu et al, 2011). A child with some dehydration meets the criteria of having two or more signs of some dehydration (World Health Organisation [WHO] 2014). The child may present with any two of the following signs; thirsty, restless or irritable, and the skin turgor goes back slowly or has sunken eyes. A child with severe dehydration also meets the criteria of having two or more signs of severe dehydration. The child is lethargic or unconscious, has no or reduced urine output, cool and moist extremities, a rapid and feeble pulse, low blood pressure, and peripheral cyanosis (Wardlaw, Salama, Brocklehurst, Chopra, & Mason, 2012).

Cooke (2010) points out that the management of a child presenting with acute diarrhoea must include a thorough history and examination with evaluation of hydration status. To effectively and efficiently prevent and control dehydration, fluid replacement and Zinc supplementation are essential (UNICEF, 2013; WHO, 2014). Zinc is an important micronutrient for a child's overall health and development (WHO, 2014). It reduces duration and severity of diarrhoea eventually preventing and controlling dehydration (Qadir, Arshad, & Ahmad, 2013).

Management of dehydration has three plans; Plan A, Plan B and Plan C (UNICEF & WHO, 2009). Plan A is used to prevent dehydration in a child with no dehydration, while Plan B is used to manage some or moderate dehydration and Plan C is used to manage severe dehydration (WHO, 2014). Under plan A, the caretaker is educated on the four rules of home management of diarrhoea. These rules are; giving extra fluid as much as the child can take; giving Zinc supplements; continuing with feeding; and counselling caretaker when to return to health facility (UNICEF & WHO, 2009; WHO, 2014). Suitable extra fluids to be given by caretaker include water, breast milk, Reduced Osmolarity Oral Rehydration Solution (ORS) and food based fluids

such as soup to prevent dehydration (Yu et al, 2011).

Plan B Treatment is to manage and control some or moderate dehydration. The child is given ORS in calculated amounts to improve the condition within shortest possible time. Oral Rehydration Solution is calculated at 75ml/kg body weight (WHO, 2014). The measured fluids are given over 4 hours. The child is admitted at the health facility for rehydration and monitoring of improvement of the condition. The child is reassessed after 4 hours and the hydration status is noted to determine the next treatment plan (WHO, 2014).

Plan C Treatment is for management of severe dehydration. Fluids are given intravenously or through the nasogastric tube (NGT) depending on the competence of the health worker (WHO, 2014). The first priority is to give intravenous infusion (IVI). Intravenous fluids are given to treat or prevent shock (Yu et al., 2011). A severely dehydrated child is given fluids calculated at 100ml/kg intravenously (WHO, 2014). An infant less than 12 months is first given 30ml/kg to run for 1 hour and the remaining 70ml/kg to run for 5 hours, while children aged 12 months up to 5 years are given 30ml/kg to run in 30 minutes and the remaining 70ml/kg to run for 2hours 30 minutes (WHO, 2014).

The fluid of choice in replacing lost fluids and electrolytes is Ringer's Lactate (RL) (WHO, 2014). Ringer's Lactate contains electrolytes (sodium 130mEq, chloride 109mEq, calcium 3mEq, potassium 4mEq and contains lactate 28mEq which is metabolised to bicarbonate) to overcome metabolic acidosis. If RL is not available, normal saline (NS) is administered. Normal Saline 0.9% only has sodium 154mEq and chloride 154mEQ (Hockenberry & David, 2015). The

child is reassessed every 1- 2 hours to ascertain if hydration status is improving or not.

WHO (2014) Reduced Osmolarity Oral Rehydration Solution 5ml/kg/hour is also given as soon as the child can drink; usually after 3-4 hours for infants and 1-2 hours for older children. Reduced Osmolarity Oral Rehydration Solution contains glucose 75mEq, sodium 75mEq, chloride 65mEq, potassium 20mEq, citrate 10mEq and osmolarity 245mEq (WHO, 2014). After reassessment, dehydration status is re-classified and an appropriate treatment plan (A, B, or C) is chosen to continue with treatment. A child receiving ORS via NGT is supposed to be given 20 ml/kg/hour for 6 hours. Reassessment is done every 1-2 hours. If there is repeated vomiting or increasing abdominal distension, the fluid is given more slowly (WHO, 2014). If hydration status is not improving after 3 hours, the child is sent for intravenous (IV) therapy. After 6 hours, reassessment is done to re-classify dehydration. Then an appropriate plan (A, B, or C) is chosen to continue treatment.

Delays in the control of dehydration may lead to other serious complications. Hypoglycaemia is one of the immediate life-threatening complications of acute diarrhoea among under-five children, but its diagnosis may be overlooked because all the symptoms may be mimicked by severe dehydration (Onyiriuka, Awaebe, & Kouyaté, 2013). The current practice requires that every child presenting with dehydration in diarrhoea should have the blood sugar levels checked (WHO & UNICEF, 2013). This helps to have baseline data and control any hypoglycaemia present.

Blood glucose levels of less than 2.5mmol/litre (45mg/dl) in a well-nourished or less than

3mmol/litre (54mg/dl) in a severely malnourished child, is considered as hypoglycaemia (WHO, 2013). Therefore, children presenting with dehydration due to diarrhoea require prompt management to improve the chances of survival. Any child who presents with dehydration and blood glucose levels of less than 3mmol/litre should be given 5ml/kg of 10% dextrose intravenously rapidly (WHO, 2014). After 30 minutes the readings are rechecked. If the blood glucose is still less than 3mmol/litre, then 5ml/kg of 10% dextrose intravenously rapidly is repeated hourly until when the readings are above 3mmol/litre (WHO, 2014).

Management of dehydration in under-five children with AGE can be affected by factors such as knowledge and skills. Knowledge and skills of the healthcare provider can influence the way dehydration is assessed, classified and managed. Knowledge and skills are acquired during pre-service training. Integrated Management of Childhood Illness (IMCI) training is a pre-service and in-service training to equip nurses and midwives with knowledge and skills to manage children. This is a child survival intervention recommended by WHO and UNICEF to manage children with common childhood illnesses that includes diarrhoea and dehydration (UNICEF, 2013).

Dehydration due to AGE can be prevented and controlled by following IMCI guidelines recommended by UNICEF and WHO (WHO, 2014). United Nations International Children Emergency Funds (2012) recommends use of Low-osmolarity ORS and Zinc supplements to prevent and improve case management. However, only about 40% of children under the age of five years with diarrhoea receive the recommended treatment of oral rehydration therapy (UNICEF, 2012). Sub-Saharan Africa has the lowest percentage (34%) of children receiving

recommended treatment of oral rehydration therapy (UNICEF, 2012). They also noted that there were disparities of access to recommended treatment of oral rehydration therapy in low income countries. Children from the poorest (20% of the population) were much less likely to receive recommended treatment of ORS for the treatment of diarrhoea than children from the richest countries (UNICEF, 2014). The MoH of Zambia updates knowledge and skills of nurses and midwives in order to ensure quality management of dehydration due to AGE. Nurses and midwives are trained in IMCI and ETAT. In addition, management guidelines and protocols are in place in all health institutions to guide the care.

Problem Statement

Despite the high impact interventions the Ministry of Health of Zambia has under taken such as IMCI strategy, diarrhoea continues to be one of the causes of under-five mortality in the country. According to Zambia Demographic Health Survey of 2013-2014, 16% of children under age 5 had diarrhoea in the two weeks before the survey of which 66% were taken to a health facility (CSO, MOH & ICF International, 2014), and 73% of children who had diarrhoea were given ORS to treat and prevent dehydration against the set target of 85%. World Health Organisation recommends that all children with diarrhoea are supposed to be treated with ORS according to guidelines.

Furthermore, the survey revealed that 27.8% of children reported to have had diarrhoea were aged 6-11 months. Lusaka province had 15.5% of these cases. In 2013 Lusaka District Community Health Office's Health Management Information System (LDCHO) recorded 110,872 children aged 6 months to 59 months with AGE (LDCHO, 2014). Eight percent of these

children had AGE. Lusaka had a childhood mortality rate of 68 deaths per 1,000 live births of which 9% were caused by severe dehydration due to diarrhoea (CSO, MOH & ICF International, 2014).

Zambian health centres are predominantly managed by nurses/midwives and 75% of these assess and manage childhood illnesses. The Statistics of child mortality from AGE are still high despite child survival trainings in IMCI and ETAT. This could be attributed to poor quality of care due to inappropriate assessment and management of dehydration due to diarrhoea in children less than 5 years of age. Donabedian describes quality as examining the structure of the setting in which care is provided, measuring the actual process of care, and by assessing the outcomes of care. According to Donabedian, structural factors such as infrastructure, equipment and qualification of care providers; and process factors such as skills and competency affect the quality of dehydration management. Hence the need to assess management of dehydration in under-five children with AGE by nurses and midwives. The study was guided by Donabedian's Conceptual Framework for Evaluating Quality of Health Care. The major concepts of the framework are structure, process and outcomes.

Study Objectives

     Broad Objective.

To assess management of dehydration in under-five children with acute gastroenteritis in selected health centres in Lusaka, Zambia guided by Donabedian Conceptual Framework for Evaluating Quality of Health Care.

Specific Objectives.

- To assess availability of resources (structure) in the management of dehydration in under-five children with AGE.

- To examine the process of management of dehydration in under-five children with AGE.

- To evaluate caretaker satisfaction (outcome) with care given during the management of dehydration due AGE.

- To analyse associations between healthcare provider characteristics, caretaker satisfaction and case management.

Hypotheses

Null hypothesis (H_0): Child survival in-service training does not improve management of dehydration

Alternative hypothesis (H_A): Child survival in-service training does improve management of dehydration

Justification of the Study

High mortality rate due to AGE motivated the study. Assessing quality by examining structure of health Centre settings in Lusaka Health District, measuring the actual process of care by observing nurses and midwives, and by assessing the outcomes of care through caretaker satisfaction helped to identify gaps in the care of dehydration due to AGE. Implementation of findings and recommendations from this study would significantly contribute to the reduction of mortality rate of AGE due to dehydration in Lusaka Health District and the nation.

Chapter 2

Literature Review

Introduction

The chapter provides an overview of previous research on management of dehydration in under five children with AGE. The review is discussed and organized following Donabedian's conceptual model for quality and the study objectives and they have been presented concurrently.

A search of computerized internet based databases was carried out. The following databases were searched for relevant studies: MEDLINE was searched using the PubMed interface while CINAHL was searched using the ebscohost interface; and HINARI was searched using the WHO interface. Additional relevant studies were hand searched using Full Free PDF; Google scholar and Google. The search strategies used text words and relevant indexing to capture the concept of dehydration management of under-five children with AGE. A total of 51 peer reviewed articles, 3 books, 4 dissertations, and 10 proceedings of scholar and academic conferences were reviewed.

Key words for the searches included "quality of care"; "dehydration management"; "diarrhoea"; "nurses AND/OR midwives"; "and "under five children". Further terms were added according to their relevance to the search based on results obtained from the initial searches. Further searches were conducted to identify relevant publications and study articles produced by WHO and UNICEF. The review included articles published in English language only. This was done because the researcher could only understand articles published in English.

The researcher concentrated on articles 10 years old and below. Limiting the search to up to 10 years allowed the researcher get smaller list of more relevant articles. However, two articles published in 2003 and 2004 were used as they provided unique information. The article published in 2003 by Hunt was used to understand the concept of knowledge in general and how to measure knowledge on AGE. The article published in 2004 by Amaral and others was used to understand the effect of IMCI on health worker performance as it was unique.

Conceptual Framework

The study was guided by Donabedian's Conceptual Framework for examining health services and evaluating quality of health care. The framework has three related concepts; structure, process and outcome. Structure influences process; and process eventually influences outcome. Donabedian describes quality as anything anyone wishes it to be, ordinarily, a reflection of values and goals current in the medical care system (Donabedian, 2005). Quality healthcare is essential in health service delivery. According to (McQuestion, 2006), poor quality is considered to be a key obstacle to the successful implementation of health programmes and achieving Sustainable Development Goals (SDGs). The three concepts have been illustrated in Donabedian's Conceptual Framework **(Figure 1).**
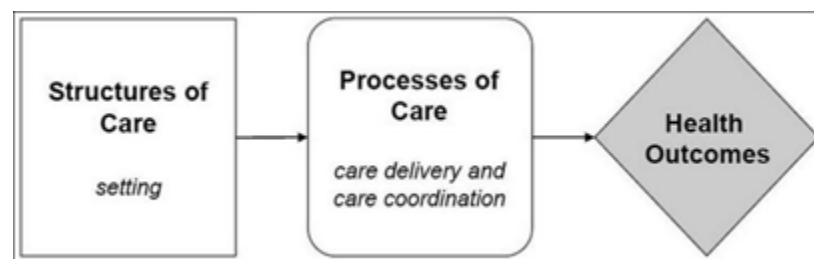
Figure 1: Donabedian's Quality of Healthcare Framework

Source (Donabedian, 2005)

Application of Conceptual Framework to the Study.

The Conceptual Framework was applied to assess quality of healthcare (**Figure 2).** The researcher chose Donabedian's Theory of Quality Healthcare as it is a Framework recommended to assess quality of care (DesHarnais, 2011), whose major concepts are structure, process and outcomes.

The concept of structure was assessed by determining availability of care giving resources. This was done by assessing facility and healthcare provider characteristics. To determine facility characteristics, data on infrastructure, human resource, clinical guidelines and protocols, equipment and supplies was collected. To determine care provider characteristics, data on level of education, duration of service (experience) and in-service training was collected.

The concept of process assessed elements of healthcare provider's knowledge and practice through use of guidelines and protocols on management of dehydration due to AGE. This was done by collecting data related to healthcare provider's knowledge and practice and observing practice of nurses and midwives.

Finally, the concept of health outcomes was assessed by determining the effectiveness of care given. This was done by reassessing the condition of the child and administering exit questionnaire to care recipients.

Figure 2: Conceptualisation of Donabedian's Quality of Healthcare Framework

Conceptualization of Donabedian's Framework for examining health services and evaluating quality of health care *"Management of dehydration in under-five children with acute gastroenteritis by nurses and midwives in selected health centres in Lusaka, Zambia."*

Concepts

| Structure of care *Setting* | Process of care *Delivery and coordination* | Outcome *Client satisfaction* |

Elements to investigate

Facility characteristics
- Infrastructure
- Material resources

Health care provider characteristics
- Level of education
- Duration of service
- Experience
- Training
- Knowledge on dehydration management

Practice (Application of knowledge)
- Assessment
- Classification
- Management
- Use of guidelines
- Monitoring and evaluation

Child's general condition
Care taker satisfaction

Data collection method

Self-administered questionnaire

Observations

Exit interviews

Data collection tools

Structured questionnaire

Observation checklist

Exit interview checklist

Adapted from (Donabedian, 2005)

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Structure

Structure comprises of attributes that help to assess availability of care giving resources. These attributes are; available infrastructure, equipment and qualification of care providers (Bloomberg School of Public Health, 2011). In this study structure included; human, material resources and in-service training.

Human and Material Resources.

Healthcare provider education improves professional practice (Forsetlund, 2012). Knowledge promotes effectiveness, safe performance of tasks, and improves quality. Nonaka and Krogh (2009) define knowledge as the capacity to act, define, and solve problems. Knowledge provides orderliness in provision of care. Therefore, the way an individual acts is dependent on the knowledge acquired through learning, practice and experience (Hunt, 2003). Dehydration is the main complication of AGE, and hydration status assessment is priority in the management of a child with AGE. The healthcare provider should be knowledgeable that a child with high-output diarrhoea associated with vomiting has a high risk of dehydration. It is therefore, expected that nurses and midwives do poses theoretical knowledge of management of dehydration due to AGE.

Trained healthcare providers in dehydration management appropriately used oral rehydration solution (ORS) via nasogastric tube (NGT) to rehydrate mildly and severely dehydrated children (Hoque et al., 2012; Nager, 2012; Nunez, Liu, & Walter et al., 2009). This shows that right treatment plan was applied as rehydration with ORS via NGT is highly recommended (WHO, 2014) if the healthcare provider is not competent enough to start IVI or the nearest health facility

is far. Using knowledge acquired during child survival in-service training, health workers are able to identify children with emergency signs that require immediate expert attention.

Although management of dehydration has been in practice for many years, challenges have been there. Parashar, Nelson and Kang (2013) in their review of literature noted that there were variation and inconsistences in the guidelines and protocols being used to manage dehydration due to AGE. Some guidelines and protocols had different signs for some and severe dehydration. This can influence the process of management of dehydration.

The other challenge is inadequate flow of supplies (Parashar, Nelson, & Kang, 2013) for AGE and dehydration management. This causes health workers not to prescribe recommended treatment. In a study that was done in Nigeria (Meremikwu et al., 2015) children seen in primary health facilities were more likely to receive wrong treatment or no treatment for diarrhoea as a result of stock out of the medications. Procurement of Zinc is a challenge. In a study on Current Approach in the Management of Diarrhoea in Children, Chiabi et al. (2010) noted that most countries in the developing world had erratic supply of Zinc supplements. Even if health workers can have good knowledge and skills in dehydration management, inadequate resources pose a big challenge to effectively manage dehydration.

In-service Training.

Integrated Management of Childhood Illness is a child survival intervention recommended by WHO and UNICEF (WHO, 2013). This comprehensive approach has been adopted in Zambia since 1996. It is a step by step approach of assessment, classification and management. These

steps are strictly followed to ensure that the child receives quality health care. The approach helps the healthcare provider manage the child individually and without omitting any necessary critical sign and symptom.

According to a Systematic Review and Meta-Analysis conducted by Nguyen, Leung, McIntyre, Ghali, and Sauve (2013) it was found that overall, IMCI-trained workers were more likely to correctly classify illnesses (RR = 1.93, 95% CI: 1.66–2.24). Furthermore, they concluded that "IMCI training improves health worker performance". In an evaluation study of an intervention to promote health workers' use of the IMCI clinical guidelines it was found that quality of care was better in intervention provinces (Naimoli, Rowe, Lyaghf, & Larbi, 2006). These results reveal that IMCI child survival intervention improved health worker performance thereby improving quality of care.

In a multi-country evaluation to determine the effectiveness, cost, and impact of IMCI in Brazil and other four countries (Amaral et al., 2004) it was concluded that IMCI case management training significantly improved health worker performance. This was because healthcare providers were following IMCI guidelines. In South Africa, it was found that IMCI training course was reported to be an effective method of acquiring skills (Horwood, Voce, Vermaak, Rollins, & Qazi, 2009). The health workers were motivated to apply the knowledge and skills gained. Nonetheless, in a study that was conducted in Niger, Uganda and Tanzania, it was found that despite following the step by step approach in case management, lack of simple equipment and supplies prevented health workers appropriately assess, classify and manage sick children

when referral was not possible (Osterholt, Onikpo, Lama, Deming, & Rowe, 2009). Therefore, this means that children did not receive quality health services for their conditions.

Process

According to Donabedian, process involves activities of giving and receiving care. The attributes assessed are skills and competency in case management (Liu, Singer, Benjamin, & Camargo Jr., 2011). In this study process examined practical application of knowledge. This included assessment, classification and management of dehydration; prevention and treatment of dehydration; and management of complications of dehydration.

Management of Dehydration.

Application of knowledge and skills in management of dehydration due to AGE is essential. Health workers are expected to practice skilfully in delivery of health services to ensure quality management of dehydration. According to Business Dictionary (n.d.) skill is the ability and capacity acquired through deliberate, systematic, and sustained effort to smoothly and adaptively carry out complex activities or job functions involving ideas (cognitive skills), things (technical skills), and/or people (interpersonal skills). Skill is noted in practice and practice is the application of knowledge. Business Dictionary (n.d.) also defines practice as a method, procedure, process or rule used in a particular field or profession. In the medical and nursing fields, practice is guided by clinical guidelines and protocols to ensure quality services. As such, management of dehydration is guided by protocols and guidelines developed by WHO and UNICEF.

Assessment for dehydration in children is a skill that is vital in management of dehydration. Various skills are used by health workers to assess for dehydration in children. Assessment starts with triaging of a child. Triage is to "sort out" patients to recognise a very sick baby or child (WHO, 2016). Triaging helps to identify and manage children with emergency conditions first to prevent serious complications. According to Steiner, DeWalt and Byerley (2005) initial assessment of dehydration in young children should focus on estimating capillary refill time, skin turgor, and respiratory pattern as combinations of examination signs performed better than any individual sign in predicting dehydration.

Brandt, Antunes and Pontes da Silva (2015) identified clinical signs to classify dehydration as ''no dehydration,'' ''some dehydration,'' or ''severe dehydration''; overall appearance, sunken eyes, dry mucosa, and reduced or no tears. Health workers use these signs to classify dehydration. However, these signs may not be obvious in severe acute malnutrition. It is often difficult to diagnose dehydration in children with severe acute malnutrition (SAM) because the clinical signs usually relied on to diagnose are similar to those found in severe wasting without dehydration (WHO, 2013). Therefore, WHO recommends that dehydration should be assumed in all children with SAM presenting with watery diarrhoea or reduced urine output. According to Mwangome, Fegan, Prentice, and Berkley (2011), in a study to determine whether diagnostic criteria for acute malnutrition was affected by hydration status they found that both weight-for-length Z-score and mid-upper-arm-circumference misclassified SAM among dehydrated children. They recommend that nutritional status should be re-evaluated following rehydration, and management adjusted accordingly.

The goal of rehydration therapy is to restore circulating blood volume; then to restore the

interstitial fluid volume; and to maintain hydration and replace continuing losses (Canavan &

Arant, 2009). Brandt, Antunes and Pontes da Silva (2015) emphasise that oral rehydration

therapy (ORT) should be preferred for rehydration in the management of acute diarrhoea, while

intravenous rehydration therapy (IRT) should only be used in cases of ORT failure or severe

dehydration. Hoque et al. (2012) found that diarrhoea case management was inadequate in

selected districts and sub-districts in Bangladesh. In separate studies conducted in Australia and

Tanzania it was found that guidelines for treatment of children with mild to moderate

dehydration were not being followed for best practice (Lee & Haden, 2007; Walter et al., 2009).

Healthcare providers initiated intravenous therapy (IVT) instead of ORT for a mildly dehydrated

child. Children were over hydrated as they presented with orbital oedema and pulmonary

congestion.

In a clinical audit conducted in Nigeria, it was found that 62.4% of prescription for diarrhoea was

inappropriate and that only about 10% of the children received ORS with oral Zinc (Meremikwu

et al., 2015). In this study, appropriate treatment was considered to be prescription and

administration of ORS with or without Zinc, while inappropriate treatment was prescription and

administration of antidiarrhoeals or antibiotics along with ORS.

Prevention and Treatment of Dehydration.

Prevention and treatment of dehydration is through fluid therapy (Elliott, 2007). Bhatnagar,

Alam, and Gupta (2010), identified that use of low osmolarity ORS with 75mEq/L of sodium

and 75mmol/L of glucose and osmolarity of 245osmol/L as a universal recommendation by

WHO/UNICEF reduced occurrence of dehydration. Low osmolarity ORS promote water and sodium absorption more efficiently than the WHO-ORS (Bhatnagar et al., 2007).

Children under five years of age with SAM who present with dehydration need to be rehydrated slowly. According to WHO (2013), fluid management is complex in all children with severe acute malnutrition. Both children with oedema and no oedema are prone to fluid retention. Therefore, children with SAM presenting with some dehydration or severe dehydration, but who are not in shock should be rehydrated orally or by nasogastric tube, with rehydration solution for malnutrition (ReSoMal), or low-osmolarity ORS with added potassium and glucose (WHO, 2013).

