THESIS ABSTRACT

Master of Public Health

Adventist University of Africa

School of Postgraduate Studies

TITLE: DETERMINANTS OF DIETARY DIVERSITY AMONG CHILDREN AGED 6-23 MONTHS IN MWENEZI DISTRICT, ZIMBABWE.

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Poor dietary diversity during the complementary feeding period has detrimental effects on children's growth, health, and development. During this period, a lack of a diverse diet increases the risk of malnutrition, morbidity, and mortality. Ensuring dietary diversity is critical to promoting child survival, adequate growth, and development.

The study aimed to identify determinants of dietary diversity among children aged 6-23 months in Mwenezi district of Zimbabwe. The study examined determinants of dietary diversity at the child, caregiver, household, and community levels.

The study was a quantitative cross-sectional design with a sample size of 417 children selected through multi-stage random sampling. As children are not able to report their food intake, their caregivers responded on their behalf. Data was gathered

by five trained field assistants using an interviewer-administered questionnaire and was analyzed using Statistical Package for Social Sciences (SPSS 20 for windows).

The study established a very low minimum dietary diversity, (21.3%) in Mwenezi district. Except for staples (grains, roots, and tubers), the consumption of other food groups was below 50%. Consumption of vitamin A-rich fruits, eggs, and dairy products were least consumed by children, ranging from 7-16%.

Determinants at the child level were age, sex, and birth weight. Caregiver knowledge of IYCF was the only caregiver level determinant identified. Household level determinants included poultry possession, possession of a nutrition garden, and joint decision-making by both spouses while community level determinants were presence of child growth monitoring services and village savings and lending associations.

Interventions to improve the quality of diets consumed by children ought to target child, caregiver, household and community levels for synergy and greater impact. These interventions should purpose to increase caregivers' knowledge of age specific child feeding practices while also creating a conducive and supportive socio-economic environment for caregivers to plan and prepare diverse diets. A comprehensive social and behaviour change program using the care group model, employing a ''whole of family approach'' to improve feeding behaviors and practices, empowering women and engaging men to support joint decision making, production of a wide range of crops and vegetables and small animals will improve consumption of diverse diets by children in Mwenezi district.

Key words: Dietary diversity, Child nutrition, Caregiver knowledge, Household resources and Community interventions

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DETERMINANTS OF DIETARY DIVERSITY AMONG CHILDREN AGED 6 – 23 MONTHS IN MWENEZI DISTRICT, ZIMBABWE

A thesis

presented in partial fulfillment

of the requirements for the degree

Master of Public Health

by

Tarusenga Huturume

October 2022

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I dedicate this thesis to my wife, Rutendo, and daughter, Keisha

for their love and support throughout the course of my study.

Individually and collectively, you are wealthier than

the world’s supply of gold.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ANC	Antenatal Care
AOR	Adjusted Odds Ratios
CI	Confidence Interval
IYCF	Infant and Young Child Feeding
MAD	Minimum Acceptable Diet
MDD	Minimum Dietary Diversity
MICS	Multiple Indicator Cluster Survey
MMF	Minimum Meal Frequency
MOHCC	Ministry of Health and Child Care
TV	Television
SPSS	Statistical Package for Social Sciences
UNICEF	United Nations Children's Emergency Fund
VSLA	Village Savings and Lending Association
WHO	World Health Organization
ZIMSTAT	Zimbabwe National Statistics Agency
ZimVAC	Zimbabwe Vulnerability Assessment Committee

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My special gratitude goes to the five trained field assistants who supported data collection and all respondents who participated voluntarily and provided responses for the success of the research. Your participation will always be highly valued. To my wife and daughter, I thank you for always cheering me on when different commitments posed challenges to my concentration on the thesis.

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CHAPTER 1

INTRODUCTION

The chapter gives a detailed account of the background of the study and the statement of the problem that gave rise to the need to research to answer the research questions spelled out on page 10. The study's aim and objectives, rationale, conceptual framework, and delimitation are detailed in this chapter. This research sought to identify determinants of minimum dietary diversity (MDD) among children aged 6-23 months old in the Mwenezi district.

Dietary diversity has long been recognized as critical in the growth and development of children. Temesgen, Negesse, Woyraw, and Mekonnen (2018) define dietary diversity as "a quantitative number of food items or groups used as a method of determining variety and nutrient adequacy of diets for an individual" (Temesgen, Negesse, et al., 2018, p. 2).