Fluids are given at a rate of 5–10 ml/kg/h, for up to a maximum of 12 hours, unless the child has cholera or profuse watery diarrhoea (WHO, 2013). Children suspected of having cholera or have profuse watery diarrhoea should be given low-osmolarity ORS because it improves intestinal absorption of fluids. Combined analysis of studies have shown that administration of low-osmolarity ORS reduced stool output by about 20% and the incidence of vomiting by about 30% (Kolpuru, 2008).

Adequately managing fluids is critical for treating shock in children with SAM (WHO, 2016). Shock and severe dehydrating diarrhoea is defined as ≥6 watery stools per day (Akech, Karisa, Nakamya, Boga, & Maitland, 2010). Children under 5 years of age with SAM and signs of shock or severe dehydration and who cannot be rehydrated orally or by nasogastric tube should be treated with intravenous fluids, either half-strength Darrow's solution with 5% dextrose, or

Ringer's lactate solution with 5% dextrose (WHO, 2016). Half-strength Darrow's solution with 5% dextrose has a lower sodium and higher potassium content. The child initially is given 15 ml/kg/h. When the pulse volume has improved, the child is given ReSoMal orally or by nasogastric tube 5–10 mL/kg/h up to a maximum of 12hours (WHO, 2013).

Zinc supplementation reduces the severity, duration and recurrence of childhood acute diarrhoea (Omuemu, Ofuani, & Kubeyinje, 2012; Qadir, Arshad, & Ahmad, 2013). In a study to assess the therapeutic effects of oral Zinc supplementation on acute watery diarrhoea of children with moderate dehydration, it was found that Zinc supplements significantly reduced mean diarrhoea frequency (Karamyyar, Gheibi, Noroozi, & Valeshabad, 2013). There was a gap in the knowledge and practice of use of Zinc supplementation in the management of childhood diarrhoea among healthcare providers in public primary health facilities in Nigeria (Omuemu, Ofuani & Kubeyinje, 2012). Healthcare providers were not prescribing Zinc despite knowledge that Zinc improves frequency of diarrhoea and severity. Factors that led to this were not identified.

Management of Complications of Dehydration.

A dehydrated child has disturbances with metabolism, gluconeogenesis and transport of substrates (Onyiriuka et al., 2013). These are complications of dehydration that put the child at risk of developing hypoglycaemia. Niescierenko and Bachur (2013) in a study on advances in paediatric dehydration therapy, found that physicians were not assessing blood glucose levels 3 to 4 hourly. Similarly, Hoque et al. (2012) found out that children admitted for dehydration were not being assessed by nurses for rehydration status. Usually, after 30 minutes to an hour of

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rehydration the child is reassessed for effectiveness of initial treatment. Lack of assessment by the nurses could be due to lack of knowledge, work over load or negative attitude and this leads to under or over-hydrating which bring about negative outcome in management of children with dehydration due to AGE.

Outcome

Outcome evaluates changes in the patient's condition following treatment; patient knowledge; and satisfaction (DesHarnais, 2011). There are two types of outcome – technical and interpersonal (Ameh, Gómez-Olivé, Kahn, Tollman, & Klipstein-Grobusch, 2017). Technical outcomes are the physical and functional aspects of care, such as absence of complications and reduction in disease, disability and death; whereas interpersonal outcomes include patients' satisfaction with care and influence of care on patient's quality of life as perceived by the patient (Ameh et al., 2017). It is much easier to evaluate some components of interpersonal attribute of outcome than technical attributes as these require more time and large samples (Ameh et al., 2017).

In this study, client satisfaction was evaluated. According to Timane, Oche, Umar, Constance and Raji (2017), client satisfaction is the extent to which clients feel that their needs and expectations are met by the services provided. National Health Services (2012) as cited by Tesfaye, Worku, Godana, and Lindtjorn (2016), indicate that providing quality service means meeting client expectations, which is a function of their experiences during a given service encounter.

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There are various factors that can enhance client satisfaction. Some of these are expectation and communication. In a study that was conducted in Nigeria on Client satisfaction with maternal and child health care services, Tesleem, Okafor and Ifeoma (2016) observed that majority of the respondents that had high expectation before going to the hospital were very satisfied with the service they received. In a descriptive study on client satisfaction with communication skills of healthcare providers in Eldoret, Kenya, Kei Robert, Jepngetich and Kipkulei (2013), found that giving clients enough time to express themselves, greeting and introducing oneself to the clients by name were statistically significant.

Summary

Literature reviewed had more information on what ought to be done versus research findings. Literature revealed that clinical guidelines and protocols were in place to guide the practice in management of dehydration in children. Clear recommendations were spelt out for health workers to follow. The studies conducted did not evaluate quality of management of dehydration due to AGE. Furthermore, there was no literature from Zambia on assessing practice of nurses and midwives on quality of management of dehydration due to AGE in children under the age of five years. Data bases MEDLINE using the PubMed interface; CINAHL using the ebscohost interface; HINARI using the WHO interface and Full Free PDF, while using key search words "quality of care"; "dehydration management"; "diarrhoea"; "nurses AND/OR midwives"; "and "under five children", did not yield relevant literature on the topic.

Literature indicated that IMCI case management training significantly improved health worker performance (Amaral et al., 2004). However, it did not exactly indicate how dehydration was

assessed, classified and managed in studies accessed. Literature explaining how dehydration due to diarrhoea was managed was not available. Furthermore, there was no published research in Zambia describing utilisation of IMCI strategy to assess, classify and manage dehydration due to AGE in under-five children.

There was scanty knowledge on the management of dehydration in under-five children with AGE by healthcare providers. Despite literature search being done from published and unpublished articles; and manual search from health offices and Kamuzu College of Nursing libraries, there were no articles on quality of dehydration management. Most of the research work had information about diarrhoea management in general and management of common childhood illnesses. Since dehydration due to AGE is a serious complication, there was need to conduct this research to generate data to determine and explain factors influencing management of dehydration in under-five children with AGE by healthcare providers.

Chapter 3

Methodology

Introduction

This chapter discusses the methodology used to conduct the study. This includes research design; study setting; study period; study population; sample size; sampling method; inclusion and exclusion criteria; reliability and validity; data collection process; ethical consideration; and data management and analysis.

Research Design

A quantitative descriptive cross sectional survey was used for this study. Descriptive research designs are recommended where there is little known about the topic. According to Brink, Walt and Rensburg (2012) descriptive study designs help to identify problems with current practice, justify current practice and determine what other professionals in similar situations are doing. The study triangulated data collection methods by using structured questionnaire, doing observations and conducting exit interviews. This helped strengthen findings on factors that influence management of dehydration in under-five children with acute gastroenteritis.

Study Setting

The study was conducted in Lusaka Urban Health District of Lusaka Province in Zambia. Lusaka Urban Health District had eight health centres that had complete data on diarrhoea cases among under five children. Data for diarrhoea incidence from the eight health facilities was sorted starting with highest number in order to select centres with high numbers. The top four health facilities were prioritised in their order of ranking. These were: Kanyama, Chawama, Kamwala

and Kalingalinga. According to aggregated data 28% (2,450) out of 8,751 diarrhoea cases were from these health centres (LDCHO, 2014). Therefore the study was conducted in these four health centres.

Lusaka District is one of the fastest growing cities in the southern region of Zambia. The population of Lusaka is 1,267,440 with approximately 20% being children below the age of 5 years (World Population Review, 2018). It has 70% of its populations living in the peri-urban areas (The Millennium Challenge Account, 2018) where there is poor sanitation and water supply. Majority of patients seen in government clinics suffer from preventable diseases related to poor sanitation and lack of access to safe water.

According to MoH (2012), Kanyama health centre is located about 4 km west of the city centre and with a catchment population of 153,624. Chawama Health Centre is located about 8 km south of the city with a catchment area of 128,858. Kamwala Health Centre is within 2 km radius of the city centre and with a catchment population of 106,969. Kalingalinga Health Centre is located about 6 km east of the city and with a catchment population of 74,019.

Study Period

Data collection period January – February 2017. On average 3 days were spent at each health facility to collecting data.

Study Population

The study population was all the nurses and midwives working with children in the four

prioritised health facilities. Nurses and midwives are primary healthcare providers who attend to sick and well children in all the health centres. According to staff establishment of the district, the number of nurses and midwives in the prioritised four centres was 301 (LDCHO, 2014). The distribution was as follows; Kanyama - 73, Chawama - 91, Kamwala - 61 and Kalingalinga - 76.

Sample Size

Two sample sizes were calculated; sample for self-administered structured questionnaire and sample for observation screening children less than 5 years presenting with diarrhoea. Children's caretakers whose child was screened by observed participant formed a sample for exit interview.

Sample for Self-Administered Structured Questionnaire.

The sample size of nurses and midwives was calculated from 301; the population of nurses and midwives in the four prioritised health facilities that were seeing under five children. A simplified formula for proportions (Creative Research Systems, 2017) was used to calculate the sample size for questionnaire administration.

$$n = \frac{N}{1 + N(e)^2}$$

Where;

n   =   Sample size

N   =   Population of nurses and midwives = 301

e =   Preferred precision/ marginal error (0.05)

$$n = \frac{301}{1 + 301(0.05)}$$

$$n = \frac{301}{1 + 301(0.05)(0.05)}$$

$$n = \frac{301}{1 + 301(0.0025)}$$

$$n = \frac{301}{1 + 0.7525}$$

$$n = \frac{301}{1.7525}$$

$n = 171.754636$

$n = \underline{\textbf{172}}$

Since the study was conducted in four (4) centres, ratios were used to get the sample for the

nurses and midwives.

Ratio = Kanyama Clinic: Chawama Clinic: Kamwala Clinic: Kalingalinga

= 73:91:61:76   =   73 + 91 + 61 + 76   = **301**

Therefore, centre sample size was calculated using the formula

Css =   Cpop X New ss
                      Tpop

Css	=	Centre sample size
Cpop	=	Nurses and midwives at a given health centre
New ss	=	Study sample size – 172
Tpop	=	Total number of nurses and midwives for four health centres – 301

Table 1: Calculated Sample Size per Health Centre for Questionnaire Administration

Health centre	Nurses and midwives per centre	Result	Sample size for each centre
Kanyama	73	41.7	42
Chawama	91	52.0	52
Kamwala	61	34.9	35
Kalingalinga	76	43.4	43
Total # of nurses and midwives, from 4 health centres	**301**		**172**

Sample for Observation Checklist and Exit Interview.

To get the sample size for observations, mathematical calculation of subtraction was done first. Sample size for questionnaire administration was subtracted from the total number of nurses and midwives in the four prioritised health facilities.

Step 1 ssObs = pop - New ss

Given that   ssObs   = Sample size for observations

　　　　　　　pop   = estimated population of nurses and midwives = 301

　　　　　　　New ss   = Sample size for questionnaire administration = 172

　　　　　　　301 - 172 = **129**

The substrate had the following ratio; Kanyama 31, Chawama 39, Kamwala 26 and Kalingalinga 33. The simplified formula for proportions was used to determine the sample size for observations

$$n = \frac{N}{1 + N(e)^2}$$

Where;

n = Sample size

N = Substrate population of nurses and midwives = 129

e = Preferred precision/ marginal error (0.05)

$$n = \frac{129}{1 + 129(0.05)}$$

$$n = \frac{129}{1 + 129(0.05)(0.05)}$$

$$n = \frac{129}{1 + 129(0.0025)}$$

$$n = \frac{129}{1 + 0.3225}$$

$$n = \frac{129}{1.3225}$$

$n = 98.54253308$

$n = \underline{\underline{99}}$

Since the study was conducted in four (4) centres, ratios were used to get the sample of under five children with diarrhoea to be assessed per centre.

Ratio = Kanyama Clinic: Chawama Clinic: Kamwala Clinic: Kalingalinga

Kanyama 31, Chawama 39, Kamwala 26 and Kalingalinga 33.

$$= \quad 31{:}39{:}26{:}33 \quad = \quad 31{+}39{+}26{+}33 = \mathbf{98}$$

Therefore, centre sample size was calculated using the formula

Css = $\quad$ <u>Cpop X New ss</u>
$\qquad\qquad\qquad$ Tpop

Css $\qquad$ = $\qquad$ Centre sample size

Cpop $\qquad$ = $\qquad$ Nurses and midwives at a given health centre

New ss $\qquad$ = $\qquad$ Study sample size – 99

Tpop $\qquad$ = $\qquad$ Total substrate number of nurses and midwives for four health

$\qquad\qquad\qquad\qquad$ Centres – 129

Table 2: Calculated Sample Size per Health Centre for Observation

Health centre	Nurses and midwives per centre	Result	Sample size for each centre
Kanyama	31	23.8	24
Chawama	39	29.9	30
Kamwala	26	20.0	20
Kalingalinga	33	25.1	25
Total # of nurses and midwives, from 4 health centres	**129**	**98.8**	**99**

The caretakers to under-five children with diarrhoea assessed by observed research respondents participated in an exit interview. Due to demand for duties, only 59% (58) of nurses and midwives were observed assessing children. All care recipients whose children were assessed

gave response to the exit interview questionnaire of (**Figure 3).**
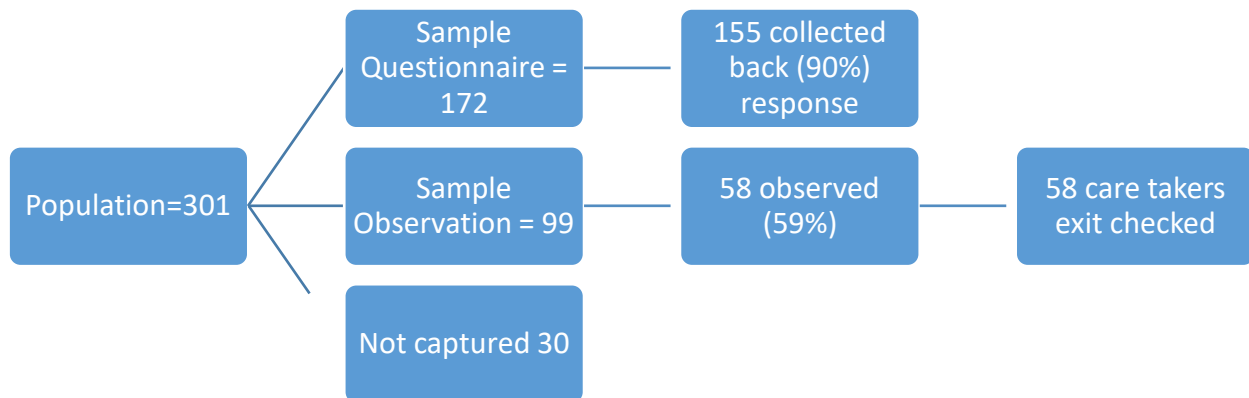
Figure 3: Breakdown of Study Sample Size

Sampling Method

Simple random sampling was used to select questionnaire respondents and observation respondents. Pieces of paper equivalent to the required sample were prepared. These were written "Questionnaire" and "Observation". Whoever picked a specific paper, that was his /her area of involvement in the study. For those who picked "Questionnaire" they were given structured questionnaires to respond. The questionnaire was self-administered. For those who picked "Observation" they screened under-five children with diarrhoea. Simple random sampling was used to give an equal and independent opportunity for everyone to be drawn (Brink, Walt and Rensburg, 2012). Care takers automatically identified with observation case record identifier.

Inclusion Criteria.

All nurses and midwives who had screened sick under-five children for not less than 1 month before or who were allocated to under-five screening rooms were eligible. Nurses and midwives

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offer primary health services to children with childhood illnesses that include diarrhoea. Only nurses and midwives who were willing and consented were recruited. All caretakers whose children were assessed by observation research respondents and gave consent were legible.

Exclusion Criteria.

All nurses and midwives who had screened sick under-five children for less than 1 month or who were not allocated to under-five screening rooms as well as nurses and midwives who were not willing and did not consent were not recruited. All caretakers whose children were not assessed and managed by observation research respondents were not legible and all caretakers who did not consent were not legible.

Data Collection

Data collection were done by the researcher and assisted by Health Centre In-Charges. The questionnaire was self-administered. The researcher distributed the questionnaires and the Health Centre In-Charges corrected the completed questionnaires. On site orientation of Health Centre In-Charges was done on how to check for completeness of the questionnaires. The researcher was directly responsible with collection of data from respondents through observation and from caretakers through exit interviews. This was necessary for quality, efficiency and accuracy of data collection and management.

Data Collection Tools

Data were collected using a structured questionnaire, observation checklist and exit interview checklist. The questionnaire and observation checklist were adapted from IMCI supportive

supervision, monitoring and mentorship tool developed by WHO. The exit question Likert scale was adapted from Survey Monkey (2017) "Customer Satisfaction Survey Template". The Modification was done in order to ensure collection of specific data related to diarrhoea and dehydration management. The modification was done after pretesting the study.

Questions were developed using study objectives and concepts of Donabedian conceptual framework for quality of health care. Independent and dependent variables were studied. The dependent variable for the study was management of dehydration. The independent variables were: availability of resources, Care delivery and Care coordination. These were used to guide the structure and flow of questions in the tool. The questionnaire was written in English.

The questionnaire was divided into four sections. Section A covered demographic characteristics to assess structure. Demographic data used to assess structure were: equipment and human resource. Section B and C covered process. Data from section B was used to assess knowledge on Care delivery and Care coordination. This was done by asking nurses and midwives questions on how the child with AGE should be assessed, classified and treated. Data from section C were used to examine application of knowledge to Care delivery and Care coordination. This was done by asking nurses and midwives specific practical questions on management of dehydration due to AGE. Section D covered availability of resources. Data from this section was to complement data for assessing structure.

The observation checklist had three sections that are demographics, skills and summary sections. These were deduced from the questionnaire. The demographic section was used to gather

information about the healthcare provider. The skills section was used to assess the process of assessing, classifying and treating dehydration due to AGE. The summary section was used to check the completeness of the process of assessing and classifying. Summary was done on a Likert scale with scales of 1- 5. On scale there was   1= Poorly managed; 2=Not well managed; 3= Somewhat well managed; 4= Well managed; and 5= Excellent management. Data from observation checklist was used to complement application of knowledge.

The exit checklist for the caretaker was a Likert scale with scales of 1-5. The Likert scale had 5 questions. On the scale; 1=strongly disagree; 2=disagree; 3=neither; 4=agree; and 5=strongly agree. The questions were used to evaluate caretaker satisfaction.

Pre-testing the Study tool

Pre- testing was conducted at Hospital Affiliated Centre (HAC) of Chilenje 1st Level Hospital in November 2016. This is a clinic within hospital clinic performing functions of a health centre. Using the introductory letter from the District Health Director, permission was granted by the Health Centre In-Charge to conduct the pre-test. The purpose of pre-testing was to determine feasibility of the methodology and increase validity and reliability of the tools. The tools were modified after pretesting.

On the day of conducting the pre-test, there were 18 Nurses and Midwives on duty. The In-Charge set aside the staff room to be used for explanation of the purpose of the study and pre-test as well as collection of informed consent from the nurses and midwives who would participate in the pre-test. The researcher explained to the nurses and midwives that they were being requested

to participate in the study because they were the frontline healthcare providers that primarily were assessing and managing childhood illnesses. He further explained that their participation in the pre-test would positively help to guide how the main study should be conducted.

The sample size was calculated using the proportion of 75% of Nurses and Midwives screening under five children. Data were collected from 14 respondents. Using a simple random sampling method, 14 pieces of paper were prepared on which the word "Questionnaire" was on 10 pieces and the word "Observation" was written on 4 pieces. The respondents got involved in the pre-test according to the piece of paper they had picked. Therefore, data were collected from 14 nurses and midwives (10 for the questionnaire and 4 for observation) and 4 guardians.

Self-administered questionnaires were given to the 10 respondents. They completed the questionnaires form the staff room. After completion, the centre In-Charge collected the questionnaires. Each of the 4 Observation Respondents assessed and managed one child with diarrhoea. Observation checklist was used. Each participant was observed on average for 15-20 minutes. The researcher explained to the 4 care takers for the assessed children the purpose of the pre-test and their expected roles. Consent was obtained for participation from the care takers. Data were collected using the observation checklist.

All the three data collection tools were checked for completeness. A data set was created in the International Business Machines Statistical Package for Social Sciences Statistics (IBM SPSS) version 24.0. This was used to analyse data. Descriptive statistics were computed and the findings. Frequencies were generated; percentages and means were calculated.

Corrections made were on the questionnaire. Question 11 second response was changed from "Duration of hydration" to read "Duration of rehydration". Question 21 changed from "What fluids do you give for dehydration in malnutrition" to read, "What fluids do you give for dehydration in severe acute malnutrition?" Question 51 "If YES to No.61, Zinc tablets should be given for how many days?" was rewritten to read "What is the duration for Zinc supplementation in a child with dehydration due to diarrhoea?" Questions 55 "Do you have rehydration room for children?" and 56 "If YES to No.55 is the room equipped with necessary furniture?" were deleted and replaced with "Is your rehydration room equipped with necessary furniture?"

Changes on the observation checklist were on the following questions; Q.17 "Healthcare provider prescribed Zinc?" to be followed by Q.19 "Healthcare provider explained the dose, route and frequency of Zinc" and Q.18 "Healthcare provider educated caregiver on preparation and giving of ORS" to be last. Case Summary Sheet was also added. After pretesting, the only changes done to Exit Questionnaire was addition of Summary Sheet to rate satisfaction. Ethical considerations were followed as in the real study.

Reliability and Validity

Reliability is the measure of the degree of consistency with which an instrument measures the target attribute (Polit & Beck, 2010). Adapting the tool from the already existing standardised IMCI recording forms and IMCI supportive supervisory tools ensured reliability. The researcher ensured content validity through consultation with the Principal IMCI Officer who assisted in reviewing the content and structure of the tools to ensure that it was relevant and comprehensive. Validity was further enhanced through use of information from reviewed literature.

Ethical Consideration

The proposal was reviewed by ERES Converge IRB to ensure that ethical issues had been considered. Thereafter, approval was obtained for data collection from Ministry of Health, Provincial Health Office, District Health Management Office, and Health Centre In-charges and respondents. The major ethical issues in this study were; informed consent, respect for anonymity and confidentiality. Confidentiality, anonymity, privacy, self-determination, fair treatment and protection from any harm, were adhered to.

Respondents were assured of confidentiality and that their identity would not be disclosed in the final report or publications. Self-determination was done by informing the respondents that they had the right to refuse to participate or withdraw from the study at any point if they felt uncomfortable. They were also informed that they could refuse to answer any questions if uncomfortable. They were further informed that their participation in the study had no direct benefit to them, but that research results would help better the quality of child health services provided for dehydration management. Furthermore, they were assured that their refusal to participate in the study would not affect their job security and that there was no link between their job and their participation.

The respondents were informed that there would be no risks involved with their participation in the study. They were encouraged to contact the chairperson of ethics committee, if they felt that their rights were being violated in any way. An information sheet was given to the respondents and respondents for them to understand study objectives and its relevance. A signed consent form was obtained indicating willingness and acceptance to participate in the study.

Data Collection Process

The researcher and research assistants who were health centre managers collected the data. At each health centre, the researcher paid a courtesy call to the health centre in charge. An introductory letter from the District Medical Officer (DMO) and letter of ethical approval was shown for permission to collect data. Permission was obtained as well from nurses and midwives and care recipients to collect data.

Nurses and midwives on duty were asked to meet in the staff room or any other room made available. The researcher introduced himself. The nurses and midwives were asked to introduce themselves by their job title whilst withholding their names for anonymity. This gave an opportunity to identify nurses and midwives to participate in the study. The researcher explained the objective of the study. The respondents were given the information sheet **(Appendix 1)** for them to understand the relevance of the study. The nurses and midwives then gave an informed consent before administration of the questionnaire **(Appendix 2)**. The structured questionnaire **(Appendix 3)** was administered to nurses and midwives.

Pieces of paper equivalent to the required sample were prepared. These were written "Questionnaire" and "Observation". Whoever picked a specific paper, that was his /her area of involvement in this study. For those who picked "Questionnaire" they were given structured questionnaires to respond. The questionnaire was self-administered. Collection of filled in and completed questionnaires were collected through health centre in charges.

Respondents who picked pieces of paper Witten "Observation" screened under-five children

with diarrhoea. In order to avoid Hawthorne effect (Brink, Walt & Rensburg, 2012) by

respondents changing their behaviour because of awareness of being observed, the researcher

checked the case record books to complete the observation checklist. Checking of records was in

addition to observation.

The researcher introduced himself to the care recipients whose children had been assessed by

observation research respondents. The researcher explained the objective of the study. An

informed signed consent was obtained. The researcher completed the checklist by conducting an

exit survey using questions on the Likert scale. The researcher thanked the respondents for

participating.

Data Management and Analysis

All questionnaires were checked for completeness at the site of data collection and soon after the

respondent had completed the tool. International Business Machines Statistical Package for

Social Sciences Statistics (IBM SPSS) version 24.0 was used to analyse data. All the

questionnaires (N=155), observation checklist (N=58) and exit questionnaires (N=58) were

eligible for data entry and analysis. Files containing information and data were password

protected. Hard copies were securely locked up in lockable drawers. Cleaning of data was done.

Simple statistics such as frequencies were done to check for omissions or errors with data entry.

Check and double-checking was compared with raw data from the questionnaires to make

corrections.

Descriptive statistics were computed and the findings have been presented as frequencies, percentages and means. Interpretation of the findings has been enhanced by Tables and charts (pie and bar). Nominal and ordinal data on knowledge and practice of nurses and midwives on assessment, classification and management, was analysed using descriptive statistics, cross tabulations and Pearson's chi square test.

Chapter 4

Findings

Introduction

This chapter presents study findings on management of dehydration in under-five children with AGE by nurses and midwives. The findings are presented and organized following Donabedian's conceptual model for quality and the study objectives that guided the study. Concepts for Donabedian's Framework are structure; process and outcome. The broad objective was to assess management of dehydration in under-five children with acute gastroenteritis in selected health centres in Lusaka, Zambia. The specific objectives were: to assess availability of resources (structure) in the management of dehydration in under-five children with AGE; to examine the process of management of dehydration in under-five children with AGE; to evaluate caretaker satisfaction (outcome) with care given during the management of dehydration due AGE; and to analyse associations between healthcare provider characteristics, caretaker satisfaction and case management. The findings of the study using the conceptual framework and objectives are presented concurrently.

A total of 155 respondents answered the self-administered structured questionnaire. This represents 90% response rate, while 58 respondents were observed assessing and treating children and mothers to these children were interviewed using and exit interview checklist. Triangulation of data collection method was done in order to minimize procedural bias that would have arisen due to the method used to collect data using the structured self-administered questionnaire. Triangulation of data was also done to enrich the quality of data collected using different data collection methods. This adds value to the findings by explaining different aspects

of dehydration management in diarrhoea. For these reasons, methodological triangulation (Kennedy, 2009) was used and it involved data collection using self-administered structured questionnaire from 155 nurses and midwives, 58 nurses and midwives through observations and from 58 mothers through an exit interview.

Data were analysed in three categories; data from self-administered questionnaire, data from observations, and data from exit interviews. Findings are presented according to the study objectives and conceptual framework. The statistical package IBM SPSS version 24.0 was used to analyse data. Descriptive statistical analysis was used to identify frequencies and percentages to answer to achieve the objectives as guided by the Donabedian's Conceptual Framework. The statistical significance of relationships among selected variables was determined using the Chi-square test. The level of significance was set at 0.05.

Data from Self-Administered Questionnaire

Structure.

Availability of care giving resources assessed structure of management of dehydration. Variables used to assess were: human resource; sources for initial assessment; and supportive supervision.

Human resource.

Healthcare provider demographic characteristics asked were; professional level of education; duration of service; in service training; experience screening under five children; children screened per day; knowledge of nurses and midwives on dehydration management. These characteristics were assessed as they contribute to structure of quality of service.

The majority of respondents 58% (n=90) were RNs and the least was Registered Midwife 1% (n=1). Most of the respondents 43% (n=66) had no in-service training in child survival skills after basic training, while only 39% (n=60) were trained in IMCI (**Table 3)**. Furthermore, most of the respondents 41% (n=63) had a duration of service of between 1 to 5 years. The mean duration of service was 10.5 years (SD ±1.5). Few respondents 45% (n=69) had been screening children for more than 3 years, while 25% (n=39) had been screening children for less than 1 year. The mean duration of screening children was 2.5 years (SD ±1.7).

Table 3: Demographic Characteristics for Questionnaire Respondents

N=155

Professional training	Frequency	Percent	Duration of service (mean 10.5 (SD ±1.5))	Frequency	Percent
Enrolled Nurse	44	28.4	1-5years	63	40.6
Enrolled Midwife	16	10.3	6-10years	34	21.9
Registered Nurse	90	58.1	11-15years	17	11
Registered Midwife	1	0.6	16-20years	13	8.4
BSN	4	2.6	> 20years	28	18.1
Total	155	100	Total	155	100

In service training	Frequency	Percent	Experience screening< 5 years (mean 2.5 (SD ±1.7))	Frequency	Percent
IMCI	60	38.7	Less than 1year	39	25.2
ETAT	6	3.9	1year	7	4.5
None	66	42.6	2years	15	9.7
Other	23	14.8	3years	25	16.1
Total	155	100	More than 3 years	69	44.5
			Total	155	100

Supervision.

Workload and supervision are part of structure in management of dehydration. Respondents were asked to indicate the average number of children they were assessing every day and whether they were receiving supportive supervisory visits. Twenty seven percent (n=42) of the respondents were screening more than 40 children every day (**Table 4**). On average the number of children screened on daily basis was 20-29 children. Only 41% (n=64) indicated that they received

supportive supervisory visits related to assessment and management of children, while 3% (5)

respondents did not respond.

Table 4: Workload and Supportive Supervisory Visits

N=155

Children screened per day	Frequency	Percent	Supportive supervisory visits	Frequency	Percent
0-9	36	23.2	Yes	64	41.3
10-19	40	25.8			
20-29	23	14.8	No	86	55.5
30-39	14	9			
40 and above	42	27.1	No answer	5	3.2
Total	155	100	Total	155	100

Knowledge on care delivery and care coordination.

To examine knowledge on care delivery and care coordination, the following were assessed;

diarrhoea assessment; classifying dehydration; treatment plans for dehydration; use of Zinc in

dehydration management; fluids for severe acute malnutrition and severe dehydration; amount of

fluid determination; duration for rehydration in children; and determining evidence of statistical

significance.

Diarrhoea assessment.

Respondents' knowledge was examined by assessing diarrhoea assessment using the following

variables: use of age; weight; assessing for vomiting; lethargy/unconsciousness; drinking

poorly/thirsty; sunken eyes; skin turgor; classification; and management. Majority of respondents

63% (n=97) indicated that age of the child was used for calculation of fluids. Only 26% (n=40)

indicated that it was used to determine duration of rehydration. Majority of the respondents, 98%

(n=152) indicated that weight was used for calculation of fluids, while 2% (n=3) indicated that it

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was for determining duration of rehydration **(Table 5).**

Table 5: Assessing for Diarrhoea

N=155

Use of age	Frequency	Percent	Use of weight	Frequency	Percent
Calculation of fluid	97	62.6	Calculation of fluid	152	98.1
Duration of hydration	40	25.8	Duration of hydration	3	1.9
Not sure	18	11.6	Total	155	100
Total	155	100			
Vomits everything	**Frequency**	**Percent**	**Lethargic/unconscious**	**Frequency**	**Percent**
History taking	59	38.1	Calling	11	7.1
Child visibly vomiting	28	18.1	Interested in the environment	138	89
Offer water	68	43.9	Not sure	6	3.9
Total	155	100	Total	155	100
Thirst/drinking poorly	**Frequency**	**Percent**	**Sunken eyes**	**Frequency**	**Percent**
Offering water to drink	54	34.8	Drooping eyelid	18	11.6
Child refusing	85	54.8	Eyes looking hollow	119	76.8
Child spitting	12	7.7	Child looks sleepy	10	6.5
Not sure	4	2.6	Not sure	8	5.2
Total	155	100	Total	155	100
Skin pinch	**Frequency**	**Percent**			
Between umbilicus and chest	23	14.8			
Around umbilicus	13	8.4			
Between umbilicus and side of abdomen	119	76.8			
Total	155	100			

Few respondents 44% (n=68) said they would offer water to check and confirm the sign of

vomiting everything. Majority of the respondents 89% (n=138) said they would confirm sign of

lethargy or unconscious taking note the interest the child has in the environment. Only 35%

(n=54) of the respondents indicated that they would offer water to drink or allow caretaker to

breast feed where applicable to confirm thirsty or drinking poorly. Majority 77% (n=119)

correctly indicated that they would look for hollow looking eyes to confirm sunken eyes. Fifteen

percent (n=23) of the respondents indicated that they would assess for skin turgor between the

umbilicus and chest, while 8% (n=13) indicated that they would assess around the umbilicus.

Classifications for dehydration.

Respondents were asked to indicate classifications for dehydration almost all the respondents 98% (n=152) said classifications of dehydration according to IMCI are "No dehydration", "Some dehydration", and "Severe dehydration", while 2% said it was "Severe dehydration".

Treatment plans for dehydration.

Knowledge on treatment plans was assessed. All the respondents (100%) indicated that treatment plans for dehydration were "Plan A", "Plan B" and "Plan C".

Use of zinc in dehydration management.

Knowledge of respondents on use of Zinc in dehydration management due to diarrhoea was assessed. Sixty eight percent (n=106) of the respondents said Zinc is used to reduce the duration and severity of diarrhoea, while 32% (n=49) indicated that it is used to replace lost electrolytes. #

Fluids for severe acute malnutrition and severe dehydration.

Respondents were asked to indicate fluids used for severe dehydration in a child with severe acute malnutrition and in a well-nourished child. A few respondents 53% (n=82) correctly indicated they would use ReSoMal to manage dehydration in severe acute malnutrition, while 19% (n=29) said they would use Half Strength Darrow's with 5% Dextrose **(Table 6)**. With regards to severe dehydration in a nourished child, the majority of the respondents 85% (n=131) correctly said they would you give Ringers Lactate, 8% (n=12) said they would use Normal Saline.

Table 6: Fluids for Severe Acute Malnutrition and Severe Dehydration

N=155

Fluids for dehydration in malnutrition	Frequency	Percent
Half strength Darrow's with 5% dextrose	29	18.7
Ringers lactate	23	14.8
ORS	8	5.2
ReSoMal	82	52.9
Not sure	13	8.4
Total	**155**	**100.0**
Fluid for severe dehydration in a well-nourished child	**Frequency**	**Percent**
Normal saline	12	7.7
Half strength Darrow's with 5% dextrose	12	7.7
Ringers lactate	131	84.5
Total	**155**	**100.0**

Amount of fluids.

Respondents were asked to indicate amount of fluids per kg body weight for severe and some dehydration in a well-nourished child. Most of the respondents 66% (n=102) would correctly give 100ml/kg for severe dehydration, while only 32% (n=50) would correctly give 75ml/kg for some dehydration **(Figure 4)**.

(N=155)
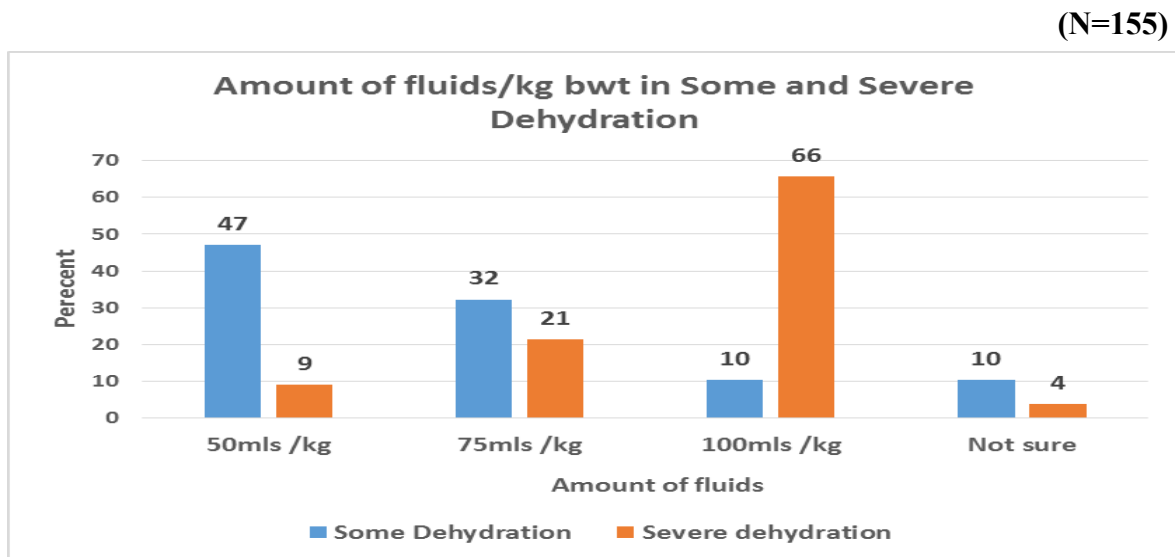
Figure 4: Fluid Calculation for Severe and Some Dehydration

Amount of fluids for shock due to diarrhoea.

Respondents were asked to indicate amount of fluids per kg body weight in a child with shock. Only 22% (n=34) of the respondents would give 20ml/kg in a child presenting with shock. Most of the respondents 36% (n=56) would give 10ml/kg.

Duration for rehydration in children aged under 5 years.

Respondents were asked to indicate the duration for rehydration for some dehydration in children aged under 5 years. Only 21% (n=33) of respondents correctly indicated that they would rehydrate the child for 4 hours, while most of the respondents 30% (n=47) indicated that they would rehydrate a child for 2 hours **(Figure 5)**.

(N=155)
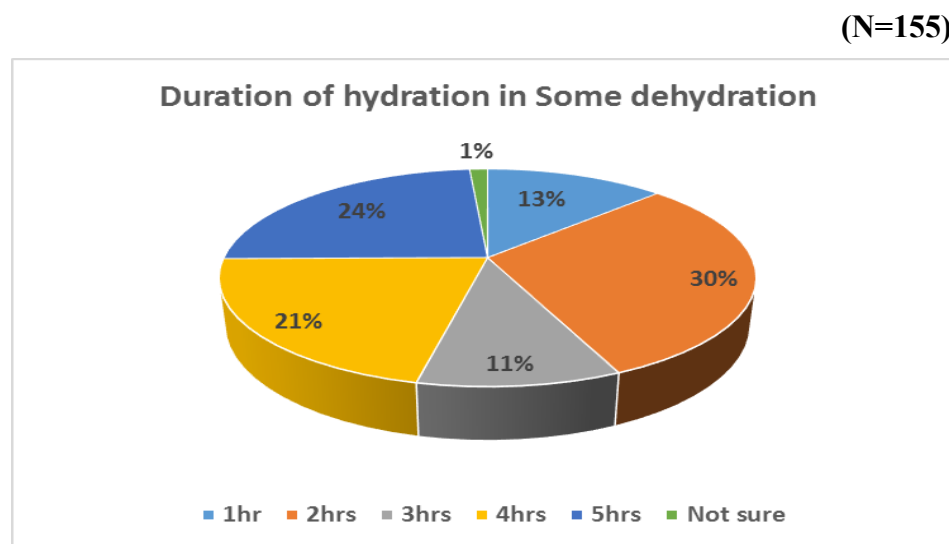
Figure 5: Duration for Rehydration in a Child with Some Dehydration

Duration for rehydration in children <12 months and 12 to 59 months.

Only 30% (n=47) of respondents correctly indicated that they would rehydrate a child <12 months with severe dehydration for 6 hours, while 32% (n=50) correctly indicated that they would rehydrate a child aged between 12months and 59 months for 3 hours **(Figure 6)**.

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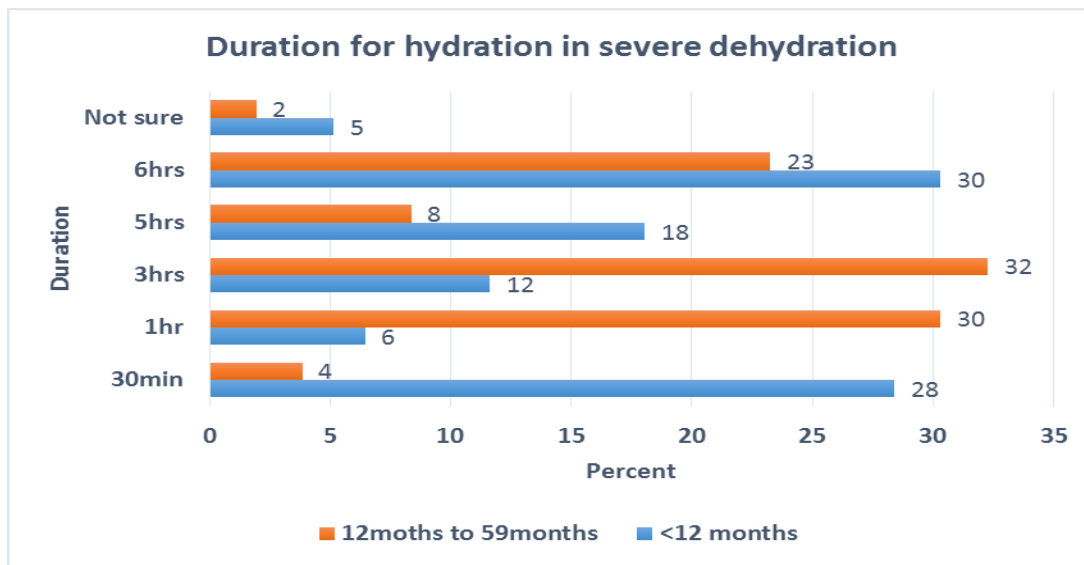
Figure 6: Duration of Hydration in Severe Dehydration

Professional education, duration of service, in-service and knowledge.

Cross tabulations were computed to determine the association between professional education, duration of service, in-service and knowledge at 95% confidence interval (5% level of significance). There was no significant statistical association between professional education and knowledge of dehydration management by age $\chi^2 = 9.963$ df = 8 p-value 0.268. However, there was significant statistical association between in-service training and knowledge of treatment for severe dehydration in an infant $\chi^2 = 50.935$ df = 5 p-value 0.000 (**Table 7).**

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Table 7: Association Between Professional Education, Duration of Service, In-Service and Knowledge

Association	Pearson's Chi-Square Test(χ^2)	Degree of freedom (df)	p-value
Professional education and knowledge of dehydration management by age	9.963	8	0.268
Duration of service and knowledge of dehydration management by age	20.266	8	0.009
In-service training and knowledge of dehydration management by age	16.820	6	0.010
Professional education and knowledge of treatment for severe dehydration in an infant	95.469	20	0.000
In-service training and knowledge of treatment for severe dehydration in an infant	50.935	15	0.000

Resources for initial assessment.

Availability of resources for initial assessment was assessed using the following variable: thermometers, number of weighing scales, types of scales, and appropriateness of scales. Most of the respondents 33% (n=51) indicated that they had more than 3 thermometers in the triage area (**Table 8**). The mean number of thermometers was 2.6, (SD ±1.1). Most the respondents 62% (n=96) indicated that they had 1 weighing scale with mean of 0.6(SD ±0.9) and most of them 49% (n=76) indicated that they had hanging and standing scales, while 16% (n=24) said they had none. Majority 82% (n=127) of the respondents indicated that they had appropriate weighing scales for children, while 18% (n=28) Indicated that they did not have appropriate scales.

Table 8: Availability of Assessment Resources in the Triage Area

N=155

Number of thermometers (mean 2.6 (SD ±1.1))	Frequency	Percent	Type of weighing scales	Frequency	Percent
None	11	7.1	Hanging and standing	76	49
1	9	5.8	Baby and standing	28	18.1
2	50	32.3	Standing only	27	17.4
3	51	32.9	Others	24	15.5
More than 3	34	21.9	Total	155	100
Total	155	100			

Appropriate weighing scales	Frequency	Percent	Number of weighing scales (mean 0.6 (SD ±0.9))	Frequency	Percent
Yes	127	81.9	1	96	61.9
			2	44	28.4
No	28	18.1	More than 2	3	1.9
			None	12	7.7
Total	155	100	Total	155	100

Resources for case management.

Respondents were asked to indicate availability of essential resources for diarrhoea case management. Availability of each of the essential resource was dichotomous requiring a "Yes" or "No" answer. Only 8% (n=12) of the respondents indicated that they did not have ORS; 21% (n=33) indicated that they did not have treatment guidelines in the screening rooms; 38% (n=59) indicated that they did not have separate screening rooms for children; 40% (n=62) indicated that they did not have Zinc tablets; 52% (n=81) indicated that they did not have necessary furniture in Oral Rehydration Therapy Rooms; and only 1% (n=2) indicated that they did not have giving sets and cannula (**Figure 7**).
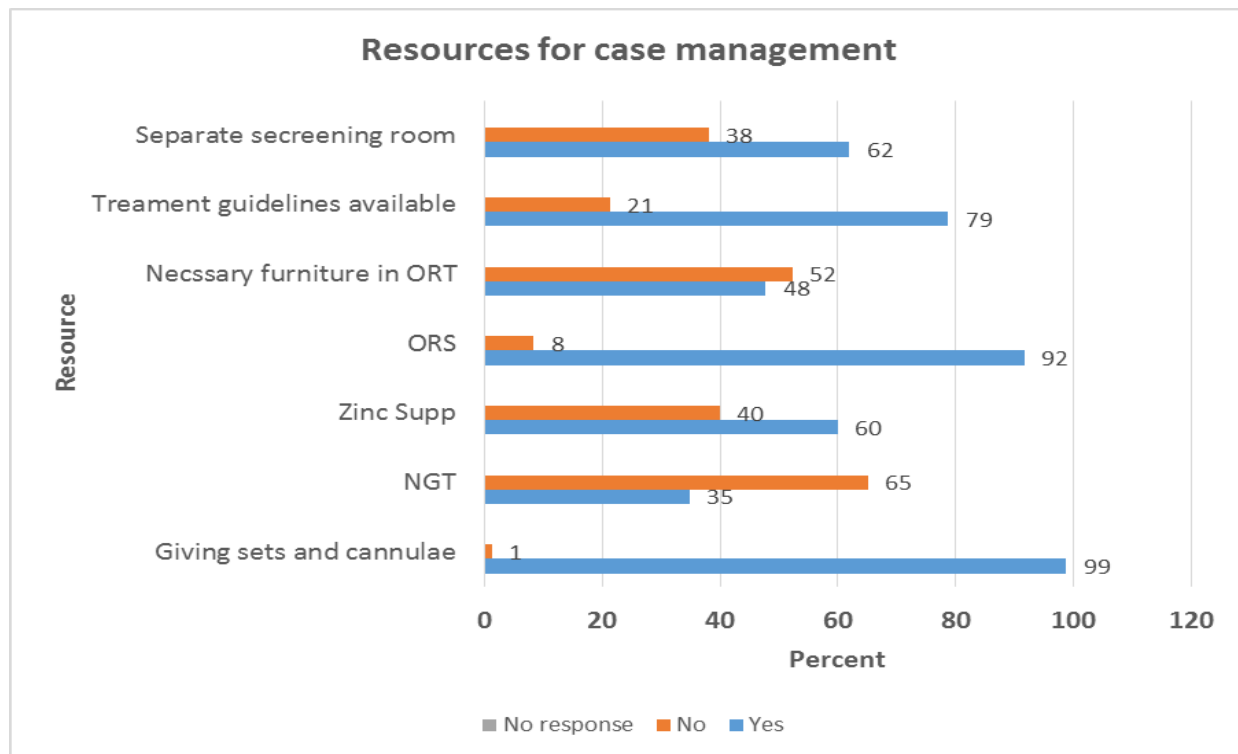
Figure 7: Resources for Case Management

Process.