It is known that children aged 6-23 months should be fed diverse foods to promote optimal growth, health, and development. During the complementary feeding period, children are vulnerable to growth faltering and nutritional deficiencies when diets lack diversity and nutrient density. According to the United Nations Children's Fund (2019), younger children aged 6-11 months consume less diverse diets compared to the 12-24 months age group. A study by Arimond and Ruel, (2004) shows a significant association between dietary diversity and the nutritional status of children.

MDD is a globally agreed population-level indicator that assesses diet diversity and nutrient quality of complementary diets consumed by children. United Nations Children's Fund (UNICEF, 2012), defines minimum dietary diversity as the "proportion of children 6-23 months of age who received foods from four or more food groups" (UNICEF, 2012, p. 23). The World Health Organization (WHO, 2010), defines the seven food groups as

1. Grains which include roots and tubers
2. Legumes and nuts
3. Dairy products
4. Fleshy foods
5. Eggs
6. Vitamin-rich fruits and vegetables and
7. Other fruits and vegetables.

According to Beyene, Worku, and Wassie (2015), poor feeding practices including a lack of diverse foods can increase chances of malnutrition, morbidity, and mortality in children below two years. According to the 2018 Food and Nutrition Council national nutrition survey report, only 6% of children aged 6-23 months old consumed diverse diets in Mwenezi districts and this is a cause for concern. Findings from this study will inform the development and implementation of interventions that will effectively promote the consumption of diverse diets by target children in the district and perhaps beyond.

Background of the Study

Maternal and child undernutrition remains one of the most pressing and persistent public health challenges in the world, as it results in increased mortality and the overall burden of disease. The United Nations Children's Fund (UNICEF, 2019),

revealed that at least one in every three children globally fails to grow well as a result of malnutrition in the visible forms of stunting, wasting, and overweight. According to UNICEF (2021) report, children affected by undernutrition are at a higher risk of dying than well-nourished children. Child stunting defined by the UNICEF, WHO, and World Bank, (2018), as a situation when a child is too short for his or her age remains very high in Africa, yet it is one of the best markers of human capital development. The UNICEF (2019) report states that children affected by stunting may not fully develop physically and that their cognitive development is also impaired. A rapid increase in stunting occurs during the period between six and twenty-three months during which time devastating effects may occur (UNICEF, 2021). The Zimbabwe National Nutrition Survey report (Food and Nutrition Council, 2018), indicated that 27% of children below five years in Zimbabwe are stunted.

There is abundant evidence that shows that optimal infant and young child feeding practices are critical in ensuring growth and development in children. Furthermore, the period between birth and the second birthday of the child's life presents a critical window of opportunity during which adequate growth and development through optimal feeding are key. From six up to twenty-three months, children become vulnerable to nutritional deficiencies because breast milk alone provides insufficient nutrients (UNICEF, 2019) and this underscores the importance of optimal child feeding practices during that growth period.

According to WHO (2013), stunting that has occurred in earlier ages is very difficult to reverse while growth faltering most evident in children between six and twelve months occurs when poor complementary diets begin to replace breast milk, often coupled with very high diarrheal diseases due to food contamination. A UNICEF report asserts that stunting which occurs during the first 1000 days of a

child's life poses the highest negative long-term impact on the education and earning potential of a person including poor school performance and also reduced adult earnings (UNICEF, 2015).

The United Nations Children's Fund (2021) emphasizes that poor diets remain one of the major obstacles to growth, survival, and development of young children in many countries. In nearly all countries, families encounter numerous barriers in giving their children nutritious foods (UNICEF, 2020). It is estimated that globally, two in every three children aged six up to twenty-three months old do not consume diverse foods (UNICEF, 2019). In addition, there has been a very small or ultimately no improvement in diets for children over the past decade (UNICEF, 2021). Child malnutrition due to poor diets remains a cause of concern in developing countries as this contributes to child morbidity and mortality (Temesgen, Yeneabat, and Teshome, 2018). Poor diets unequally affect children among regions and the most affected are children in poorer countries with children in rural areas and poorer households having the least minimally diverse diets (UNICEF, 2021). According to Olita'a, Vince, Ripa, and Tefuarani (2014), malnutrition is associated with 45% of deaths in children younger than five years.

From the age of 6-23 months, children can benefit from animal-source foods such as meat, eggs, fish, and dairy products which are rich in micronutrients such as iron, zinc, calcium, and vitamin A (UNICEF, 2019). In Zimbabwe, only 16% of children aged 6-23 months meet the criteria for minimum dietary diversity (Food and Nutrition Council, 2018). Mwenezi district is one of the districts with a very small proportion of children who consume diverse diets. The district has the lowest child dietary diversity score in Masvingo province, at 6%. This study, therefore, aimed to determine factors affecting children's dietary diversity in the Mwenezi district.

Problem Statement

Beyond six months, children need diverse complementary diets in addition to breast milk to support adequate growth and development. During this period, breastmilk becomes insufficient yet the demand for nutrients among children is very high as it is associated with rapid growth and development. Arts et al. (2021) further emphasize that this stage is characterized by the rapid increase in both body weight and height, and it is when most of the human brain is developed and yet, it is the period associated with the rapid increase in the prevalence of child stunting due to poor diets.

Child malnutrition due to poor diets contribute to morbidity and mortality in children. Furthermore, poor diets are unequally affecting children within and across regions. In addition, children having the least diets are those from poorer households mainly in rural areas and the disadvantaged regions in countries (UNICEF, 2021). In Mwenezi district, which is one of the vulnerable districts in Zimbabwe, only 6% of children consume diverse diets, and this is a cause for concern. Although several nutrition specific and nutrition sensitive interventions have been implemented to improve the nutrition status of children in the district, the drivers for such poor consumption patterns among this age group during the critical complementary feeding period are not well understood in Mwenezi district.

Research Goal

The study sought to identify the determinants of dietary diversity among children aged 6 – 23 months in Mwenezi District to provide useful recommendations for caregivers, households, and communities to promote optimal child feeding practices.

Research Questions

1. What are the feeding consumption pattern among children aged 6-23 months in Mwenezi district?
2. What child characteristics affect MDD among children aged 6-23 months in Mwenezi district?
3. What caregiver characteristics affect MDD among children aged 6-23 months in Mwenezi district?
4. What household characteristics affect MDD among children aged 6-23 months in Mwenezi district?
5. What community characteristics affect MDD among children aged 6-23 months in Mwenezi district?

Null Hypothesis

H_0: MDD is not affected by the child, caregiver, household, and community characteristics in the Mwenezi district.

Theoretical Framework

This study was based on the social-ecological model as depicted by the framework in Figure 1 below:

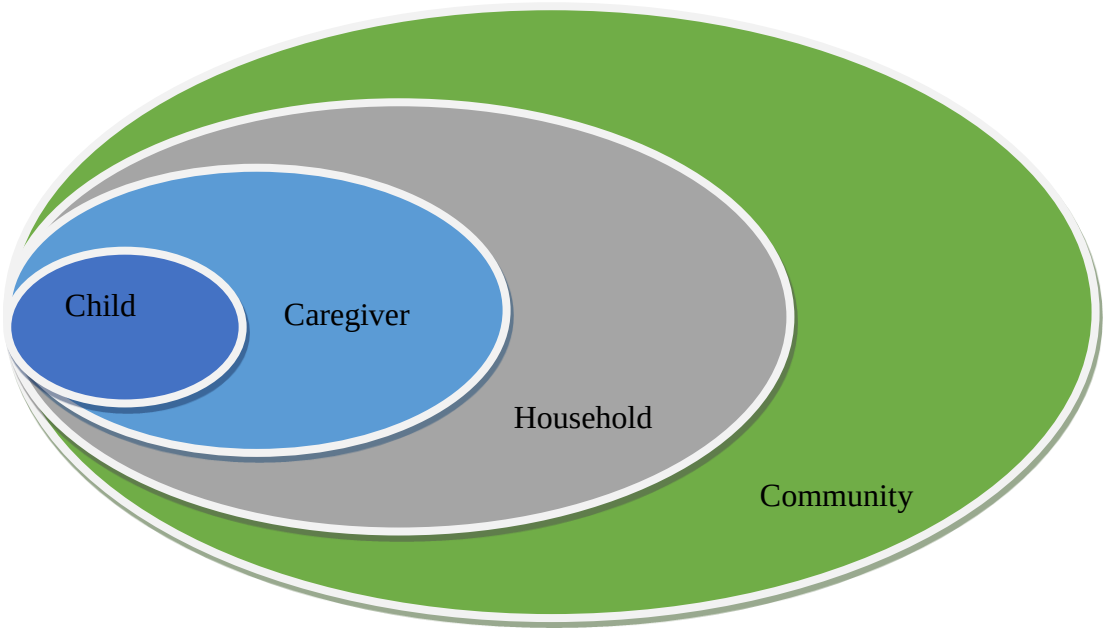

Figure 1. The Social-ecological Model of Factors Affecting Dietary Diversity (Adapted from Contento (2015)

According to Contento (2015), the social-ecological model comprises multiple levels of influence and the overlapping rings show how factors at one level affect another level. In this study, the model presents child, caregiver, household, and community characteristics as determinants that can affect dietary diversity among children.