Care delivery and care coordination forms the dimension of process in management of

dehydration. Care delivery and care coordination was examined using the following variables:

application of knowledge in the practice of diarrhoea and dehydration assessment, classification

and management.

Application of knowledge to practice in care delivery and care coordination.

To examine the application of knowledge to practice in care delivery and care coordination the

following variables were assessed; initial assessment; checking for general danger sign (GDS);

asking about diarrhoea; assessing for dehydration; use of chart booklet; checking for malnutrition

and random blood sugar; managing diarrhoea according to guidelines; management of some dehydration and severe dehydration; monitoring and evaluating hydration status on plan c; Zinc supplementation; information education and communication about ORS; and determining statistical significance of evidence.

Initial assessment.

This section presents findings on how respondents were applying knowledge to practice the delivery of care. The responses are based on the checklist responses of "never", "sometimes" and "always". The parameters assessed were checking temperature; determining the age of the child; checking the weight; and asking about the child's problems. Seventeen percent (n=26) of the respondents said they were not checking weight for children, while 81% (n=126) they always checked. There was very good response of "always" of over 90% for temperature, age and asking about child's problem.

Checking for general danger sign (GDS).

The findings have revealed that most respondents were checking for general danger signs. For example 21% (n=32) of the Respondents sometimes asked if the child had convulsions in the current illness. Very few respondents admitted to never checking for the following: 3% (n=4) lethargy/unconsciousness; 2% (n=3) not able to drink/breast feed; and 2% (n=3) vomiting everything **(Figure 8)**.
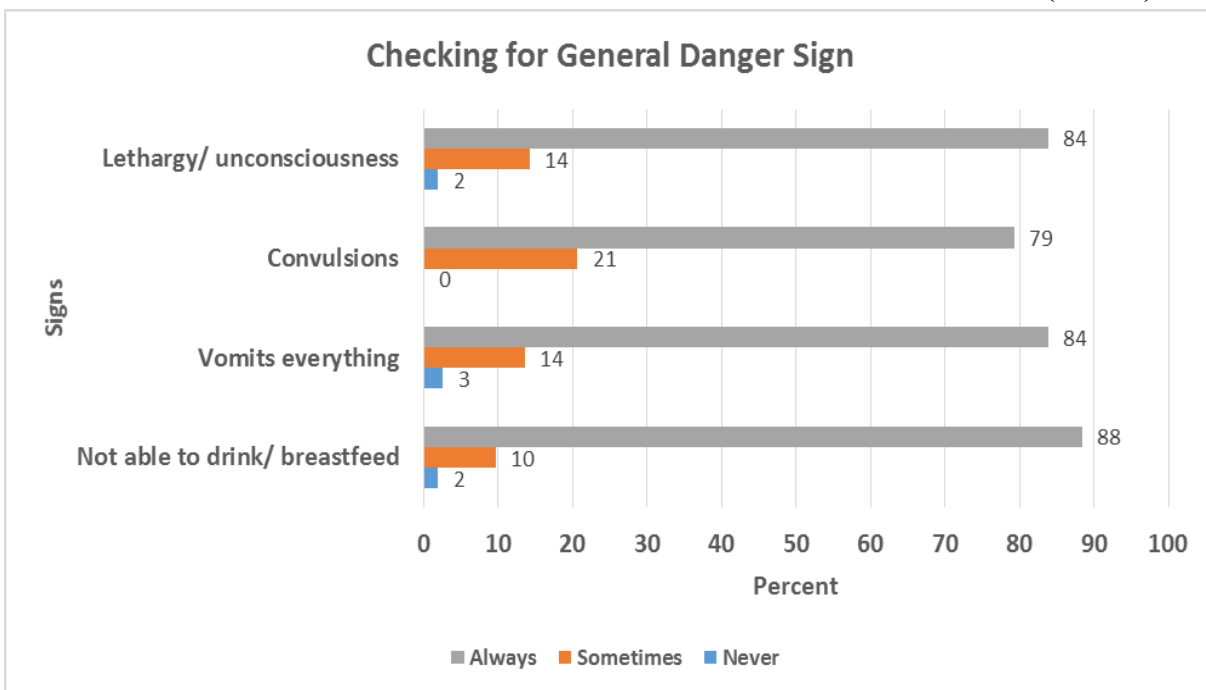
Figure 8: Checking for General Danger Sign

Asking about diarrhoea.

Respondents were asked to indicate if they were asking about diarrhoea and the duration of diarrhoea. Eighty eight percent (n=136) of the respondents indicated that they always asked about diarrhoea, while only 72% (n=112) always asked about the duration of diarrhoea. Twelve percent (n=19) of the respondents indicated that they sometimes asked about the presence of diarrhoea.

Assessing for dehydration.

Respondents were asked to indicate how they were practicing assessment for dehydration in a child with diarrhoea. The variables assessed were lethargy or unconsciousness; thirsty/ drinking poorly; sunken eyes; and skin turgor. The study found that more than 70% of the respondents were assessing the variables **(Figure 9)**. However, 12% (n=22) of the respondents sometimes

assessed for lethargy or unconsciousness; 21% (n=33) sometimes assessed for thirsty or drinking poorly; 10% (n=16) sometimes looked for sunken eyes; and 29% (n=45) sometimes assessed skin turgor by pinching the skin on the abdomen of the child. The study has also revealed that less than 5% of the respondents never assessed for sunken eyes, thirsty/drinking poorly and lethargy/unconsciousness.

(N=155)
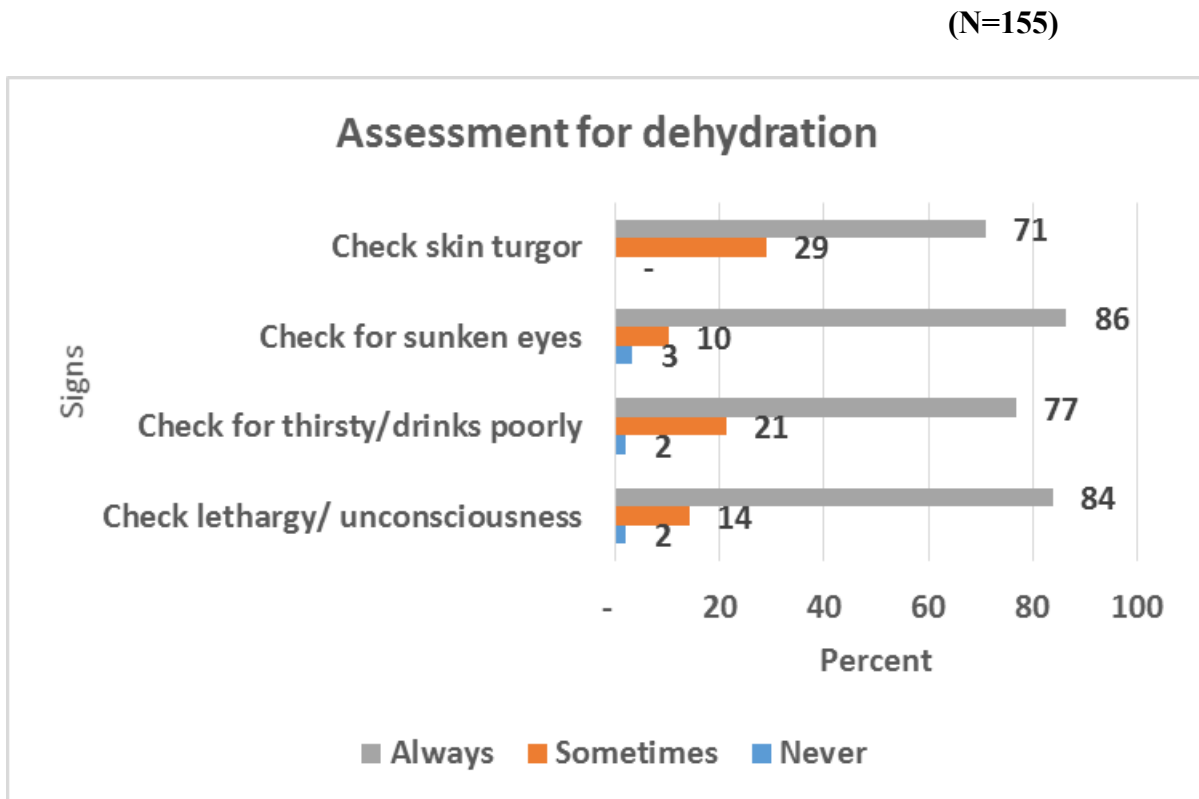
Figure 9 - Assessment for dehydration in diarrhoea

Used chart booklet to assess and classify.

Chart booklet is a clinical reference handbook for integrated management of childhood illnesses. It is expected that it is found in every room where screening of under five children is done. The study has revealed that only 54% (n=83) of the respondents always used a chart booklet to assess and classify diarrhoea for dehydration.

Checking for malnutrition and random blood sugar.

Thirty four percent (n=52) of the respondents sometimes checked for malnutrition and 19% (n=29) of the respondents checked the random blood sugar levels in children presenting with lethargy or unconsciousness in a child with diarrhoea; while 23% (n=35) never checked **(Figure 10)**.

(N=155)
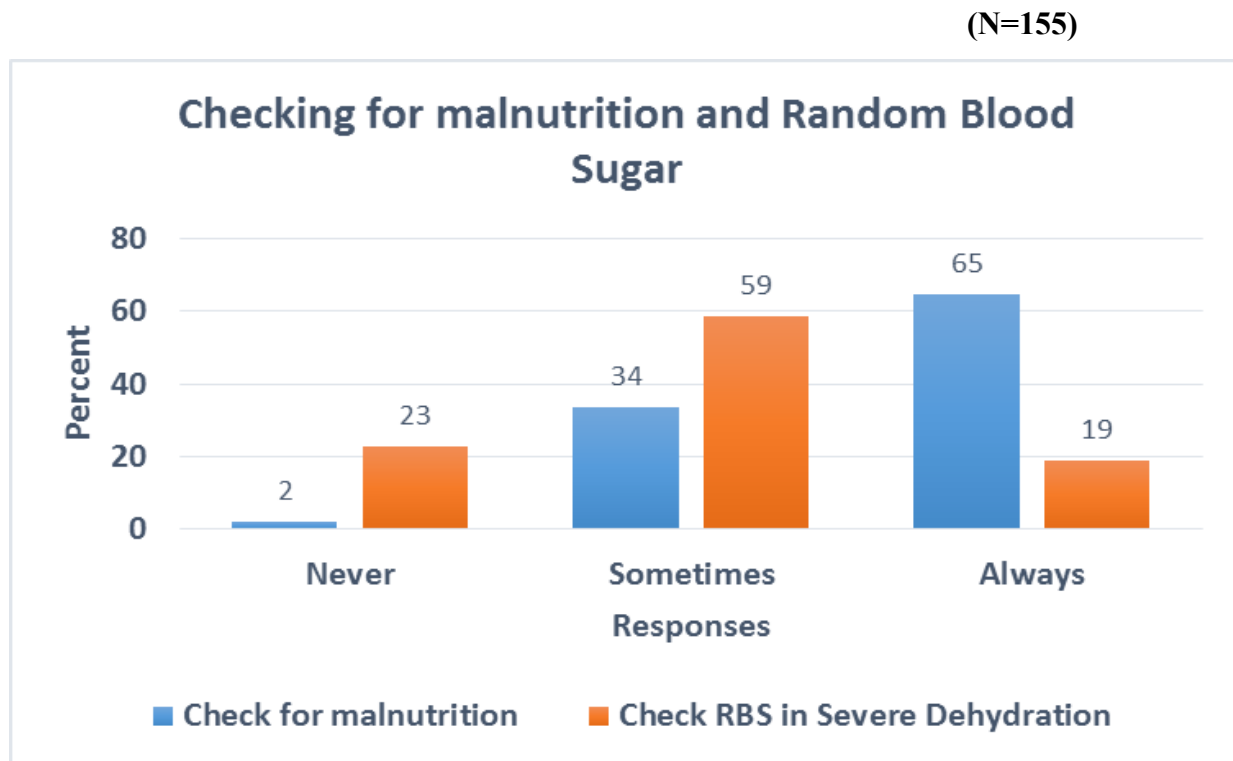
Figure 10: Checking for Malnutrition and Random Blood Sugar

Managing diarrhoea according to guidelines.

Respondents were asked to indicate how they were treating children with diarrhoea. Only 82% (n=127) always treated according to treatment plans. On the question of whether they were prescribing Zinc supplements to a child with diarrhoea, only 66% (n=103) of the respondents always prescribed Zinc supplements.

Management of some dehydration and severe dehydration.

Respondents were asked to indicate how they would manage children with some dehydration and severe dehydration. Majority of the respondents 91% (n=141) correctly indicated that they use IV fluids to manage severe dehydration, while 6% (n=9) indicated use of ORS to manage severe dehydration **(Figure 11)**. Twenty six percent (n=41) they use IV fluids to manage some dehydration, while 74% (n=114) use ORS to manage some dehydration.

(N=155)
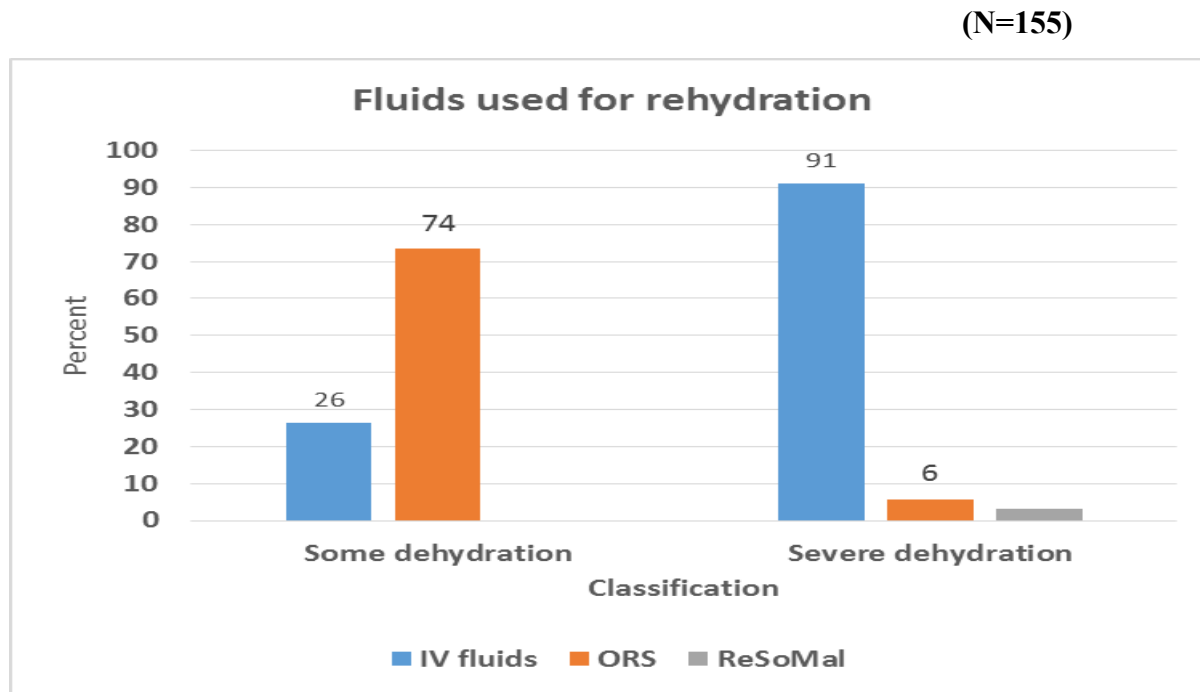
Figure 11: Fluids used for Rehydration

Monitoring and evaluating hydration status on plan c.

Respondents were asked to indicate how often they were reassessing a child for hydration on treatment plan C. Only 12% (n=19) of the respondents would correctly monitor and evaluate hydration status every 1-2 hours in a child on treatment Plan C for dehydration.

Zinc supplementation.

Zinc supplementation for diarrhoea is prescribed and given to reduce duration and severity of diarrhoea. The majority of the respondents 84% (n=130) indicated that they were prescribing Zinc tablets in diarrhoea.

Furthermore, respondents were asked to indicate for how long the child with diarrhoea should take Zinc tablets. Zinc is prescribed for 14 days. Majority 46% (n=71) prescribed for 10 days. Only 30% (n=47) of the respondents prescribed Zinc tablets for 14 days according to guidelines, while 2% (n=3) gave no response. Others prescribed for 7 days of less.

Information education and communication about ors.

Respondents were asked to indicate whether they were giving education to caretakers on ORS use. Almost all the respondents 96% (n=149) were teaching how to give ORS at home, while only 4% (=6) were not.

Statistical significance of evidence.

Cross tabulations were computed to determine Statistical significance of evidence at 95% confidence interval (5% level of significance) between professional level of education; duration of service; in-service training; years of screening; use of chart booklet; and use of age in dehydration management; duration of hydration; choice of fluids for dehydration management.

There was significant statistical association between use of chart booklet in the assessment, classification and management of diarrhoea and choice of fluids to manage severe dehydration χ^2

= 155.000 df = 4 p-value 0.000. There was also a significant statistical association between duration of service and knowledge on use of age in dehydration management χ^2 = 20.266 df = 8 p-value 0.009 **(Table 9)**.

Table 9: Association between Professional Education, Duration of Service, In-Service and Dehydration Management

Association	Pearson's Chi-Square Test(χ^2)	Degree of freedom (df)	p-value
Professional education and use of chart booklet	29.964	8	0.000
Duration of service and knowledge on use of age in dehydration management	20.266	8	0.009
Professional education and knowledge on duration of hydration in a child <12months with severe dehydration	95.469	20	0.000
In-service training and knowledge on duration of hydration in a child <12months with severe dehydration	50.935	15	0.000

Data from Observation Checklist

   Structure.

Availability of care giving resources determined structure of management of dehydration. Variables used to assess were: human resource; sources for initial assessment; workload and supportive supervision.

   Human resource.

Heath care provider demographic characters asked were; professional level of education; duration of service; and in service training. These characteristics were assessed as they contribute to structure of quality of service. Respondents observed were (N=58), 55% (n=32) were RNs, while the other 45% (n=26) were ENs. Most of the respondents 38% (n=22) had longest duration of service of more than 20 years **(Table 10)**. This is followed by the age group of 1 - 5 years. The

mean duration of service was 15.5 years (SD ±1.6). Most of the respondents 40% (n=23) had no in-services training and 43% (n=25) were trained in IMCI, while only 2% (n=1) was trained in ETAT.

Table 10: Demographic Characteristics of Observed Respondents

		N=58
Professional level of education	**Frequency**	**Percent**
Enrolled Nurse	32	55.2
Registered Nurse	26	44.8
Total	58	100.0
Duration in service(mean 15.5 (SD ±1.6))	**Frequency**	**Percent**
1-5years	11	19.0
6-10years	7	12.1
11-15years	10	17.2
16-20years	8	13.8
More than 20years	22	37.9
Total	58	100.0
In service training	**Frequency**	**Percent**
IMCI	25	43.1
ETAT	1	1.7
None	23	39.7
Other	9	15.5
Total	58	100.0

Process.

Care delivery and care coordination was examined by observing respondents practice assessment, classification and management of diarrhoea and dehydration.

Initial assessment.

Respondents were observed to determine whether they were conducting initial assessment by checking age, weight and temperature and asking about the child's problem. Age, weight and temperature were already entered in the case records. Therefore, all the respondents 100% (n=58) were able to use information already provided.

Checking for general danger sign (GDS).

General danger signs are signs used to identify children who need urgent attention at a clinic by healthcare provider before referral to nearby hospital. Respondents were observed checking for GDS. General Danger signs are also used to monitor the condition of children waiting in the queue. Only 76% (n=44) of the respondents checked for the GDS, while 24% (n=14) respondents **(Figure 12)**. Presence and absence of GDS was determined in all the cases observed, whether GDS checked or not. Twenty one percent (n=12) of the cases had a GDS present, while 79% (n=46) it was absent therefore it was not applicable to take into consideration presence of GDS. However 9% (n=) of the respondents did not take into consideration the presence of GDS.

(N=58)
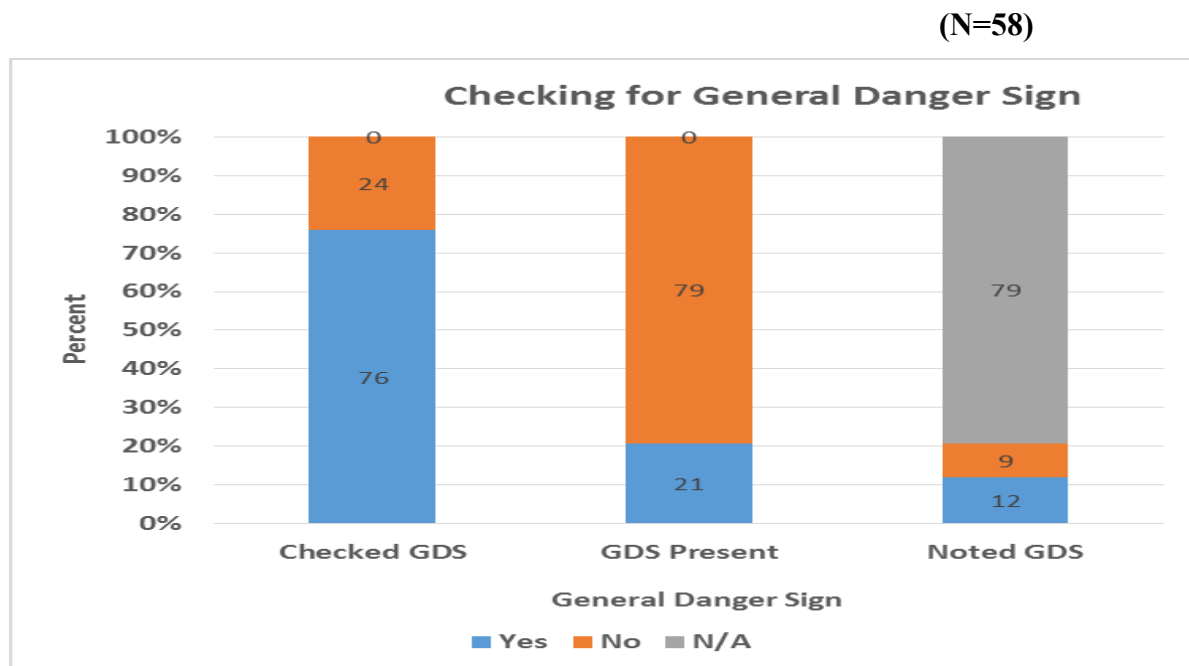
Figure 12: Checking for General Danger Signs

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Asking about diarrhoea.

Respondents were observed asking about diarrhoea according to IMCI guidelines. All the respondents 100% (n=58) asked about the presence of diarrhoea and the majority 95% (n=55) of the respondents asked about duration of diarrhoea.

Assessing for dehydration.

A dehydrated child first becomes restless and irritable and thereafter the child becomes lethargic or unconscious. When child's body loses fluids, the eyes look sunken and the skin turgor goes back slowly or very slowly. Respondents were observed assessing for dehydration. Some respondents did not complete assessment for dehydration **(Figure 13)**. Forty three percent (n=25) did not check for thirsty or drinking poorly; 33% (n=19) did not check for lethargy or unconsciousness. Commonly checked signs were skin turgor and sunken eyes. The majority of the respondents 83% (n=48) checked for skin turgor, while 76% (n=44) checked for sunken eyes.

(N=58)
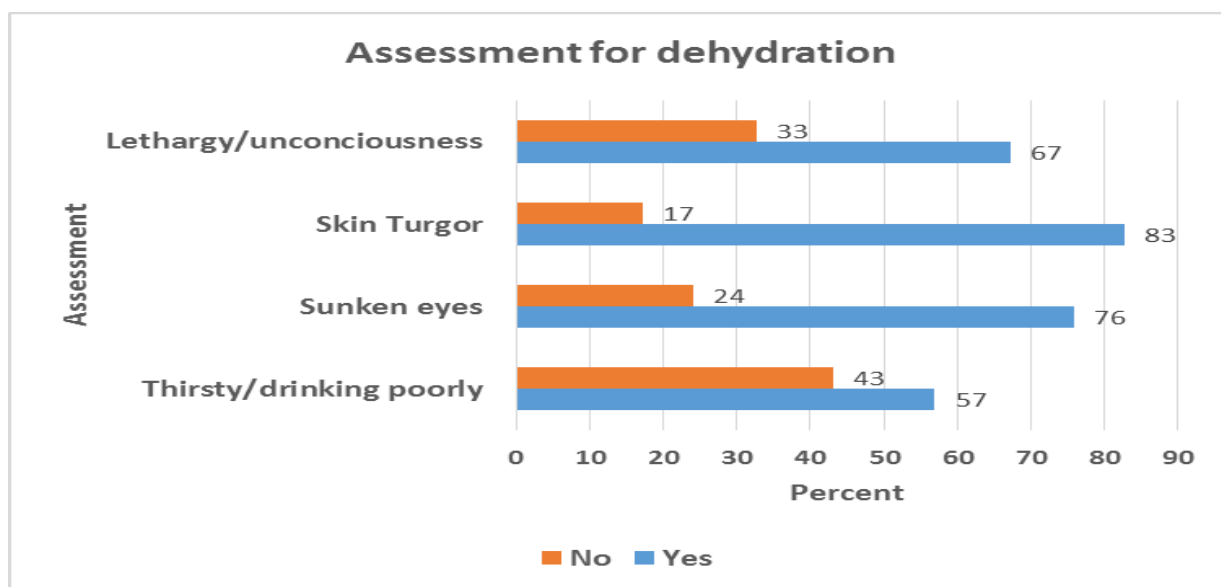
Figure 13: Assessing for Dehydration

Use of chart booklet.

Use of chart booklet was observed during assessment. Only 40% (n=23) of the respondents used that chart booklet assess and classify.

Checking for malnutrition.

A child with malnutrition has a higher risk of many complications including death. Early identification of children with malnutrition can help prevent complications and death. Only 50% (n=29) of the respondents checked for signs of malnutrition.

Classification for dehydration.

There are three possible classifications for dehydration in a child with diarrhoea: severe dehydration; some dehydration; and no dehydration. Classifications made during the observation were 69% (n=40) Some Dehydration; 12% (7) Severe Dehydration; and 19% (n=11) No Dehydration.

Checking for random blood sugar (RBS).

It is recommended that RBS be checked in every child presenting with lethargy to rule out hypoglycaemia. Checking for RBS in children presenting with lethargy/unconsciousness was observed. Children with lethargy/unconsciousness were (N=7). Only 29% (n=2) of the respondents who observed the sign lethargy/unconsciousness checked for random blood sugar.

Management of diarrhoea and dehydration management.

Respondents were observed manage diarrhoea and dehydration according to IMCI guidelines. Thirty six percent (n=21) of the respondents did not treat according to dehydration treatment plans and 41% (n=24) did not explain to caretakers how to give Zinc supplement tablets to children with diarrhoea **(Figure 14)**. However, 84% (n=49) of respondents prescribed Zinc supplement.

(N=58)
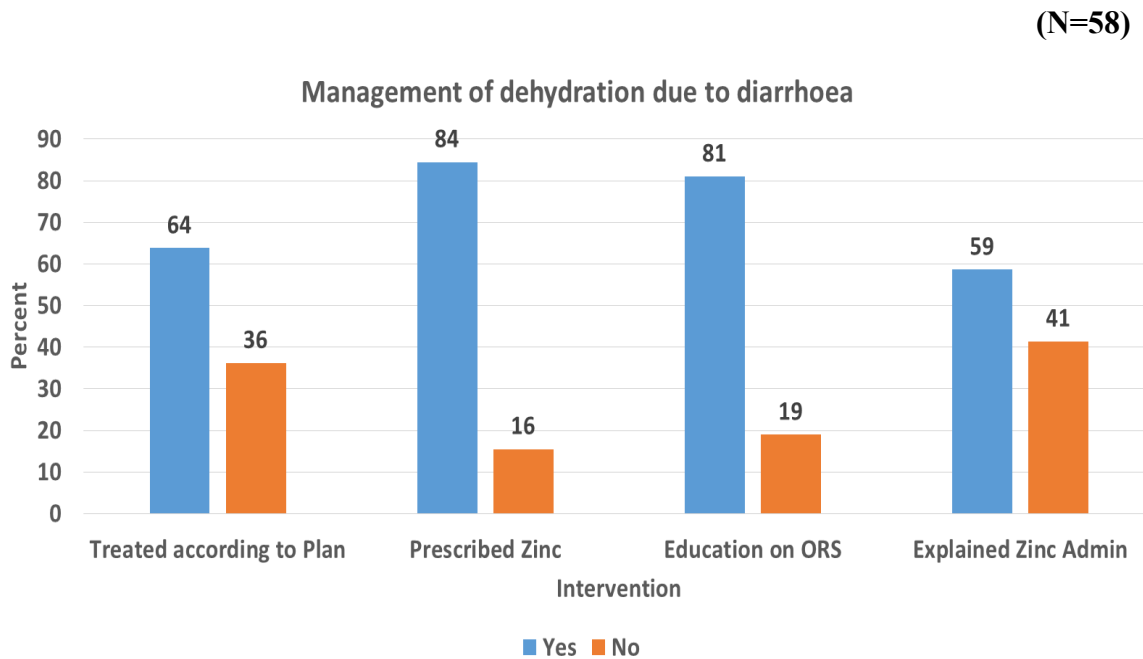
Figure 14: Observed Management of Dehydration due to Diarrhoea

Rating for case management.

Case management of children with diarrhoea was summarised on Likert Scale of 1 to 5. The scale of 5 = Excellent management - All the parameters done; 4 = Well managed - All the parameters done, except for Random Blood Sugar check; 3 = Somewhat well managed - At least 3 parameters done, except for Random Blood Sugar check; 2 = Not well managed - At least 2 parameters done, except for Random Blood Sugar check; and 1 = Poorly managed - Less than 2

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parameters done, except for Random Blood Sugar check. Generally 40% (n=23) cases were well managed, while only 2% (1) of cases received excellent management.

Statistical significance of evidence on observed practice.

Cross tabulations were computed to determine association between professional education, in-service and case management at 95% confidence interval (5% level of significance). There was no significant association between professional level of education and case management $\chi^2 = 6.387$ df = 4 and p-value 0.172. However, there was a strong significant association between in-service training and case management $\chi^2 = 78.335$ df = 12 p-value 0.000 **(Table 11)**.

Table 11: Association between Professional Education, In-Service and Case Management

Association	Pearson's Chi-Square Test(χ^2)	Degree of freedom (df)	p-value
Duration of service and case management	31.336	16	0.012
Professional level of education and case management	6.387	4	0.172
In-service training and case management	78.335	12	0.000

Data from Exit Interview Checklist

Care Taker Satisfaction.

Health acre satisfaction is one of the elements to determine outcome of care given. Caretakers whose children were assessed by respondents were interviewed during rehydration or after collecting drugs and supplies from pharmacy. Parameters assessed were; improved condition of the child; information on management and prevention of dehydration; knowledgeable and skilled on ORS preparation; know signs when to bring back child; and satisfied with care received.

These were rated on a Likert scale of "Strongly disagree", "Disagree", "Neither", "Agree" and "Strongly agree". Most of the caretakers 79% (n=46) agreed that information about diarrhoea was provided. Sixty seven percent (n=39) of caretakers indicated that they were satisfied with the care received.

Rating for Satisfaction.

Caretaker satisfaction was summarised on Likert Scale of 4 – 1. The scale of 4 = Very Satisfied - "5" Strongly Agree Responses; 3 = Satisfied - "4" Strongly Agree Responses; 2 = Somehow Satisfied - "3" Strongly Agree Responses; and 1 Not Satisfied - "2" Strongly Agree Responses. Seventy one percent (n=41) of caretakers were very satisfied, while 12% (n=7) caretakers were not satisfied.

Statistical Significance of Evidence.

Cross tabulations were computed to determine Statistical significance of evidence at 95% confidence interval (5% level of significance) between care taker satisfaction and improved condition of the child; information on management and prevention of dehydration; knowledgeable and skilled on ORS preparation; know signs when to bring back child; satisfied with care received.

There was no significant statistical association between care taker satisfaction and improved condition of the child $\chi^2 = 6.947$ df = 3 p-value 0.074. Nevertheless, there was significant statistical association between care taker satisfaction and knowing the signs when to bring back child to the health centre $\chi^2 = 98.332$ df = 9 p-value 0.000. There was also a significant statistical

association between care taker satisfaction and information on management and prevention of dehydration χ^2=59.838 df = 9 p-value 0.000 **(Table 12)**.

Table 12: Association between Case Management and Caretaker's Opinion

Association	Pearson's Chi-Square Test(χ^2)	Degree of freedom (df)	p-value
Care taker satisfaction and improved condition of the child	6.947	3	0.074
Care taker satisfaction and information on management and prevention of dehydration	59.538	9	0.000
Care taker satisfaction and knowledgeable and skilled on ORS preparation	72.543	9	0.000
Care taker satisfaction and know signs when to bring back child	98.332	9	0.000
Care taker satisfaction and with care provided	59.055	9	0.000

Summary

The chapter has presented the findings of the study from self-administered questionnaire, observation and exit interview. The study found that most of the nurses and midwives working with under-five children were Advanced Beginners who require close supervision. However, the study found that majority of the respondents had not received Integrated Management of Childhood Illnesses (IMCI) supervisory visits. Furthermore, the study found that most of the respondents did not receive in-service training on child survival skills.

On the dimension of process, the study found that only a few of the respondents knew that age was used to calculate amount of fluids for rehydration and few were knowledgeable with assessment of a child's general condition for dehydration. The study also found that most of the respondents did not use the chart booklet to assess, classify and manage diarrhoea. There was a significant statistical association between in service training and case management χ^2 = 78.335 df

= 12 p-value 0.000 and there was a significant statistical association between duration of service and case management $\chi^2 = 31.336$ df = 16 and p-value 0.012. However, there was no statistically significant relationship between professional level of education and case management $\chi^2 = 6.387$ df=4 p-value 0.172.

On the dimension of outcome the study found that most of the caretakers were very satisfied, while few were not satisfied. The levels of satisfaction were due to information on management and prevention of dehydration, being knowledgeable and skilled with ORS preparation and knowing the signs when to bring back child when very sick. There was no significant statistical association between caretaker satisfaction and improved condition of the child $\chi^2 = 6.947$ df = 3 p-value 0.074. However, there was a statistically significant association between care taker satisfaction and information on management and prevention of dehydration $\chi^2 = 59.538$ df = 9 P<0.000. There was also a significant association between care taker satisfaction and being knowledgeable and skilled on ORS preparation $\chi^2 = 72.543$ df = 9 p-value 0.000. Furthermore, there was a significant statistical association between care taker satisfaction and knowing signs when to bring back child is becomes sicker $\chi^2 = 98.332$ df = 9 p-value 0.000. Finally, there was a significant statistical association between care taker satisfaction and being satisfied with care received $\chi^2 = 59.055$ df = 9 p-value 0.000.

Chapter 5

Discussion of Findings

Introduction

The Chapter discusses the findings and results presented in chapter four. The discussion is presented and organized following Donabedian's Conceptual Framework for Evaluating Quality of Health Care and the objectives that guided the study. Major concepts for the framework are structure; process and outcome. The aim of the study was to determine the management of dehydration of under-five children with AGE by nurses and midwives as case of selected health facilities in Lusaka Urban District. The specific objectives were: to assess availability of resources (structure) in the management of dehydration in under-five children with AGE; to examine the process of management of dehydration in under-five children with AGE; to evaluate caretaker satisfaction (outcome) with care given during the management of dehydration due AGE; and to analyse associations between healthcare provider characteristics, caretaker satisfaction and case management. The chapter also presents conclusions and recommendations from this study.

A total of 155 respondents answered the self-administered structured questionnaire. This represents 90% response rate. This response rate is unusual. However, according to Emerald Publishing Limited (2018), there are several ways of increasing the likelihood of completing the questionnaires, which eventually increase the response rate. Some of these ways are; making the questionnaire easy to complete - not taking more than 15 minutes, ensuring the questionnaire looks professional, and assurance of confidentiality. In this study, the tool for data collection had pre-determined answers. The respondents were familiar with the research topic under study and

were conversant with the language used. Furthermore, when the questionnaires were distributed they were allowed to use a quiet room to complete the questionnaires.

The interpretation of the study findings used a reductionist approach to bring about meaningful conclusions about the findings (Qualea, 2008). The reductionist approach helped to breakdown the Donabedian's concepts into ever smaller for easy discussion. Triangulation of data was done to enrich the quality of data collected using different tools. Methodological triangulation was used and it involved data collection using self-administered structured questionnaire, observation of nurses and midwives, and exit interviews with caretakers.

Structure

This section discusses study findings on availability of care giving resources (structure). The variables discussed are material resources; professional level of education; duration of service and experience; in-service training; supportive supervision; and knowledge on dehydration management.

Material Resources.

The study has revealed that health facilities had inadequate supplies of nasogastric tubes (NGT); furniture for rehydration rooms; and equipment for checking random blood sugar (RBS) such as glucometers and their consumables. Over 80% of respondents indicated that facilities had inadequate supplies of NGT and furniture for rehydration rooms. Administration of oral rehydration salts (ORS) through the NGT is an alternative to intravenous infusion (IVI) for continuous infusion in children. Canavan & Arant (2009) indicate that failure rate of NGT

placement is significantly less than that of IV lines. In a study by Rébeillé-Borgella et al (2017) they found that rehydration via NGT reduced the duration of rehydration and the length of hospital stay without increasing the incidence of serious adverse events for dehydrated children hospitalized for AGE.

Approximately 46% respondents indicated that facilities had no glucometers and their consumables. None availability of glucometers and their consumables has an effect on case management and outcomes. These findings are important as they have an impact on how the healthcare provider manages a child with complications of dehydration. Children with AGE are susceptible to low blood glucose levels due to poor intake and increased fluid loss. There is need to routinely check random blood sugar levels in children who are lethargic (SA Child Health Clinical Network, 2017).

The study has also revealed that 82% of respondents indicated that health facilities had availability of appropriate weighing scales for children. Effective management of dehydration is dependent on weight of the child. Weight is used to calculate the amount of fluids to rehydrate the child. It was also found that over 90% of health facilities had adequate supply of ORS and giving sets. This finding is contrary to the study that was conducted in Uganda, where they found that ORS was out of stock in almost half of the facilities, (Lofgren, Tao, Larsson, Kyakulaga, & Forsgberg, 2012). Oral Rehydration Solution is the primary intervention in the control of diarrhoeal diseases.

Professional Level of Education.

The study found that approximately 58% of respondents were Registered Nurses. This finding is not surprising as training of Enrolled Nurses had gradually reduced. Registered Nurses plan, coordinate and supervise the care of children. The study has found that there was a strong significant association between professional level of education and knowledge on duration of rehydration in infants with severe dehydration (χ^2 = 95.469 df = p-value 0.000). This finding is similar with the argument by Hunt (2003) that the way an individual acts is dependent upon the knowledge acquired through learning, practice and experience. It is therefore, imperative that nurses and midwives as frontline healthcare providers for child health services are equipped with skills and knowledge to be able to provide quality services in dehydration management.

Duration of Service and Experience.

The study reveals that respondents had minimal duration of service and experience screening children. Only 40.6% of the respondents had 1-5 years duration of service, while only 44.5% had more than 3 years duration of screening children. The mean duration of screening children was 2.5 years. This finding implies that majority of the nurses and midwives were advanced beginners. Advanced beginners are considered not to be competent. Therefore, this is has an influence on the way childcare would be provided. According to Benner, there are five stages for Clinical Competence. These are a novice; advanced beginner; competent; proficient nurse; and an expert (Dreyfus & Dreyfus, 2009).

Benner explains that a novice has difficulty interpreting things, while an advanced beginner demonstrates acceptable performance and has prior experience in actual situations. She further

says that a competent nurse has 2-3 years' experience on the job in the same area or in similar day-to-day situations, sets priorities, and decides on plans. Is able to demonstrate, coordination, efficiency, and confidence in delivery of care; while a proficient nurse is able to predict events more precisely; and an expert knows what to do at a right time. Forty one percent of the respondents had a duration of service of 1 to 5 years. The study has found that duration of service strengthens knowledge acquisition. There was a significant association between duration of service and knowledge on use of age in dehydration management ($\chi^2 = 20.266$ df $= 8$ and p-value 0.009).

In-service Training.

Training has an impact on practice. The study found that most respondents had not undergone in-service child survival training. The study has shown that 43% of the respondents who answered the questionnaire and 40% of observed respondents did not receive in-service training on child survival skills. Training of health workers in child survival skills has several bottlenecks. Most of the trainings require health workers to leave their places of work leading to staff shortage. Some trainings are costly adding more demand for money on a budget that already has other priorities to fund. In Kenya and Tanzania on challenges of achieving high training coverage for IMCI, it was found that the main barrier was the cost of training due to its duration, the number of facilitators and its residential nature (Mushi, et al., 2011).

In-service training in child survival skills contributes to quality child health service delivery. Lack of in-service training will therefore, affect the way the child and caretaker would be managed. In randomised trials to evaluate the effects of programs that implement the IMCI strategy, it was found that implementing IMCI strategy would reduce child mortality (Gera,

Shah, Garner, Richardson, & Sachdev, 2016). In line this this finding, our study has noted a strong significant association between in-service training and case management ($\chi^2 = 78.335$ df = 12 p-value 0.000). The findings are also in conformity with a systematic review and meta-analysis by Nguyen, Leung, McIntyre, Ghali, & Sauve, (2013) which showed that IMCI trained workers were more likely to correctly classify illnesses and that workers with lower baseline performance showed greater improvements in prescribing medications. Therefore, there is need to intensify Integrated Ma IMCI training in Zambia in health training institutions and at all levels of service delivery to improve case management.

Supportive Supervision.

The findings of the study indicate that supportive supervision are not being provided. As already explained, an advanced beginner requires mentoring and supportive supervision. This study has found that only 41% of respondents received supportive supervisory visits related to assessment and management of children. This is similar with a study that was conducted in Afghanistan where it was found that very few health workers trained in IMCI received supervision in clinical case management (Mansoor, et al., 2017). Health workers caring for children require adequate supervision. This is in order to improve the quality of child health care being provided. WHO emphasises that supervision plays a key role in maintaining the quality of performance of health workers and the services they deliver (WHO, 2016). In a study conducted in Tanzania, it was found that lack of onsite mentoring, lack of refresher courses and lack of regular supportive supervision paused challenges in the implementation of IMCI (Augustine, Richard, Damas, & Doenica, 2014). Hoque, et al., (2014) also concluded that regular supervision sustains improvements in the quality of child health care in first-level health facilities, even among

workers with minimal pre-service training.

The World Health Organisation acknowledges that routine supervision is one of the weakest areas in many developing country settings due to various factors (WHO, 2016). Some of the factors are shortage of staff. The importance of mentorship and supervision is supported by the study that was conducted on factors influencing the implementation of IMCI by healthcare workers in Tanzania (Kiplagat, Musto, Mwizamholya, & Morona, 2014). They found that supporting healthcare workers through training and onsite mentorship and supportive supervision could assist with case management of sick children. Therefore, there is need to explore factors that cause infrequent or lack of supervisory visits in Lusaka District.

Knowledge of Nurses and Midwives on Dehydration Management.

On initial assessment of diarrhoea, the study has revealed that only 25.8% of respondents had knowledge that age is used to determine duration for rehydration. This finding has an implication on fluid management in children under the age of 5 years. In a comprehensive search performed on five databases and focusing on observational studies of healthcare professional's management of childhood diarrhoea in low-income countries, Diallo, Cong, Henderson, and McGrath, (2017) also found that knowledge was not enough to appropriately manage childhood diarrhea. This would mean that majority of the children are either over-rehydrated or under-rehydrated.

The study has also found that respondents had inadequate knowledge on how to confirm two signs of severity of diarrhoea, that is vomiting everything and thirst/drinking poorly. Only 43.9% of respondents indicated that they would offer water to confirm the sign of vomiting everything;

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while only 34.8% indicated that they would offer water to drink or allow caretaker to breast feed to confirm thirsty or drinking poorly. This shows that children with diarrhoea are not adequately assessed leading to mismanagement of diarrhoea and dehydration. According to WHO (2014), a child is classified as having some or severe dehydration if he has two or more signs of dehydration. Nurses and midwives are responsible for thorough assessment for signs of dehydration, formulating care plans and responding to signs of deterioration (Campbell, 2011).

On Zinc Supplementation, the study has revealed that nurses and midwives had adequate knowledge on the use of Zinc in diarrhoea management. Approximately 68% of the respondents said Zinc was used to reduce the duration and severity of diarrhoea. This finding in similar with what Omuemu, Ofuani and Kubeyinje (2012) found where two-thirds of their respondents were aware of Zinc supplementation. However, specific knowledge of Zinc supplementation in the management of childhood acute diarrhoea was poor. Zinc is an important micronutrient for a child's overall health and development. It reduces duration and severity of diarrhoea eventually preventing and controlling dehydration (Qadir, Arshad, & Ahmad, 2013). Studies suggest that providing children with a 10 to 14 days course of Zinc treatment can reduce the duration and severity of diarrheal episodes and may also prevent future episodes for up to three months (Bajait & Thawani, 2011). Zinc treatment also can reduce the duration of acute diarrhoea by 25% and could prevent one in four diarrhoea deaths (Omuemu, Ofuani and Kubeyinje (2012). Therefore, nurses and midwives should have more specific knowledge of Zinc supplementation in the management of childhood acute diarrhoea.

On selection of appropriate fluids for severe dehydration in a child with severe acute

malnutrition (SAM), the study found that knowledge was above average. About 53% of the respondents said they would give ReSoMal to treat severe dehydration in a child with SAM. The implication of this finding is that children with SAM would be rehydrated using intravenous fluid (IVF).