Based on the socio-ecological model adapted from Contento (2015) the factors affecting MDD can be arranged in a hierarchical fashion that is; at the level of the child, caregiver, household, and community levels. A social-ecological approach provides an important way for guiding research and the efforts for interventions associated with eating behaviors due to its multi-layered links and the relationship of many factors which impact nutrition and health and also how people connect with their environment (Story, Kaphingst, Robinson-O'Brien, and Glanz, 2008).

Child-level characteristics included age, sex, birth order, birth weight, disability, and chronic illness. Caregiver-level characteristics included age, marital status, education, religion, and knowledge of infant and young child feeding (IYCF) while household-level characteristics included family size, monthly income, garden ownership, livestock ownership, possession of radio or television (TV), and educational attainment of the household head. Community characteristics included participation in growth monitoring sessions, exposure to IYCF messages, participation in village savings and lending association groups (VSLA), and cultural influence.

At the individual level, minimum dietary diversity in children 6-23 months of age can be influenced by characteristics such as the child's age, sex, mother's age, marital status, level of education of the mother, ethnicity, and religion as described below. In Ethiopia, Beyene et al. (2015) reported an association between minimum dietary diversity and the child's age, birth index of the child, mother's educational level, and exposure to media. In another study in Ethiopia, Edris, Atnafu, and Abota (2018), reported an association between MDD and mothers' educational attainment, mothers' knowledge of nutrition, urban residence, antenatal care (ANC) follow-up, and having fewer children. In their study, Agize, Jara, and Dejenu, (2017) showed that mothers between 24 and 34 years were more likely to feed their children diverse foods than those between 15 and 24 years and also that married mothers are less likely to give their children diverse foods than single mothers.

At the household level, household income level, involvement of mothers in the decision-making process, presence of a nutrition garden, and livestock ownership have been shown to influence child dietary diversity. Mitchodigni et al. (2017) showed that children from households that produce a wide range of crops consume

diets that meet minimum dietary diversity. A study by Arimond and Ruel (2004) showed that families with higher incomes are more likely to have diverse diets. In Ethiopia, Temesgen and colleagues found that mothers' involvement in the decision-making process, media exposure, and urban residence were associated with minimum dietary diversity in children (Temesgen, Negesse, et al., 2018). In another study in the Gorche district of Ethiopia, Dangura and Gebremedhin (2017) found an association between minimum dietary diversity and husband's education, vegetables and fruit production, and exposure to messages on IYCF.

At the community level, characteristics that can influence dietary diversity include participation in growth monitoring, exposure to media, participation in village savings and lending groups, culture, and religion. A study in Ethiopia by Kumera, Tsedal, and Ayana (2018) showed that the practice of fasting by mothers or caregivers affects dietary diversity among children. Belew, Ali, Abebe, and Dachew (2017) also found that exposure to media and participation of mothers in growth monitoring follow-ups were associated with dietary diversity.

Conceptual Framework

The characteristics described above are represented in a conceptual framework in Figure 2 below.