According to WHO (2013), children with SAM presenting with some dehydration or severe dehydration, but who are not shocked should be rehydrated orally or by nasogastric tube, with rehydration solution for malnutrition (ReSoMal), or low-osmolarity ORS with added potassium and glucose. In systematic review of randomised controlled trials of Fluid Expansion As Supportive Therapy (FEAST), it was found that fluid resuscitation increased the risk of death, leading to an excess mortality of 3 in every 100 children receiving fluid boluses, compared with controls receiving no boluses (Obonyo & Maitland, 2014). In a study conducted in Kampala, Uganda on risk factors in hospital deaths in severely malnourished children, the main risk factors were blood transfusion and intravenous infusion (Bachou, Tumwine, Mwadime, & Tylleskär, 2006). Nevertheless, the only indication for intravenous infusion in a child with severe acute malnutrition is circulatory collapse caused by severe dehydration or septic shock when the child is lethargic or unconscious, but excluding cardiogenic shock (WHO, 2017).

The study found that knowledge on amount of fluids for severe dehydration in a well-nourished child was adequate. The study has shown that 66% of respondents would correctly give 100ml/kg for severe dehydration. However, knowledge on amount of fluids for some dehydration was inadequate. Only 32% of respondents would correctly give 75ml/kg for some dehydration. This finding may imply that duration of dehydration is prolonged and eventually

leading to lengthy hospitalization. According to WHO (2014) guidelines on management of some dehydration, fluids are calculated at 75ml/kg body weight for four hours. A child with some dehydration and receiving ORS less than 75ml/kg will have prolonged hospital stay because fewer fluids and being administered. Sometimes the degree dehydration may worsen because of excess fluid loss not being replenished adequately.

This study has also found that knowledge on duration for some and severe dehydration in a well-nourished child was inadequate. Only 21.3% of respondents correctly indicated that they would rehydrate a child with some dehydration for 4 hours. Only 30.3% of respondents correctly indicated that they would rehydrate an infant with severe dehydration for 6 hours, while 32.3% correctly indicated that they would rehydrate an older child for 3 hours. According to WHO (2014), an infant with severe dehydration should be rehydrated for 6 hours. The first 30ml/kg to run for 1 hour and the remaining 70ml/kg to run for 5 hours. The older child with severe dehydration is rehydrated for 3 hours. The first 30ml/kg to run in 30 minutes and the remaining 70ml/kg to run for 2 hours 30 minutes.

Generally, the study has shown that knowledge of nurses and midwives on dehydration management was inadequate. This finding has an implication on fluid management in children under the age of 5 years. Similarly, Pakenham-Wash & Bukachi (2009) found that there was gross lack of knowledge about the basics on how to diagnose and manage common chilhood diseases. In a comprehensive search performed on five databases and focusing on observational studies of healthcare professional's management of childhood diarrhoea in low-income countries, Diallo, Cong, Henderson, and McGrath, (2017) also found that knowledge was not enough to

appropriately manage childhood diarrhea. However, from this study it can be concluded that in-service training can enhance knowledge of nurses and midwives on dehydration management. There was there was a very strong significant association between in-service training and knowledge of treatment for severe dehydration in an infant χ2 = 50.935 df = 5 p-value 0.000.

Process

This section discusses study findings on process of care delivery and coordination. The variables discussed are assessment and management. Generally the process of care delivery and coordination was inadequate. Most of the participants did not complete the assessment for diarrhoea and dehydration. Furthermore, management of diarrhoea and dehydration was not according to treatment guidelines.

Assessment of Diarrhoea and Dehydration.

Generally, the study found that assessment of a child with diarrhoea and dehydration was not complete. Only 76% of the respondents checked for the General Danger Sign (GDS). However, despite noting the presence of GDS, 9% of the respondents did not take into consideration the presence of it. Furthermore, approximately 43% of respondents did not complete assessment for dehydration by checking for thirsty or drinking poorly and lethargy or unconsciousness.

A general danger sign is a sign used by IMCI practitioners to identify children who need to be referred urgently to hospital (WHO, 2013). Such children may need lifesaving treatment such as with injectable antibiotics, oxygen or other treatments that may not be available in a first-level health facility. This finding indicates that children requiring urgent treatment miss the

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opportunity to receive urgent care to prevent deterioration. Similarly, in a South African study it was found that health workers were not identifying children that needed referral (Horwood, Voce, Vermaak, Rollins, & Qazi, 2009).

The study has also established that random blood sugar checks are not done in children with lethargy or GDS. Only 29% of the respondents who observed the sign lethargy/unconsciousness checked for random blood sugar. A dehydrated child has disturbances with metabolism, gluconeogenesis and transport of substrates (Onyiriuka et al., 2013). These are complications of dehydration that put the child at risk of developing hypoglycaemia. Similarly, Niescierenko and Bachur (2013) in a study on advances in paediatric dehydration therapy, found that physicians were not assessing blood glucose levels 3 to 4 hourly. Hypoglycaemia is one of the immediate life-threatening complications of acute diarrhoea among under-five children. The current practice requires that every child presenting with dehydration in diarrhoea with lethargy should have the blood sugar levels checked (WHO & UNICEF, 2013) to rule out hypoglycaemia. This helps to have baseline data and control any hypoglycaemia present. This finding therefore cause upon the management to ensure that health workers check RBS in children with lethargy.

The study has revealed that there was inadequate use of chart booklet. Approximately 40% of the respondents used chart booklet to assess, classify and manage diarrhoea and dehydration. Chart booklet is a clinical reference handbook for integrated management of childhood illnesses. Nurses and midwives screening children should always use the chart booklet for easy reference (WHO, 2017). There was a strong significant association between professional level of education and use of chart booklet $\chi^2 = 29.964$ df = 8 p-value 0.000. The finding shows that RNs are more

likely to use the chart booklet to manage diarrhoea and dehydration. Lee and Haden (2007) recommended staff to utilize gastroenteritis treatment guidelines to optimize outcomes.

Management of Diarrhoea and Dehydration.

The study has revealed that nurses and midwives were adequately prescribing Zinc Supplements to children with diarrhoea. Approximately 85% of respondents prescribed Zinc supplement. Zinc is an important micronutrient for a child's overall health and development (WHO, 2014). It reduces duration and severity of diarrhoea eventually preventing and controlling dehydration (Qadir, Arshad, & Ahmad, 2013). Omuemu, Ofuani & Kubeyinje (2012) also found that nurses and midwives were not prescribing Zinc despite knowledge that Zinc improves frequency of diarrhoea and severity in Nigeria. However, factors that led to this were not identified.

Nevertheless, the general management of diarrhoea and dehydration was inadequate. According to UNICEF/WHO (2013), fluid replacement to prevent dehydration and Zinc Supplementation are the first two main elements of the 7-point plan for comprehensive diarrhoea control. About 36% of the respondents did not treat diarrhoea and dehydration according to treatment plans and about 41% of the respondents did not explain to caretakers how to give Zinc tablets to children with diarrhoea. It is necessary to follow guidelines in managing diarrhoea in children. Nunez, Liu, and Nager (2012) found that paediatric trained physicians followed established guidelines compared with non-paediatric trained physicians. However, in a study to determine treatment patterns of childhood diarrhoea in rural Uganda found that there was a significant gap between knowledge and documented practices among staff (Lofgren, et al., 2012).

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Process of Care Delivery and Coordination.

It can be concluded that process of care delivery and coordination was inadequate. Only

approximately 40% of the cases were well managed. The study did not find a significant

association however between professional level of education and case management $\chi^2 = 6.387$ df

= 4 and p-value 0.172, but there was a strong significant association between in-service training

and case management $\chi^2 = 78.335$ df = 12 p-value 0.000. Therefore, there is need to plan for

child survival in-service trainings in the district

Outcome

     Client Satisfaction.

The goal of service delivery is to have a satisfied clientele. Donabedian urges incorporation of

patient perception in quality assessment (Al-Abri & Al-Balushi, 2013). This study found that

caretakers were satisfied with the care provided. Approximately 71% of caretakers were very

satisfied. This could be attributed to engagement of the client through information sharing. This

is because 79% agreed that they were given information on how to manage and prevent

dehydration at home and 65% agreed that they knew signs when to bring back their child if

became sicker. This finding compares with Prakash, (2010) that informing a client and

explaining issues promotes compliance and become less anxious because they know what is

happening.

There was a strong statistical significance between caretaker satisfaction and information on

management and prevention of dehydration ($\chi^2 = 59.538$ df = 9 p-value 0.000). However, this

may be argued that mothers were in agreement just to please the researcher based on the

environment they were in. According to Farnsworth (2016), "all respondents would provide honest and clear answers about their innermost thoughts, but we know that this isn't always the case."

Conclusion

This study, measured quality by examining the structure of the setting in which care is provided, measuring the actual process of care, and by assessing the outcomes of care as described by Donabedian. Structural component was measured by examining availability of furniture, equipment and qualification of nurses and midwives. Process of care was measured by observing nurses and midwives practice assessment, classification and management of a child with dehydration due diarrhoea. Outcome was measured by determining the interpersonal element of outcome which is caretaker satisfaction with care provided.

The study has shown that quality of management of dehydration due to AGE in under-five children was inadequate. Nurses and midwives assessing and managing children with dehydration due to AGE were Advanced Beginners who required mentoring and supportive supervision. Management of dehydration was not according to guidelines as most of the respondents were using age of a child to calculate amount of fluids to be administered instead of using weight. There were inconsistencies in the assessment for dehydration and management. Finally, the study has revealed that management of dehydration according to treatment plans is related to level of professional education and IMCI training.

This study provided evidence that professional development through in-service training improves

knowledge of treatment for severe dehydration in children among nurses and midwives. The evidence from this study shows that improved case management of dehydration due to AGE is through in-service training in child survival interventions. Furthermore, the study has shown that the outcome of care taker satisfaction is enhanced by adequacy of information provided to the care taker on management and prevention of dehydration. Only competent, well trained nurses and midwives will through short in-service training helps improve the management of dehydration due to AGE in under-five children. Improving the management of dehydration due to AGE in under-five children by nurses and midwives in Lusaka is an urgent priority.

Recommendations

Based on study findings, the following are recommendations:

   Structure.

1. Lusaka District Health Management Team (LDHMT) should plan for regular mentorship and supportive supervision (Horwood, Voce, Vermaak, Rollins, & Qazi, 2009) of health workers especially those who are Advanced Beginners as they are not competent. This measure will help improve and maintain the quality of child health care provided in the district.

2. In order to address the issue of in-service training on child survival skills, LDHMT should plan for less costly and less time demanding innovative solutions to ensure that adequate skills are acquired and maintained (Horwood, Voce, Vermaak, Rollins, & Qazi, 2009) such as IMCI – Computerised Adaptation Training Tool (ICATT) to update the knowledge of health workers in case management.

3. There is also need for the LDHMT to ensure that health facilities have at least functional

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glucometer with consumables to routinely check random blood sugar levels in dehydrated children who are lethargic.

Process.

1. There is need for LDHMT to strengthen the bundling of ORS with Zinc to ensure that each and every child with diarrhoea receives both ORS and Zinc.

2. To ensure that health workers are administering fluids according to body weight and not age in children, LDHMT should strengthen facility clinical meetings.

3. In order to address the issue of fluid management, there is need for LDHMT to introduce journal clubs in health facilities to promote evidence-based practice among nurses and midwives.

Outcome.

1. There is need to promote health information communication skills among health workers to foster better information dissemination to clients/families.

2. There is need to strengthen the practice of random exit interviews with clients/families to monitor and evaluate satisfaction.

Policy.

This study has identified some policy implications that are relevant to practice such as:

1. Policy makers and administrators to develop a strategic plan that will provide high impact interventions on dehydration management.

2. Help nurse managers develop protocols on assessment and management of diarrhoea and dehydration in children

Research.

1. There is need to conduct a study to evaluate effectiveness of IMCI pre-service training in RN training institutions.

2. There is also need to conduct this study at a larger scale using mixed methods in order to understand the deep rooted knowledge, practices and factors that influence dehydration management due to diarrhoea in children aged under-five years.

Study Limitations

Although the study has generated some evidence to support change, the study has both methodological and researcher limitations. Methodologically, the sample size for observation was not adequate enough for empirical generalization to other settings. The study did not collect data that would have examined theoretical knowledge of each participant and compare it with how the theoretical knowledge was being applied.

The researcher had limited time and financial constraints. The researcher did not have enough time to personally collect data from the respondents. This could have resulted in respondents sharing the information during completion of the questionnaire or another person completing it on behalf of the other. Nevertheless, program planners and implementers can use the information from the study to improve management of dehydration due to diarrhoea in children under five years of age.

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Appendices

Appendix 1: Information Sheet

My name is **Rodgers Gift Benkele**, a student at University of Malawi - Kamuzu College

of Nursing. I am pursuing Master of Science Degree course in Child Health Nursing. As part of my studies I am conducting a research project on *Management of dehydration in under-five children with acute gastroenteritis (AGE) by nurses and midwives in Lusaka.*

The aim of the study is *to determine factors influencing management of dehydration in under-five children with AGE by nurses and midwives*. I'm inviting you to participate in the study because you are frontline healthcare providers that primarily assess and manage childhood illnesses. Your participation in the study is entirely voluntary. You may choose to participate or not. You can also withdraw from the study at any time and this will not have any effect on your job at your facility and in the ministry. Participation does not have any foreseeable physical harm (risks) but you may feel uncomfortable to answer some questions. In case you feel uncomfortable to answer some questions you can contact this researcher OR ERES Converge IRB Zambia on contacts in the last paragraph on the last page. You may also forward your concerns and complaints to Kamuzu College of Nursing – Lilongwe – Malawi.

You are also informed that there are no benefits for participating in the study. Nonetheless, findings of the study might help to identify any gaps existing in the quality of care of dehydration due to AGE in children. No any form of identity of you shall be found in the study reports as only code numbers shall be used. Results of the study shall be given to you if need be. The study and its procedures have been approved by ERES Converge IRB Zambia and the Medical Officer for Lusaka District Health Office. Should you agree to participate in the study, I will ask you to sign a consent form on the space provided to indicate that you have accepted to respond to the questionnaire.

You are free to contact me for any further information regarding your rights and the study as a study participant on this address: Rodgers Gift Benkele, The University Teaching Hospital,

Lusaka Schools of Nursing School of Paediatrics and Child Health Nursing, Nationalist Rd, Ridgeway, P.O. Box 50366, Lusaka 10101, Zambia. Cell +260 955 064 500/+260 962 845 154/+260 974 247 358 OR you may also contact University of Malawi, Kamuzu College of Nursing, Blantyre Campus, P.O. Box 415, Blantyre, Cell phone +265 884 683 759/+260999 583 759 OR you may also contact; The Chairperson, ERES Converge IRB Office, 33 Joseph Mwilwa Road, Rhodes Park, Lusaka, Zambia. Email: eresconverge@yahoo.co.uk, Phone +260 955155633, +260 955 155634.

Appendix 2: Participant's Consent Form

Please read and sign this consent form if you are taking part in this study

I have read understood the content of the information letter and I have been given the opportunity to ask questions, where deemed necessary, about the study and its procedures. I understand that the information obtained through the questionnaire will be kept confidential and will only be accessed by the researcher and/or those people who are directly concerned with the study. I know that I do not have to suffer any injury or harm during the research process and the information obtained by the researcher shall not be used against me in future. I voluntarily agree to take part in the study.

....

Participant's Signature   **Date**

....

Name of person taking consent *(If different from researcher)*   **Date**

....

Researcher's Signature   **Date**

For further information contacts: Rodgers Gift Benkele, The University Teaching Hospital, Lusaka Schools of Nursing School of Paediatric and Child Health Nursing, Nationalist Rd, Ridgeway, P.O. Box 50366, Lusaka 10101, Zambia. Cell +260 955 064 500/+260 962 845 154/+260 974 247 358 OR The Chairperson, ERES Converge IRB Office, 33 Joseph Mwilwa Road, Rhodes Park, Lusaka, Zambia. Email: eresconverge@yahoo.co.uk, Phone +260 955155633, +260 955 155634 OR University of Malawi, Kamuzu College of Nursing, Blantyre Campus, P.O. Box 415, Blantyre, Cell phone +265 884 683 759/+260999 583 759.

Appendix 3: Structured Questionnaire

Management of dehydration in under-five children with acute gastroenteritis by nurses and

A.	**DEMOGRAPHIC CHARACTERISTICS *(Structure)***

1. Health centre code: [   ] **CODE**

2. What is your professional level of education? [   ]

3. How long have you been in service? [   ]

4. What in-service training in child health have you received after your basic graduation? *Please tick appropriate box*

   IMCI [   ]

   ETAT [   ]

   NONE [   ]

   Others (Specify)………………………………………….

5. For how long have you been screening under five children?

   [   ]

6. On average how many children do you see per day?

   [   ]

7. How many thermometers are in the triaging area?

   [   ]

8. Do you have weighing scales appropriate for children?

   YES [   ]   NO [   ]

9. How many weighing scales are there in your triaging area?

   [   ]

10. What type of weighing scale is in the triaging area?

[   ] TION -- KNOWLEDGE *(Process)*

CODE

Please tick appropriate box

11. What is the use of age in management of dehydration?

Calculation of fluids ☐

Duration of rehydration ☐

Not certain ☐

12. What is the use of weight in management of dehydration?

Calculation of fluids ☐

Duration of hydration ☐

Not certain ☐

13. How do you check if the child vomits everything?

History taking ☐

Child visibly vomiting ☐

Offer something ☐

14. How do you check if the child is lethargic or unconsciousness?

Alert ☐

Responds to voice ☐

Responds to pain or unresponsive ☐

15. How do you check whether the child is thirst or drinking poorly?

History taking ☐

Child refusing ☐

Child spitting ☐

Please tick appropriate box   **CODE**

16. How do you describe sunken eyes?

☐

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Drooping eyelid

Eyes look hollow

Child looks sleepy

17.   Where do you pinch the skin of the abdomen of the child?

Between umbilicus and chest

Around umbilicus

Between umbilicus and sides of the abdomen

18.   What are the classifications of dehydration according to IMCI?

No dehydration, some dehydration, severe dehydration

Some dehydration

Severe dehydration

19.   What are the treatments plans for dehydration according to IMCI?

Plan A, Plan B and Plan C

Plan B

Plan C

20.   What is the use of Zinc in dehydration management?

Reduces duration and severity

Replaces lost fluids

Replaces lost electrolytes

Please tick appropriate box   **CODE**

21.   What fluids do you give for dehydration in severe acute malnutrition?

108

Half Strength Darrow's with 5% Dextrose

Ringers Lactate

ORS

ReSoMal

22. What is the fluid of choice for severe dehydration in a
well-nourished child?

Normal Saline ☐

Half Strength Darrow's with 5% Dextrose ☐

Ringer's Lactate ☐

23. How much fluid do you give per kilogram body weight for some
dehydration in a well- nourished child?

50ml/kg ☐

75ml/kg ☐

100ml/kg ☐

24. How much fluid do you give per kilogram body weight for severe
dehydration?

50ml/kg ☐

75ml/kg ☐

100ml/kg ☐

Please tick appropriate box   **CODE**

25. For how long should a child under 12 months with severe
dehydration be hydrated with?

☐

109

30 minutes

1 hour

3 hours

5 hours

6 hours

26. For how long should a child aged 12 months up to 5 years with severe dehydration be hydrated?

30 minutes ☐

1 hour ☐

3 hours ☐

5 hours ☐

6   hours ☐

27. For how long should a child up to 5 years with some dehydration be hydrated with fluid?

1hour ☐

2 hours ☐

3 hours ☐

4 hours ☐

5 hours ☐

Please tick appropriate box   **CODE**

28. How much fluid should a child with shock due to Acute Gastroenteritis be given as bolus?

110

5ml/kg

10ml/kg

15ml/kg

20ml/kg

C.	**CARE DELIVERY AND COORDINATION -- PRACTICE** *(Process)*

Please tick appropriate box

	Never	Sometimes	Always
29. Do you ask the age of the Child?			
30. Do you measure or check the temperature of the child?			
31. Do you check the weight of the child?			
32. Do you ask the care taker about the child's problems?			
33. Do you ask the care taker whether the child is not able to drink or breast-feed?			
34. Do you ask the care taker whether the child vomits everything?			
35. Do you ask the care taker whether the child has had convulsions at home?			
36. Do you check the child for lethargy or unconsciousness?			
37. Do you ask the care taker whether the child has Diarrhoea?			
38. Do you ask the care taker the duration of diarrhoea?			
39. Do you check whether the child is thirst or drinking poorly?			
40. Do you check for sunken eyes?			

CODE

	Never	Sometimes	Always
41. Do you pinch the skin of the abdomen of the child?			

111

42.	Do you use CHART BOOKLET to classify diarrhoea for dehydration?			
43.	Do you check for malnutrition?			
44.	Do you check random blood sugar?			
45.	Do you treat dehydration according to treatment plans?			
46.	Do you prescribe Zinc for dehydration?			

Please tick appropriate box

47. What fluids do you give for some dehydration in a well- nourished child?

   IV fluids

   ORS

   ReSoMal

   None

48. What fluids do you give for severe dehydration in a well- nourished child?

   IV fluids

   ORS

   ReSoMal

   None

49. How often should a child on treatment Plan C be reassessed and monitored for hydration?

   CODE

112

Every 30 minutes

Every 1-2 hours

Every 3-4 hours

50. Have you been prescribing Zinc tablets for children with dehydration due to diarrhoea?

YES ☐   NO ☐

51. What is the duration for Zinc supplementation in a child with dehydration due to diarrhoea?

3 ☐

5 ☐

7 ☐

10 ☐

14 ☐

52. Have you been teaching the care takers how to prepare and give ORS at home?

YES ☐   NO ☐

D.   AVAILABILITY OF CARE GIVING RESOURCES – *(Structure)*

Please tick appropriate box

	YES	NO
53. Do you have separate screening room for children?		
54. Are there treatment guidelines for your use in the room?		
55. Is your rehydration room equipped with necessary furniture?		
56. Do you have adequate supply of Oral Rehydration Solution?		
57. Do you have adequate supply of Zinc?		
58. Do you have adequate supplies of Nasogastric Tubes?		

59.	Do you have adequate supply of giving sets and cannulas?		
60.	Do you have equipment for checking blood sugar levels?		
61.	Do you receive IMCI supervisory supportive visits?		

THANK YOU FOR PARTICIPATING

Appendix 4: Case Management Observation Checklist

Management of dehydration in under-five children with acute gastroenteritis by nurses and midwives in Lusaka.

Health centre code [ ]

Case Record Code [ ]   **Professional level of education** [ ]

Duration of service [ ]   **Trainings IMCI** [ ]   **ETAT** [ ]   **NONE** [ ]

Age of child done [ ]   **Correct classification** [*(Write)*]

Skills	Yes	No	CODE
1. Healthcare provider checked age of the child?			
2. Temperature of the child checked			
3. Weight of the child checked?			
4. Healthcare provider asked the care taker about the child's problems?			
5. Healthcare provider checked for general danger signs?			
6. General danger sign present?			
7. Healthcare provider took account the presence of general danger sign? *(Where applicable)*			
8. Healthcare provider asked the care taker whether the child has diarrhoea?			
9. Healthcare provider asked the care taker the duration of diarrhoea?			
10. Healthcare provider checked whether the child is thirst or drinking poorly?			
11. Healthcare provider checked for sunken eyes?			
12. Healthcare provider assessed skin turgor?			
13. Healthcare provider used CHART BOOKLET to classify diarrhoea for dehydration?			
14. Healthcare provider checked for malnutrition?			
15. Healthcare provider checked random blood sugar?			
16. Healthcare provider treated dehydration according to treatment plans?			
17. Healthcare provider prescribed Zinc?			
18. Healthcare provider explained the dose, route and frequency of Zinc			
19. Healthcare provider educated caregiver on preparation and giving of ORS			

Summary		
1. General danger sign checked? *Yes*		
2. Assessment for diarrhoea complete?		

Ask about Diarrhoea, Ask duration of diarrhoea, Check Ability to Drink (General Condition), Checked for sunken eyes, Check for skin turgor		
3. Random Blood Sugar checked in severe dehydration? *(Where applicable)*		
4. Correct treatment plans used? *Severe Dehydration – Plan C, Some Dehydration – Plan B; No Dehydration Plan A*		
5. Zinc prescribed? *2 months up to 6 months 1/2 tablet (10mg) daily for 14 days* *6 months or more 1 tablet (20mg) daily for 14 days*		

Excellent management 5	Well managed 4	Somewhat well managed 3	Not well managed 2	Poorly managed 1
All the parameters done	All the parameters done, except for Random Blood Sugar check	At least 3 parameters done, except for Random Blood Sugar check	At least 2 parameters done, except for Random Blood Sugar check	Less than 2 parameters done, except for Random Blood Sugar check

Appendix 5: Checklist for Exit Questionnaire

Management of dehydration in under-five children with acute gastroenteritis by nurses and midwives in Lusaka.

Health centre code: [   ]   **Case Record Code** [   ]

Age of child done [ ]   **Correct classification** [   ]

Description	1 Strongly disagree	2 Disagree	3 Neither	4 Agree	5 Strongly agree	CODE
1. My child's condition has improved compared to the time we came.						
2. I have been given Information on how to manage and prevent dehydration at home						
3. I am now knowledgeable and skilled on ORS preparation.						
4. I now know signs when to bring back my child if he becomes sicker.						
5. I'm satisfied with the care my child received						

Summary			
Very Satisfied 4	**Satisfied 3**	**Somehow Satisfied 2**	**Not Satisfied 1**
"5" Strongly Agree Responses	"4" Strongly Agree Responses	"3" Strongly Agree Responses	"2" Strongly Agree Responses

Appendix 6: Approval Letter from KCN

KAMUZU COLLEGE OF NURSING

Appendix 7: Request to Conduct Research PHO

All Correspondence should be addressed to the
Provincial Medical Officer
Telephone: +260 211 256815
Telefax: +260 211 256814

In reply please quote:

File No. ....

REPUBLIC OF ZAMBIA
MINISTRY OF HEALTH

PROVINCIAL MEDICAL OFFICE
P. O. BOX 32573
LUSAKA

8th August 2016

Rodgers Gift Benkete
MScCHN Student

Appendix 8: Receipt of Payment for Ethical Approval PHO

ERES CONVERGE
I.R.B. No. 00005948
F.W.A. No. 00011697

33 Joseph Mwilwa Road
Rhodes Park, Lusaka
Tel: +260 955 155 633
+260 955 155 634
Cell: +260 966 765 503
eresconverge@yahoo.co.uk

RECEIPT

PAID
23 AUG 2016

P/BAG 125, LUSAKA

NO.: 0723

Received from Mr. Rodgers Gift Bwalya   Date: 23/08/2016

The sum of in words   One thousand

Appendix 9: Ethical Approval - Ethics Body1

33 Joseph Mwilwa Road
Rhodes Park, Lusaka
Tel: +260 955 155 633
+260 955 155 634
Cell: +260 966 765 503
Email: eresconverge@yahoo.co.uk

I.R.B. No. 00005948
F.W.A. No. 00011697

27th August, 2016

Specific conditions will apply to this approval. As Principal Investigator it is your responsibility to ensure that the contents of this letter are adhered to. If these are not adhered to, the approval may be suspended. Should the study be suspended, study sponsors and other regulatory authorities will be informed.

Conditions of Approval

- No participant may be involved in any study procedure prior to the study approval or after the expiration date.
- All unanticipated or Serious Adverse Events (SAEs) must be reported to the IRB within 5 days.
- All protocol modifications must be IRB approved prior to implementation unless they are intended to reduce risk (but must still be reported for approval). Modifications will include any change of investigator/s or site address.
- All protocol deviations must be reported to the IRB within 5 working days.

Appendix 10: Request to Conduct Research MoH

The University Teaching Hospital,
School of Paediatrics and Child
Health Nursing,
P.O. Box 50366,
Lusaka 10101.

19th September, 2016

The Permanent Secretary
Ministry of Health
Ndeke House
P.O. Box 30205
Lusaka 10101.

Dear Sir/Madam,

Appendix 11: Approval to Conduct Research MoH

THE NATIONAL HEALTH RESEARCH AUTHORITY
C/O Ministry of Health
Haile Selaisse Avenue,
Ndeke House
.P.O. Box 30205
LUSAKA

MH/101/23/10/1

29 September 2016

Rodgers Gift Benkele
The University Teaching Hospital

Appendix 12: Authority to Conduct Research DHO

P. O. Box 50827
Lusaka
Tel: +260-211-235554
Fax: +260-211- 236429

In reply please quote:

No:...........................

REPUBLIC OF ZAMBIA

MINISTRY OF HEALTH
LUSAKA DISTRICT HEALTH OFFICE

19th October, 2016

Appendix 13: Curriculum Vitae

Appendix 13.1. First Research Supervisor

PERSONAL DATA

Name   Angela Faith Chimwaza (Ph.D)

Address   Kamuzu College of Nursing
                                    P.O. Box 415, Blantyre. Malawi
                                    Phone 08-866 706
                                    Email address: afchimwaza@kcn.unima.mw

Employer   University of Malawi (at Kamuzu College of Nursing)

Occupation   Associate Professor

EDUCATIONAL BACKGROUND

Period of study	Institution	Award
1998 – 2002	University of Pennsylvania USA	Doctoral degree in Nursing. Apart from dissertation the Ph.D program comprised of course work. One of the core courses was leadership and management. My dissertation was on the experience of family caregivers of patients with symptoms of AIDS in resource poor communities.
1991 - 1992	University of Pennsylvania (U.S.A.)	Masters degree in Nursing - Specialized in Health Care of Women/ Reproductive Health
1985 - 1988	University of Ulster (Northern Ireland (U.K)	Bsc. (Honors) degree in Nursing with a major in Nursing Education. (Passed the Nursing Education option with a commendation).
1979 - 1980	Kamuzu College of Nursing	Malawi Certificate of Midwifery
1975 - 1978	Kamuzu College of Nursing	Malawi Registered Nurse
1974	Lilongwe Girls Secondary School.	Malawi Certificate of Education (Equivalent to O'Levels)

SPECIAL AWARDS

2000   Awarded a Margaret McNamara Memorial Fund (MMMF) award in the U.S.A (MMMF is under World Bank) The competition for the award was open to all international female students in the USA. Only 4 people won).

1998   Awarded a Fulbright Scholarship to study in the U.S.A.. (1998-2002). The scholarship provided partial funding for my Ph.D degree.

1991   Awarded a Rockefeller Foundation Scholarship to study in

the U.S.A

1978   Awarded a gold medal for being the best overall student for
                            the 1978 graduating students in Nursing

EMPLOYMENT HISTORY AND EXPERIENCE

Employment by the University of Malawi
Period   Position   Responsibilities

2012 to date Associate Professor   Teaching and supervising of students in
                                          clinical area and in research. Mentoring
                                          of junior faculty. Research supervision of
                                          Masters and PhD students.

2007-2013   Dean of Post Graduate   Responsibilities included providing
             Studies and Research   leadership in issues related to
             post   .   graduate studies and
             research at the
                                          college. Spearheaded the development
                                          of Masters' degree Programs at KCN
                                          and development of postgraduate
                                          guidelines. Supervised students'
                                          research.

2003-2012   Senior Lecturer   Duties include teaching Masters and
                                         undergraduate students,
                                         providing leadership to
                                         junior faculty staff members.

2003- 2006   Deputy Dean of Faculty   Assisted the Dean in
                                     running academic affairs of the
                              College.

2002 to date Deputy Director of the   Responsible for capacity building
             Research Centre   in research methods, providing
             at KCN   leadership in research.

1995 – 1997 Vice Principal   Responsible for general
                                         administration and academic affairs at
                                         Blantyre campus including preparing
                                         and controlling budget for the campus.
                                         Stood in for Principal whenever
                                         necessary.

1994 -1995	Head of Medical/ Surgical Department	Responsibilities included: planning, monitoring and evaluating departmental activities and staff (for the two campuses of the college); preparing and controlling departmental budget; organizing students' learning activities; teaching medical, surgical and gynaecological nursing; processing assessments for courses offered in the department; evaluating students' theoretical and clinical performance; recruiting academic staff and external examiners for the department; counselling of students; and collaborating with clinical staff in hospitals on issues that affected students' learning.
1992- 1994	Coordinator of Medical/Surgical department	performed administrative duties for Med/surg department at Blantyre Campus in liason with Head of dept.; organizing clinical teaching for students.
1992 - 1998	Lecturer	Duties included classroom teaching Of Medical, surgical and gynaecologic conditions to degree and diploma students; and supervision of students in clinical areas.

Employment by Ministry of Health

From 1978 to 19 84 I worked for Ministry of Health in various clinical areas

RESEARCH ACTIVITIES/CONSULTANCIES

2015	Country principal investigator for a study titled "**Confidence of midwifery students on selected midwifery competencies at the point of registration: A multi-centric study.**" This study is being conducted in 9 countries namely, Malawi, Kenya, Zambia, Tanzania, Uganda, Zimbabwe, England, Australia, Sweden and Somaliland. The study is sponsored by Karolinska Institutet of Sweden
2015	Country Principal investigator for a study titled "**Engaging Partners in Childbirth for prevention of Mother-To-Child**

Transmission of HIV". The study is being conducted in Kenya and Malawi and other partners include College of Medicine, University of Nairobi, University of Manchester, World Health organisation and University of Leeds (in the process of data collection). The study is sponsored by Medical Research Council of UK through University of Manchester .

2015   Principal Investigator for a study titled "**Preparation of male partners for their involvement during labour and delivery".** This study was conceived after doing a metasynthesis that showed gaps in the preparation of males. The results of this study will inform and intervention study which will address how the men are to be prepared

2013 to date   Country focal person for **Lugina Africa Midwives Research Network (LAMRN).** This is a project of 6 African countries that aim to promote research and provision of evidence based practice. The networking countries are Malawi, Zambia, Zimbabwe, Uganda, Tanzania and Kenya.

2013 to date   Principal Investigator for a project with ELMA philanthropies whose aim is to strengthen child health education in Malawi and the region through curriculum review and implementation in Malawi. For the past 5 years the program is being offered in in partnership with University of Cape Town. The ELMA project will build capacity for KCN to be able to offer the program independently. The project includes purchasing of books, teaching models, 2 LCD projectors, 2 laptops, I small printer and 1 big modern printer/scanner/copier. The project also includes educating 2 faculty members at Masters level and staff exchange program between the two countries.

2009 to 2013   Principal Investigator for a research project with partners from Arizona State University on fertility related attitudes and behaviours of young adults in Balaka district. The project was called Tsogolo la thanzi (TLT). At the end of the project the office block that was built for the project was donated to Balaka Distric Council and they are currently using it as their main office.

2009   Worked with COWI International Consultants to review NUFU and NOMA projects in Malawi

2008   Prevention of HIV in Very Young Adolescents in Rural Malawi PI: Dr. A. Chimwaza, Co-PI: Ass. Prof. Susan M. Kools, Prof. Sally Rankin (Working in partnership with University of California San Francisco). This study was approved by the Ethics Committee and data collection will begin in July.

2008	Participated in "Implementation of the health systems strengthening for equity : The power and potential of mid-level providers (HSSE) project" I worked in partnership with Columbia University's Mailman School of Public Heath Averting Maternal mortality and disability program (AMDD), Realizing Rights: The Ethical Globalization Initiative (RR:EGI), the African-based Regional Prevention of Maternal Mortality network (RPMM), Malawi College of Medicine and Trinity College Dublin Centre for Global Health (CGH).
2007	Mid-term review of Reproductive health services in Malawi under Sector Wide Approach (SWAp). Consultancy done for UNFPA and Reproductive Health Unit of the Ministry of Health. I was one of the two Malawian consultants. Mid-term assessment was conducted on the reproductive health including maternal and newborn care service in Malawi since SWAp was commenced. This was part of the bigger SWAp mid-term review where all medical services in Malawi were reviewed. The exercise attracted experts from America, Europe and other parts of Africa. My experience in this exercise and the information obtained provides broad overview of reproductive health services in Malawi including, the set up of the services, role of all healthcare providers including health surveillance assistants, services provided or the lack of services, supplies available or lack of supplies for the services, financing for the services, strengths and weaknesses in the services.
2004 to 2006	Evaluation coordinator for Peer Education Project on prevention of HIV. The study is being conducted in partnership with University of Illinois at Chicago.
2004	Co- Principal Investigator for a Research project on HIV/AIDS home-based care. The study was conducted in partnership with University of Illinois at Chicago
2001-2002	A descriptive study of the experience of family caregivers of patients with symptoms of AIDS in resource poor communities
1997	Wound dressing procedures and prevention of contamination and cross infection at health care facilities in Blantyre.
1995	Family Planning Decision Making: Use of Condoms in a Family as a Contraceptive Method. A survey conducted for Project Hope Malawi.
1995	Contraceptive Consumer Knowledge, Attitude and Practice (KAP Survey). A study conducted for Population Services

International (PSI) of Malawi.

1992   Needs assessment in computer training of staff at Kamuzu of
                College of Nursing

PUBLICATIONS

Bwazi, C., **Maluwa, A.,Chimwaza,**A., Pindani, M., (2014) utilization of Postpartum
    Family Planning Services between Six and Twelve Months of Delivery at
    NtchisiDistrict Hospital, Malawi.*Health* (6) 1724- 1737 http://www.
    Scirp.org/journal/health

Chadza E., Chirwa A., Maluwa A., Malata A., Kazembe A, **Chimwaza**, A (2012) Factors
    that contribute to delay in seeking cervical cancer diagnosis and treatment among women
    in Malawi. *Health* Vol.4, No.11, 1015-1022 (2012) Health
    doi:10.4236/health.2012.411155

Chasweka R., **Chimwaza,** A. Maluwa, A. Odland, J.O. (2012) Magnitude of domestic
    violence against pregnant women in Malawi. *Journal of Research in Nursing and
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    KachingweSitingawawo I; Norr Kathleen Fordham; Norr James L Impact of a
    peer-group intervention on occupation-related behaviors for urban hospital
    workers in Malawi.*The Journal of the Association of Nurses in AIDS Care :
    JANAC* 2009;20(4):293-307.

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    men who support their partners during child birth in low resource settings: a
    Descriptive review. *African journal of Midwifery and Women's health*. January-
    March 2015.9 (1) 29-34**.**
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    J.L, C.N., Jere, Kachingwe, S.I. 2012). Changes in clients' care ratings after HIV
    prevention training of hospitalized workers in Malawi. *International Journal of
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    AIDS   in rural sub-Saharan Africa *AIDS Care, 16 (7) 795-80.*

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    caregivers of patients with AIDS in resource poor communities: The case of
    Malawi. *UMI dissertation publishing (Bells and Howell information and learning*).
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Malawi.	*Open journal of Nursing*, 2013, 3, 343-350 OJN
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and prevention of contamination and cross infection. *MalawiMedical Journal,* 70-
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survivors of central nervous system tumours in the UK. *European Journal of
Cancer,* 36,   1459-1461.

Greef, M., Chepuka, L., Chilemba, W. **Chimwaza**, A., Kululanga, L.I, Kgositau, M.,
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methodology to investigate the appropriateness of quantitative instrument in an African
context.*AIDS Care: psychological and social-medical aspects of AIDS/HIV* published on
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client teaching for rural health workers: A peer-group intervention.*AIDS Care,* 22,
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Kamara, B.O., Rodriguez, R, Chorwe-Sungani, G. **Chimwaza A.** (2015) Perceptions
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occupation-related behaviors for urban hospital workers in Malawi**.** *J Assoc
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- Chimwaza, A.F., Yeatman, S., Trinitapoli, J., Chilongo, A. Muheriwa, R.S. (2015) How is the HIV and AIDS epidemic influencing the sexual and

reproductive behaviors of female youths in Balaka District, Malawi? A paper presented at Lugina Africa Midwives Conference in March, 2015.

- Mathews, A. Chimwaza, A. Sinclair, M., O'Muthana, D, & Nyirenda, .C (2011). Past, Present and future policy and Practice of traditional birth attendants: A focus of evidence. Paper presented and the International Confederation of Midwives in June, 2011.

- Chimwaza, A. (2004) The experience of caregivers of patients with symptoms of AIDS in resource poor communities: The Case of Malawi. *MedimondS.r.l*.161-164

PRESENTATION OF PAPERS

March 2015	Presented a paper in Dares Salaam titled: How is the HIV and AIDS epidemic influencing the sexual and reproductive behaviors of female youths in Balaka?
15-14-13	presented a paper on innovative program: improving quality of child health care at a child health conference in Cape Town. I received an award for being one of the best presenters.
4-5 -2011	Improving quality of Nursing and Midwifery practice through advanced health Education. Paper presented at 2011 Professional Fellows Congress organised by United States Department of State from 2-5th May 2011 in Washington
9 – 9 2008	Successes and challenges of developing midwifery education (masters degree programme): capacity in East Central and Southern Africa (ECSA) region. Paper presented at a UK-Africa Partnership dissemination conference organized by British Council at Imperial College, South Kensington Campus, London.
August 2008	Chimwaza, A., Chimango., J., Kaponda, C., McCreary, L., (2008, August) Peer group intervention for urban health workers in Malawi: Impacts on personal HIV prevention . XVII International AIDS Conference Mexico City. Abstract #TUPEO487, Poster
August 2008	Chimango., J., Kaponda, C, Chimwaza, A.,Jere, D.L., Norr, J., Norr, K. (2008). Effects of Peer Group Intervention on Work-related HIV prevention for Urban Health workers . XVII International AIDS Conference, Mexico City. Abstract# WEACO205, Oral presentation.
November 2007	Norr, J., Norr, K. (2008), Chimango., J., Chimwaza, A., Jere, D.L., Kachingwe, SI., Mbeba, MM, & Kaponda, C.P.N. (2007). Impacts of a peer Group Intervention on urbanhealth workers in Malawi.

Presented at American Public Health Association Meeting, Washington D.C.

27 – 03 -2008   Women and Reproductive Health. Paper Presented at U.S. Embassy Auditorium in commemoration of Women's History Month

31– 07-2007   HIV Prevention Peer Groups For Hospital Workers and Client Satisfaction With Health Services. Paper presented at the SIGMA THETA TAU Conference.

30-07-2007   Enhancing midwifery capacity to reduce maternal and neonatal mortality and morbidity in East, Central and Southern Africa (ECSA). Paper presented at SIGMA THETA TAU. Co authors: Vidot, P., Lugina, H., Kawala, L., Donavan, P., Kapoor, B., Adejumo, O., Msidi, E.

28 – 06- 2007   The Effect of a Peer group intervention on Personal HIV Prevention among urban hospital workers – Presented at NAC Conference in Lilongwe

28-06-2007   Impact of peer-group education for universal precautions and client teaching among urban and rural health workers.

28-04-07   Preparedness of Higher Education Institutions (HEIs) to offer a masters degree in Midwifery and Women's Health. A paper presented in Pretoria to Heads or representatives of heads of HEIs of University Colleges in Nursing in the ECSA region.

October 2004   Role preparation of caregivers of patients with symptoms of AIDS. Paper presented at a Research Dissemination seminar at Kamuzu College of Nursing.

27– 01 - 03   The experience of caregivers of patients with symptoms of AIDS in resource poor communities: The case for Malawi. A paper presented at the National Health Research Dissemination Conference held at Natural Resources College, Lilongwe, Malawi.

8-01-03   Giving care to people with symptoms of AIDS in rural Malawi. A paper presented at the National Health Research Dissemination conference held at Natural resources College, Lilongwe, Malawi.

March 1998   The feasibility of use of condoms by married couples in Malawi. A paper presented at University of Pennsylvania, U.S. A

INTERNATIONAL LINKS/RESPONSIBILITIES

March 2015   Established collaboration with Sweden to do joint research among

the following countries: Malawi. Kenya, Zambia, Uganda, Zimbabwe and Tanzania. Proposal writing will be done in Sweden in August 2015.

2014 to date	External Examiner for University of Swaziland Nursing Program
2013	Established collaboration with University of Manchester, University of Nairobi, University of Zambia, Uganda, Zimbabwe and Tanzania and we are working together as a network to improve evidence based practice and nursing/midwifery research in our countries.
2008 to 2010	External Examiner for University of Zambia - Masters degree in Nursing programme
2008	Member of the Editorial board for the African Journal of Midwifery and Women's Health
2010 to date	Established a partnership with University of Cape Town of South Africa. We now have a joint Masters degree program which I spearheaded.
2007	Established a relationship with University of California at San Francisco to collaborate in research, development and implementation of Masters programmes.
2007	Member of an international steering committee that developed a Masters program in Midwifery and Women's Health for the ECSA region in liaison with Commonwealth Secretariat, East Central and Southern African College of Nursing (ECSACON) and Indira Ghandi National Open University.
2007	Member of the Maternal and Infant Nutrition and Nature (MAINN) Unit International Advisory Board for Institute for Women, Infant and Health, University of Central Lancashire. United Kingdom
2007-2011	Member of the Board of Trustees for Global AIDS Interfaith Alliance (GAIA). This organisation supports some Nursing students such at Kamuzu College of Nursing and Malawi College of Health Sciences with a view of increasing nursing personnel in hospitals, offers bursaries to students in other University colleges, secondary schools and primary schools and supports rural development activities.
2004 to 2007	Affiliate for Population Studies Research Centre - University Pennsylvania

1995 to 1997 External Examiner for five Nursing Colleges affiliated
to the University of Botswana. The names of the colleges are Molopolole, Lobatse, Gaborone, Francis Town and Kanye SDA College.

NATIONAL COMMITTEES

2014   to date   Member of Cancer Association of Malawi

2013 to March 2015 Member of Ministry of Health's knowledge transformation platform. A committee (under Dignitas International) responsible for writing policy brief in order to promote use of evidence in practice

2008 to 2010   Member of the Malawi Industrial Research Council

2005 to date   Member of the Executive Committee of Malawi-U.S. Exchange Alumni Association. I am the Chairperson for the Blantyre Chapter of the Association

2003   Member of the National Training Committee on ARVs

1994 - 1998   Member of the National Cancer Committee

UNIVERSITY AND COLLEGE COMMITTEES

2007 to 2013   Chairperson of College Postgraduate Committee

2007 to 2013   Member of University Senate

2007 to 2013   Member of the University-wide Postgraduate Committee

2007 to 2013   Chairperson of the College Post Graduate Committee

2005 to 2012   Member of the College of Medicine Research and Ethics Committee (COMREC)

2004 to 2010   Chairperson of the College Research and Publications Committee

2003 to 2013   Member of the College's Management Committee

2003 to 2013   Member of the College Curriculum Committee

2003 to 2013   Member of the College Examinations Committee

2003 to 2013   Member of the College Assessment Committee

1995 – 1997   Chairperson of Academic Staff Appointments Committee
1995 - 1997   Chairperson of Career Promotion Committee

PROFESSIONAL MEMBERSHIP

2005 to date	Member of the East Central and Southern African College of Nursing (ECSACON)
1978- to date	Member of the Nurses and Midwives Council. Member of the Nurses Association of Malawi.
1993	Member of the SIGMA Theta TAU honour society for nurses

OTHER SCHOLARLY ACTIVITIES

2015	Internal assessor for a PhD candidate
2012 to date	Supervisor for a PhD candidate, Linda Nyondo Mipando who is a CARTA student under Malawi College of Medicine (COM).
2005-2006	Supervisor for a Ph.D and masters students candidate, Mrs. Lucy Mkandawire-Vahlmu who studied at University of Wisconsin- Madison School of Nursing. USA (now working in USA)
2012	Supervisor for PhD student Ellen Scarr studying at University of California in San Francisco
2003	to date Supervision of Masters degree students

CAPACITY BUILDING

July 2006 Organized training in Epidemiology for KCN staff and other health care workers in conjunction with University of Rochester and University of Pennsylvania of the U.S.A.