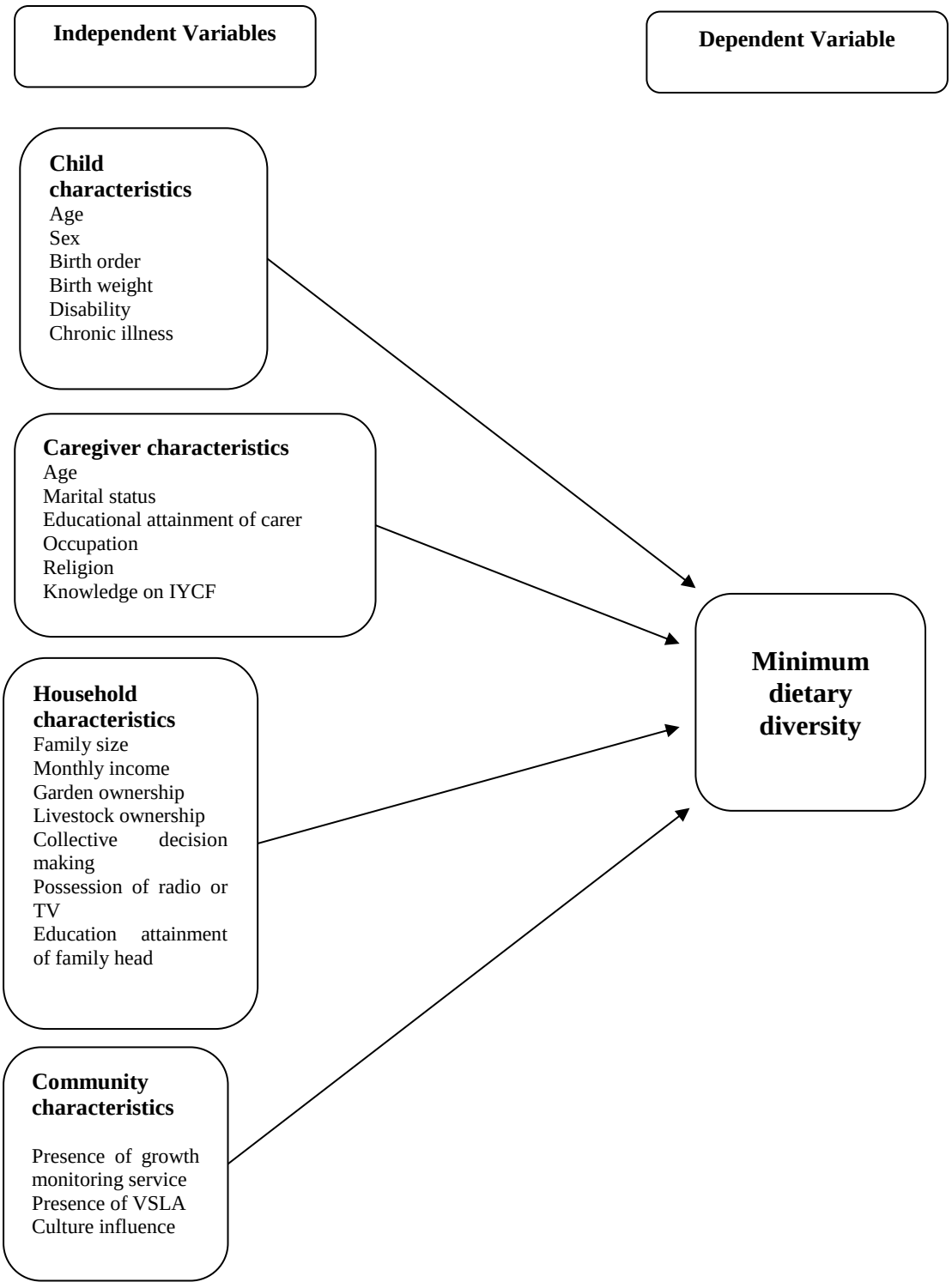

Figure 2. Conceptual Framework of Factors Associated with Dietary Diversity

Significance of the Study

This study identified determinants of minimum dietary diversity among children aged 6-23 months in the Mwenezi district. Findings from this study provide the government, non-governmental organizations, and the Mwenezi community with useful information for planning and designing evidence-based policy and program interventions that will effectively improve child-feeding practices in the district. These programs may include nutrition specific and nutrition sensitive interventions which aim to promote consumption of diverse foods during the complementary feeding period. The findings also provide useful recommendations that help caregivers, households, and communities to improve child-feeding practices.

Scope of the Study

Mwenezi district, is in Masvingo province and share borders with Chiredzi in the East, Chivi in the North, Beitbridge in the South and Mberengwa in the West. The district total population is 166 993 of which 77372 are males while 89621 are females (ZIMSTATS, 2012).This study sought to identify determinants of dietary diversity among children aged 6-23 months. The age group was chosen because of its vulnerability to nutritional deficiencies and growth faltering owing to its high nutritional needs for growth and development relative to other age groups (UNICEF, 2019). Furthermore, this age group constitutes part of the child's 1000 days, a window of opportunity during which well-planned interventions can reduce all forms of malnutrition in children. This study focused primarily on minimum dietary diversity and therefore WHO infant and young child feeding (IYCF) indicators focusing on breastfeeding were beyond the scope of this study. Moreover, this study did not focus on the minimum acceptable diet (MAD), a composite indicator of MDD and

minimum meal frequency (MMF), which reflects both quality and quantity of complementary diets but rather on quality as determined by MDD.