2006	Conducted two workshops in Focus group discussions and in-depth interviews for KCN faculty members
2013 and 2016	Two of my students (1 Masters and 1 PhD) are recipients of international conference awards (Mrs Muheriw- Matemba and Dr. Nyondo) for outstanding presentations/research work.

INITIATIVE

February 2005	Started student outreach activities on issues related to Reproductive Health at Blantyre campus
2002	Found a donor in the US for MANASO to assist with development of teaching aids for HIV and AIDS.

SOME OF THE SHORT COURSES ATTENDED

November2015   Continuing Professional development at Mangochi in innovative curriculum design, development implementation, evaluation and review process

October 2015   Had refresher training in PG connect.

2014   Had training on how to use PG Connect at KCN Blantyre Campus

2014   Had training on how to use TURNITIN at KCN Blantyre campus organised by College of Medicine

Dec. 2012   Attended a one week workshop in Emergency Triage Assessment and Treatment (ETAT)

Aug. 2013   Attended training on bubble continuous positive airway pressure (CPAP) for children with respiratory distress CPAP at training at Queen Elizabeth Central Hospital

May 2012   Attended a workshop on quality assurance in Higher Learning organised by Ministry of Education

March 2012   Attended a workshop on supervision of PhD student in Nairobi organised by a Consortium of African Universities

18-19th Oct 2011   Attended a workshop on Mentorship training organised by Malaria Capacity Development Consortium in partnership with College of Medicine

23 April to 19th May, 2011. As a member of Global Health Professional Fellows (as Fulbright scholar) in the US, we had in-service education in several areas, particularly in teaching including Reflective journaling, integrating teaching strategies, pedagogies of e-learning, Computer designing of moodles, public media in communication, social networking, E-granary and moodles, introduction to free educational databases and dealing with diverse groups.   This was funded by the US Government.

31st Aug – 2nd Sep. 2010   Postgraduate supervision and training. This training was on supervision of Masters and PhD research. It was organised by London School of Hygiene and Tropical Medicine.

7th – 10th June 20 10 Management training - Catalysing Change in African Universities: A workshop aimed at strengthening leadership, management and Cross cutting professional skills of senior management leaders in

East, Central and Southern Africa Universities. Organised by J. C. Quality

20th – 23rd October   2009 Attended a workshop on Research Ethics " Conducting Research Responsibly" organised by the Steve Biko Center for Bioethics at University of Witwatersrand, South Africa

31-8 to 11-9, 2009   Attended a workshop on contemporary issues in Family planning organised by Intrahealth International and Ministry of health. The goal of the workshops to update participants on contraceptive training methodologies and skills in teaching of Family planning to pre service and graduate students.

2006   Attended training in Kenya on integration of adolescent health, including life skills and youth friendly services into pre-service nursing and midwifery curricula.

2006   Attended a course on Pathways to HIV/AIDS quality care organised by International training and Education Centre on HIV of USA (I-TECH). The course included content in counselling, ARVsand Prevention of Mother To Child Transmission of HIV

2006   Attended a workshop on Problem-based Learning by Prof. Baker of Indiana University.

2005   Training in Finance management for non Finance managers

2005   Attended an Ethics Training workshop organised by the National Health Sciences Research Committee and College of Medicine, sponsored by UNC Centre for AIDS Research and Fogarty Centre.

2003   Attended a workshop on Ethics, Research and Human Subjects organised by University of Illinois at Chicago

2003   Training in Integrated Management of Childhood Illnesses (IMCI)

Appendix 13.2: Second Research Supervisor

MAUREEN DAISY MAJAMANDA (SECOND RESEARCH SUPERVISOR)

Personal Details

Name :	Maureen Daisy Majamanda
Postal Address:	University of Malawi, Kamuzu College of Nursing, P O Box 415, Blantyre, Malawi.
Phones and E-mail:	**Phone**: +265 (0)1 873 623 (**Office**), +265 (0) 992 160 415 (**Mobile**) **Fax**: +265 (0)1 875 341,

Email: mdmajamanda@kcn.unima.mw,

mdmajamanda@gmail.com

Summary

- MSc Advanced Practice (Child health) - Cardiff University, United Kingdom
  Bachelor of Science in Nursing - University of Malawi, Kamuzu College of Nursing
  University Certificate in Midwifery - University of Malawi, Kamuzu College of Nursing
  Certificate in Leadership and Management in Health - University of Washington
  Certificate in Person Centred Care (CPD course) - University of Edinburgh
- Member of Nurses and Midwives Council of Malawi, White Ribbon Alliance and Sigma Theta Tau Lambda Malawi Chapter.
- Experience in systematic literature search in electronic databases
- Experience in systematic reviews
- Experience in Child Health Nursing Education (Undergraduate, Post Basic, Post Graduate), Research, Community Outreach, Clinical skills
- Knowledge and skills in Child Health Module development (Master of Science, Post Basic and Undergraduate)
- National Trainer in short courses/ programs (Emergency Triage Assessment and Treatment + Trauma (ETAT) and Continuous Positive Airway Pressure (bCPAP).
- Skills in grant proposal writing, report writing, team work, leadership and management, problem solving, crisis management and decision making
- Self-starter, enjoy taking responsibilities and work well even under pressure.

Publications

1. Majamanda, M.D., Munkhondya, T.E.M., Simbota, M. and Chikalipo, M. (2015) Family Centered Care versus Child Centered Care: The Malawi Context. *Health*, **7**, 741-746. http://dx.doi.org/10.4236/health.2015.76088
2. Majamanda Juma, Maureen .D, Munkhondya Mbeya Tiwonge and Carrier Judith (2014) The Effectiveness of Community-Based Nutrition Education on the Nutrition Status of Under-five Children in Developing Countries. A Systematic Review. *Malawi Medical Journal* . 26(4): 115- 118 http://www.medcol.mw/mmj/?p=2314

3. Tiwonge Ethel Mbeya Munkhondya, Gladys Msiska, Evelyn Chilemba, Maureen Daisy Majamanda (2014)Experience of Conducting Objective Structured Clinical Evaluation (OSCE) in Malawi Open Journal of Nursing, 4, 705-713.http://www.scirp.org/journal/ojnhttp://dx.doi.org/10.4236/ojn.2014.410075

Conference Presentations

1. Building Children's Nursing for Africa Conference (22-24 April 2015) at Belmont Square Conference Centre, Cape Town.
   Title: Faculty involvement in Child Health Practice: An Approach for Kamuzu College of Nursing and Queen Elizabeth Central Hospital. Oral Presentation

2. 16th College of Medicine Research dissemination conference (27th October, 2012) Blantyre, Malawi.
   Title: The Effectiveness of Community-Based Nutrition Education on the Nutrition Status of Under-five Children in Developing Countries. A Systematic Review. A poster presentation

3. Sigma Theta Tau   International Conference (July 2012). Blantyre, Malawi
   Title: The Effectiveness of Community-Based Nutrition Education on the Nutrition Status of Under-five Children in Developing Countries. A Systematic Review. An Oral presentation

Current Research Studies

1. Majamanda M D, Simbota M, Ngwale M & Kasitomu C. An exploration of Nurses' knowledge, skills, attitudes and beliefs regarding evidence based practice at Queen Elizabeth Central Hospital, Blantyre, Malawi. (October 2015 to date)

2. Simbota M, Kafulafula U, Majamanda D, Gondwe W, Kapito E. Building Capacity of Nurses and Midwives in Neurological Care of Neonates and Children with Common Neurological Dysfunctions at Queen Elizabeth Central Hospital, Blantyre, Malawi (January 2016 to date)

MSc Students research projects supervised

1. Kholowa E. Nurses Knowledge and Attitudes towards Pain management in Children Admitted in the Paediatric Department of Queen Elizabeth Central Hospital (2012)

2. Muzombwe M. Nurses Communication of Health Information to Caregivers of Children Hospitalised at Queen Elizabeth Central Hospital (2013)

3. Tewesa E. Risk Factors for Birth Asphyxia and Short-term Outcomes of Neonates with Birth Asphyxia at Queen Elizabeth Central Hospital (Chatinkha Maternity Wing) (2014)

4. Gondwe M. Experiences of Caregivers of Infants who have been on Bubble Continuous Positive Airway Pressure at Queen Elizabeth Central Hospital (2015)

Referees

The Principal,   The Vice Principal,

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Appendix 13.3. Zambian Research Supervisor

PERSONAL DETAILS
Name: Concepta Namukolo Kwaleyela   **Date of birth:** 09th March 1964

Email: conceptak@yahoo.com   **Nationality:** Zambian

       ckwaleyela@gmail.com **Marital status:** Married

Phone: +260967716691 (M)   **Next of Kin:** Mr Charles Ackim Phiri

Address: 4 NAPSA Complex

Nyumba Yanga

Lusaka

Zambia

QUALIFICATIONS AND EDUCATION

2009 – 2013 **PhD Health Studies:** University of Nottingham, United Kingdom.
2001 – 2003 **MSc Advanced Midwifery and Neonatology:** University of the Western Cape, South Africa.
1993 – 1996 **BSc in Nursing:** University of Zambia, Zambia.
1990 **Certificate in Registered Midwifery** (Passed with Honours)**:** University Teaching Hospital School of Midwifery, Zambia.
1982 – 1985 **Diploma in Registered Nursing:** Lusaka School of Nursing, Zambia.
1979 – 1980 **Form V Cambridge 0-level Certificate** (Division II)**:** Holy Cross Girls Secondary School, Zambia.
1976 – 1978 **Junior Secondary School Leaving Certificate** (Division I)**:** Holy Cross Girls Secondary School, Zambia.
1969 – 1975 **Grade VII Certificate** (Division I)**:** Sesheke Primary School, Zambia.

PROFILE

I am a midwife lecturer with over 28 years of full life cycle development experience working as a nurse midwife educator, practitioner and qualitative researcher. I have been involved in various projects worldwide and therefore, I have a deeper understanding of interworking and collaborating with people from different walks of life. I have a lot of experience working as a bedside nurse, administrator and researcher. I have been exposed to a mind framework of being efficient, hard-working, productive, self-motivated, and a team player. I have successfully supervised both qualitative and quantitative undergraduate and postgraduate researches. Due to my inclination and vast knowledge of qualitative research methodologies I was appointed as one of the external examiners for the University of Nairobi in Kenya as well as University of Johannesburg. I am a reviewer for the Africa Journal of Nursing

and Midwifery.

I have successfully designed, developed and participated in a number of projects of different sizes internationally and nationally with the recent one being "The distance learning Curriculum for Masters of Science Degree in Midwifery; East, Central, Southern African (ECSA) region". The project was focused on increasing the number of midwifery educators in the region as one of the interventions to mitigate the high maternal mortality ratios (MMR) ravaging sub-Saharan African region.

TECHNICAL SKILL SUMMARY

I am computer literate. I can use Microsoft Word, Microsoft PowerPoint, Microsoft Excel, Microsoft Publisher, Microsoft Office applications, EndNote referencing, search engines like ASSIA, CINAHL, PubMed, Scopus, PsychInfo, MIDIRS, MEDLINE, BNI, AMED, EMBASE, GOOGLE, organise qualitative data using statistical programmes such as Nvivo, EPI-Info as well as analysing data using content analysis principle and SPSS.

I am proficient in qualitative research in particular phenomenology and grounded theory. I have advanced knowledge of antenatal, intrapartum, postpartum, neonatal and all obstetrical emergency care.

FIRST AUTHOR PUBLICATIONS
1. Kwaleyela, C.N., Maimbolwa, M.C., Gottvall, K. and Ransjo-Arvidson, A. (2009) Students' perceptions of Zambian women: choosing where to deliver. *Africa Journal of Midwifery and Women's Health, 3(3), 113-116.*
2. Kwaleyela, C.N. and Kearns, E. (2009) Women's perceptions of midwifery care in Lusaka, Zambia. *Africa Journal of Midwifery and Women's Health.* 3(2), 62-65.
3. Kwaleyela, C.N., Greatrex-White, S. and Walsh, D. (2015) Being in a dilemma: Childbirth experiences of women birthing in Zambia. *Africa Journal of Nursing and Midwifery.* Vol 17, S43-S55

PROFESSIONAL MEMBERSHIP
- Lugina Africa Midwives Research Network (LAMRN): Zambia Chapter Board member

- East, Central and Southern Africa College of Nursing (ECSACON): Steering committee member of the midwives educators' programme in ECSA region
- East, Central and Southern Africa College of Nursing (ECSACON): Member of the educational committee, Zambia chapter

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AWARDS
1990: University Teaching Hospital School of Midwifery: **Best midwife student**

EMPLOYMENT HISTORY
Jan 2016 – To date University of Zambia, Department of Nursing Sciences
Coordinator (Advanced Midwifery Science and Practice)
  Main duties
  - Planning, coordinating, directing, managing and implementing PhD and Masters Midwifery programmes.
  - Preparing timely sectional updates.
  - Participating actively in research activities.
  - Participating actively and effectively in the lecturing of students.

  Achievements
  - Inception of the first PhD (Midwifery) programme.

July 2013 – Dec 2015 University of the Western Cape, Department of Nursing
Midwifery coordinator (Postgraduate)
  Main duties
  - Planning, coordinating, directing, managing and implementing policies and guidelines for the post-graduate programme.
  - Guiding and marking research work for post-graduate and under-graduate students.
  - Preparing timely sectional updates.
  - Ensuring accurate record keeping and accounting.
  - Planning, structuring, implementing and monitoring school curriculum.
  - Preparing and conducting examinations within given time schedules, standards and procedures.

- Participating and ensuring timely selection, recruitment and induction of students.
- Instilling discipline among students.
- Participating actively and effectively in the lecturing of students.
- Setting of standards and assessing of students in practicum work areas.
- Participating actively in research activities.

Achievements
- Increased the number of international as well as local students to the programme.

Oct 2005 – Sept 2009   University of Zambia, Department of Nursing Sciences:
Lecturer
Main duties
- Planning, coordinating, directing, managing and implementing policies and guidelines for post-graduate and under-graduate midwifery students.
- Guiding and marking research work for post-graduate and under-graduate students.
- Preparing timely sectional updates.
- Ensuring accurate record keeping and accounting.
- Planning, structuring, implementing and monitoring school curriculum.
- Preparing and conducting examinations within given time schedules, standards and procedures.
- Participating and ensuring timely selection, recruitment and induction of students.
- Instilling discipline among students.
- Participating actively and effectively in the lecturing of students.
- Setting of standards and assessing of students in practicum work areas.
- Participating actively in research activities.

Achievements
- All students whose researches I have supervised have been appointed as Staff Development Fellows (SDFs) by the University of Zambia, School of Medicine.
- Maintained a 100% pass rate.

- Introduced Master of Science and Bachelor of Science Degrees in Midwifery and Neonatology.

Nov 2003 – Oct 2005 University Teaching Hospital School of Midwifery:
Principal Midwifery Lecturer
Main duties
- Planning, coordinating, directing, managing and implementing policies and guidelines for midwifery students.
- Ensuring a conducive learning and teaching environment for both staff and students.
- Producing timely school reports.
- Accounting for all the donations made to the school.
- Maintaining effective confidential information and records filing systems on all staff and students.
- Ensuring availability of up-to-date guidelines on midwifery procedures and practice.
- Participating actively and effectively in the lecturing of students.

Achievements
- Maintained a 100% pass rate.
- Introduced rural midwifery practice to the curriculum.
- Successfully updated the Midwifery curriculum.
- Introduced the staff and student exchange programme with Karolinska Institutet, Stockholm, Sweden.

Jan 1997 – Oct 2003 University Teaching Hospital School of Midwifery:
Senior/Midwifery Lecturer
Main duties
- Assisting the Principal midwifery lecturer.
- Producing timely school reports.
- Participating actively and effectively in the lecturing of students.
- Mentoring students in the practicum areas.
- Reviewing the midwifery and neonatology curriculum

Achievements
- Due to my diligence and dedication to duty, I was sponsored to the University of the Western Cape for a Master of Science Degree.
- Completed my Master of Science Degree within the stipulated timeframe.
- Appointed to the University of Zambia to initiate the MSc and BSc programmes in Midwifery and Neonatology.

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- Introduced Advanced Midwifery practice course at the University of Zambia for long-serving midwives without academic qualifications needed to enter the BSc programme.

Jan 1991 – Mar 1993 Chelstone urban maternity clinic, Lusaka:
Registered midwife
Main duties
- Conducting deliveries.
- Caring and monitoring antenatal, intrapartum and postnatal mothers.
- Conducting domiciliary visits.
- Offering family planning services.
- Caring and monitoring neonates.
- Caring, monitoring and referring neonates and mothers who developed complications to the hospital for further obstetricians care.

Achievements
- Appointed to mentor midwifery students during their assignment to Chelstone clinic.
- Awarded a scholarship to University of Zambia for a Bachelor of Science Degree in Nursing.
- Completed my Bachelor of Science Degree within the stipulated timeframe.

Feb 1985 – Dec 1989 Chipata General Hospital:
Registered Nurse/Ward Manager/Nursing Officer
Main duties
- Bedside nursing patients with medical, surgical and gynaecological conditions.
- Clerking clients/patients seeking Out Patients services.
- Commencing and monitoring patients on intravenous therapy.
- Conducting routine ward chores.
- Conducting administrative day and night ward/hospital supervisions.
- Ensuring effective day to day running of wards and hospital.
- Mentoring student nurses.
- Conducting interviews.
- Ensuring that wards and the hospital have enough staff at all times.

Achievements
- Steadily rose through the ranks.
- Obtained invaluable nursing and administrative experiences.

REFERENCES

Dr Miriam A. Chimumbwa   Dr Catherine Mubita Ngoma

miriamchimumbwa@yahoo.co.uk   catherinengoma@yahoo.com

Appendix 13.4. Researcher

CURRICULUM VITAE

Rodgers Gift Benkele
Principal Tutor
Arthur Davison Children's Hospital
School of Paediatrics and Child Health Nursing
Copperbelt Province, Ndola, Zambia

Personal Profile	
Name:	Rodgers Gift Benkele
Date of Birth:	7th December 1971
Nationality:	Zambian
Marital Status:	Married
Address:	Arthur Davison School of Paediatrics and Child Health Nursing. P.O. Box 240227, Ndola, Zambia,
Mobile (MTN)	+260-962-845-154
Mobile (Airtel-Z)	+260-974-247-358
Mobile (Zamtel)	+260-955-064-500
E-mail:	benkelerg@gmail.com

Academic qualifications:

- MSc Child Health Nursing – University of Malawi
- PG. Diploma Child Health Nursing (Clinical Nurse Specialist) – University of Cape Town,
- PG. Diploma Registered Paediatric Nurse – Gertrude Children Hospital, Kenya,
- BSc. Nursing (Medical Surgical), University of Zambia,
- Diploma Registered Nursing
- Certificate Enrolled Nursing

Other trainings:

- *Helping Babies Breath (HBB) 2nd Edition.* Grand Sheraton Hotel, Chicago, United States of America
- *Newborn Life Support Course*, Groote Schuur Hospital, Cape Town, South Africa.
- *Emergency Triage Assessment and Treatment (ETAT)*, Queen Elizabeth Hospital, Blantyre, Malawi.
- *European Pediatrics Advanced Life Support (EPLS)*, Gertrude Children Hospital, Nairobi Kenya.
- *IMCI Case Management Course*, Chipata General Hospital, Chipata, Zambia.
- *TOT Course IMCI Facilitator* – University Teaching Hospital, Lusaka, Zambia.

- *Supervisory Management Development Skills*, Institute of Local Government Entrepreneurship Training Research and Consultancy, Lusaka, Zambia.
- *TB Diagnosis and Management Training*, Chipata General Hospital, Chipata, Zambia. ? *EPI Country Level Mid-Level Course*, University Teaching Hospital, Lusaka, Zambia.
- *Community Care for HIV/AIDS TOT Course*, Chikankata Mission Hospital, Mazabuka, Zambia.

Professional Registration:

General Nursing Council of Zambia: *Registered Nurse* (RN), *Registered Paediatric Nurse* (RPN), *Bachelor of Science Nursing* (BScN).

GNC Registration Number: **RN3285**

Experience:

Have vast experience in
- Advanced Neonatal Resuscitation
- Emergency Triage Assessment and Treatment (ETAT)
- Paediatric Advanced Life Support (PALS).
- Integrated Management of Childhood Illnesses (IMCI) - Case management, training and supportive supervision.
- Teaching and learning processes.
- Expanded Programme on Immunisation (EPI).
- Vast experience in strategic planning
- Vast experience in Activity Based Budgeting, monitoring and reviewing of action plans.
- Vast experience in health management and organisation, community mobilisation, child health issues, and child health nursing
- Community Care for HIV and AIDS.
- Tuberculosis (TB) Management.
- Leadership and management.

Research Studies

1. Benkele, R. G. (2018). ***Dehydration management in under-five children with acute gastroenteritis by nurses and midwives in selected health centres in Lusaka Zambia.*** UNIMA, Kamuzu College of Nursing, Lilongwe, **(Unpublished)**.

2. Benkele, R. G. (2009). ***Parents' understanding of elements of an informed consent at Gertrude's Children's Hospital in Nairobi – Kenya.*** Gertrude's Garden Children's Hospital/World Health Organisation, Nairobi, Kenya. **(Unpublished)**.

3. Benkele, R. G. (2007). *Male involvement and participation in the prevention of mother to child transmission of HIV in Chipata District*. UNZA, School of Medicine, Department of Nursing Sciences, Lusaka, **(Unpublished)**.

Presentations

1. **Reducing neonatal mortality through transformative change at the University Teaching Hospital – Women and Newborn, Lusaka.** A Power Point Presentation at 2018 Annual Quality Congress: 20-23 September 2018, Grand Sheraton Hotel, Chicago, United States of America.

2. **Neonatal developmentally supportive care; initiating change – putting theory into practice,** The Building Children's Nursing Conference: 28-30 March 2017, River Club in Cape Town.

3. **Sustainable innovation in paediatrics; the role of Paediatric and Child Health Nurses Association in Zambia.** The Building Children's Nursing Conference: 28-30 March 2017, River Club in Cape Town.

4. **Nursing care of an infant with bladder exstrophy: Role of family centred care. A case study presentation.** A power point presentation, Continuous Professional Development for Nurses, Queen Elizabeth Central Hospital Blantyre, Malawi (15th March 2016).

5. **Developmentally supportive care for neonates - nesting and positioning. A Systematic Review. A poster presentation,** Evidence Based Practice – Change Initiative, Queen Elizabeth Central Hospital Blantyre, Malawi (4th April 2016).

Skills
Computer, problem solving, report writing, team work leadership and management

Professional Memberships
Member and President – Paediatric and Child Health Nurses Association of Zambia – PCHNAZ
Member – Newborn Support Zambia

Referees

1. Mrs Inutu Mbangweta Muzungu
   Email: inutmuz@yahoo.com

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Mentor

2. Dr. Sylvia Machoma
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   Lusaka – Zambia
   Mobile +260 975 953 545
   Mentor - Zambia Neonatal Resuscitation Program

3. Dr. Sam Miti
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