Limitations of the Study

This study relied on the ability of caregivers to recall foods consumed by their children in the past 24 hours. However, data collectors were trained to probe for as close to accurate consumption as possible and were constantly supervised for consistency throughout the data collection period. This study employed a single pass 24 – hour recall method to assess children's intake, a method unable to provide an account of day-to-day variations of children's usual dietary intake. While consecutives recall would have allowed for an estimate for children's usual intake which is important when measuring the impact of dietary intake on nutrition wellbeing outcomes, this method still suffices for determination of determinants of dietary diversity. Studies have shown that caregivers can reliably report foods consumed by their infants and young children, particularly in the home setting (Basch et al., 1990; Klesges, 1988). To ensure that caregivers accurately report the food intake of children, data collectors were thoroughly trained and supervised during data collection to ask, probe and record consumption data accurately and consistently as per the study protocol.

Operational Definition of Terms

Caregiver: A person who provides direct care to a child. In this study, a caregiver could be a biological mother to the child or any person providing direct care to the child

Complementary foods: These are foods given to infants when they reach six months of age in addition to breast milk because breast milk alone is no longer sufficient to meet their nutritional needs at that age.

Food Groups: These are food categories recommended by WHO which include: grains including roots and tubers; legumes and nuts; dairy products (milk, yogurt, cheese); flesh foods (meat, fish, poultry, and organ meats); eggs; vitamin A rich fruits and vegetables; and other vegetables.

Infant: A baby younger than 1 year (twelve months)

Minimum Dietary Diversity: A proportion of children who eat foods from four or more food groups out of the seven food groups recommended by WHO.

Young child: In this study, children aged 12-23 months are referred to as young children.

CHAPTER 2

REVIEW OF LITERATURE

The thrust of this chapter is on the review of related literature to which the study problem relates. The chapter seeks to explore different studies that have been carried out in other settings to determine factors that affect dietary diversity in children. The factors that will be discussed are categorized into the child, caregiver, household, and community characteristics as depicted by the socio-ecological model (figure 1) and conceptual framework (figure 2), both described in Chapter one.

Malnutrition Overview

Malnutrition remains a major public health challenge in the whole world affecting mostly children under the age of five years. UNICEF (2015) defines malnutrition as a condition resulting from insufficiencies or excesses as well as imbalances in energy intake and other essential micronutrients which are essential for an active and healthy life. Through the intergenerational cycle, malnutrition especially stunting can be passed from one generation to another. Whilst the WHO (2003a) recommends good nutrition as a critical component in ensuring the rights of children towards their attainment of the highest level of health, UNICEF (2020b) on the other side reports that one in every three children does not grow adequately due to malnutrition. According to the same report, at least one in every two children below the age of five years suffer from micronutrient deficiencies worldwide.

In Zimbabwe, child stunting remains one of the major challenges to national development as it affects 27% of children under the age of five years (Food and Nutrition Council, 2018). The first 1000 days of life remains a critical window of opportunity for targeting interventions that can reduce malnutrition burden including the associated negative consequences that manifest at individual, household, community, and national levels.

The UNICEF Conceptual Framework

The United Nations Children's Fund (2015) describes the conceptual framework that recognizes causes as a complex system that results in malnutrition. The UNICEF conceptual framework narrates factors that contribute to child undernutrition highlighting the interactions and multisectoral relationships among the causes. The conceptual framework (see Figure 3 below) demonstrates that nutritional status is influences by immediate, underlying, and basic causes indicating the need for a multisectoral approach in addressing the problem of malnutrition. Furthermore, UNICEF (2015) demonstrates that the interactions between causes of malnutrition vary geographically and over time and according to livelihood status of a household. Efforts to fight malnutrition comprehensively requires adopting approaches that both combine short term and long-term actions and fostering the link between curative, preventive, humanitarian as well as development programs (Dufour, Kauffmann, & Marsland, 2020). Figure 3 below shows the conceptual framework for the determinants of maternal and child nutrition.

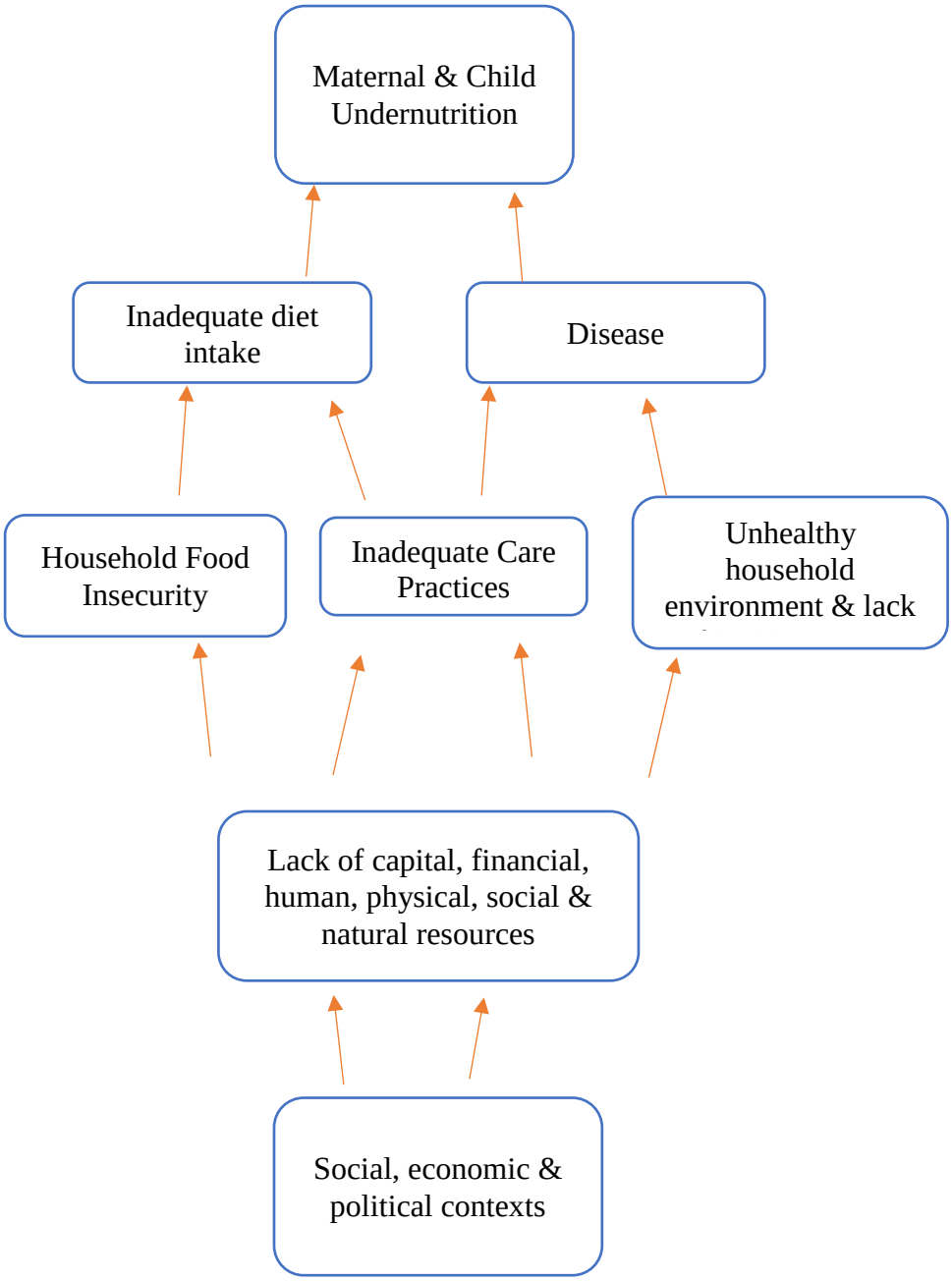

Figure 3. The UNICEF Conceptual Framework (UNICEF, 2015)

Immediate causes of malnutrition

The UNICEF conceptual framework describes inadequate dietary intake and diseases as the immediate causes of malnutrition. As stated in the integrated management of acute malnutrition guidelines in Zimbabwe (MOHCC, 2020) child undernutrition can be due to insufficient nutrients intake or infections. Infection

increases requirements for nutrients or prevents the body from absorbing nutrients from the food. The immediate causes impact at an individual level and they directly lead to malnutrition. In periods where hunger and food insecurity are at its peak and during disease outbreaks, cases of malnutrition tend to be higher.

Underlying causes of malnutrition

The underlying causes of malnutrition manifest the immediate causes and one of these causes is household food insecurity. Food security is described as the access by all people at all the times to adequate food that is acquired through socially acceptable means to enable an active and healthy life (Hackett, Melga-Quinonez, Taylor, & Uribe, 2010). Effects of climate change usually affects household food security. In 2018, the Zimbabwe vulnerability assessment committee report (Food and Nutrition Council, 2018) showed that 36,5% of households were cereal insecure during the peak hunger period in Mwenezi district due to the impact of drought.

Other underlying causes of malnutrition include inadequate care, unhealthy household environment and inadequate health services. According to IMAM guidelines (MOHCC, 2020) child caring practices which include breast feeding, age-appropriate complementary feeding coupled with hygiene and health seeking behaviors are vital to ensure good nutrition. These practices can be disrupted severely during emergencies leading to poor dietary intake and diseases. UNICEF (2019) reports that many children are not optimally breastfed due to promotion of breastmilk substitutes, influence of social norms, culture and taboos that undermine breastfeeding. Furthermore, working mothers have limited time to care for their children compromising their ability to optimally feed their children. An unhealthy household environment and lack of health services refers to those factors leading to malnutrition and are related to a healthy environment, disease exposure and access to

health services. According to MOHCC (2020) a healthy environment is influenced by access to clean and safe water. Access to basic health services is vital as it determines the extent to which diseases can be prevented but also treated when present.

Basic causes of malnutrition

Third level factors that cause malnutrition are the basic causes and these include available resources such as human, financial, and structural resources including how these are used. Political, cultural, and legal attributes in a particular country or setting for that matter can defeat efforts to prevent child undernutrition. Issues such as protection of rights of women and girls as well as the political and economic situation including polices and ideologies that govern social spheres have a bearing on the nutritional outcomes of children and the community. According to a Care rapid gender analysis report on Cyclone Idai (Care, 2019) there is differential access to resources between women and men with the later having more control over productive assets which include cattle, land and farming implements and women leading control on household items that have limited to no economic value.

Disasters and malnutrition

The occurrence of disasters remains a cause of concern in many parts of the world resulting negative consequences on health, and well-being of children to include malnutrition. Disasters include drought, floods, earthquakes, famine, and complex-conflict related emergencies. In Turkey, a recent report indicated that around 13.5 million citizens including 5.4 million children were affected by the effects of the earthquake which affected the country (UNICEF,2023).

In emergency situations, children are at a high risk of consuming poor diets which contributes to child undernutrition, morbidity, and mortality. In the 2015/16 El

Niño drought-induced emergency, severe drought conditions were experienced in Eastern and Southern Africa and many families were unable meet their basic food and nutrition needs (SavetheChildren, 2017). Affected countries included Ethiopia, Malawi, Lesotho, and Zimbabwe. In the Russian-Ukraine war, one study indicated that many households only had limited stocks of food items such as cereals, sugar, oils, and legumes compared with the pre-war period (Yazbeck, Mansour, Salame, Chahine, & Holiet, 2022). The same study also showed that nearly 50% of households consumed undiversified diets and fewer meals per day, and this underscore that children are most vulnerable to poor diets in emergency or crises situations.

The Zimbabwean population continues to suffer from the effects of shocks and hazards leading to increased food insecurity, malnutrition, poverty, and environmental degradation. A shock is defined as sudden event that consequently impact on the vulnerability of a system including its components (ACF, 2013). In 2019, Cyclone Idai caused havoc in Chimanimani and Chipinge districts in Zimbabwe affecting 270 000 people, leaving 340 people dead and destroying infrastructure and agriculture (Chatiza, 2019). A study on impact of climate change induced disasters on nutrition outcomes by Dembedza (2022) found a very low dietary diversity among children under five years in Cyclone Idai affected areas (Dembedza, Chopera, Kembo, & Macheka, 2022). Shocks and hazards affect the ability of vulnerable households and communities to produce and access diverse and nutritious foods.

Strategies that ensure resilience of communities to the effects of shocks and hazards are vital to ensure health and well-being of vulnerable members of the community such as children. Resilient communities, individuals, and households can anticipate, absorb, bounce back, and recover timely and efficiently to shocks and hazards, in a sustainable manner (Dufour et al, 2020) and thus prevent the possibility

of malnutrition especially among vulnerable groups such as children. Efforts to reduce malnutrition are vital to strengthen resilience because healthier and well-nourished individuals have greater physical reserves and can work harder and therefore can withstand shocks and hazards better. On the other hand, households that are mostly affected by shocks are at a high risk for malnutrition.

Effects of Malnutrition in Children

Malnutrition especially child stunting has devastating effects to growth, development, and health of children. UNICEF, WHO and World Bank (2021) describes stunting as a situation when a child is too short for his or her age. UNICEF (2021) report, children affected by undernutrition are at a higher risk of dying than well-nourished children. UNICEF (2019) states that children affected by stunting may not fully develop physically and that their cognitive development is also impaired. Furthermore, children affected by stunting may not perform well in school and later earn little income as adults. In addition, deficiencies in essential micronutrients affect children's growth, development, and general wellbeing.

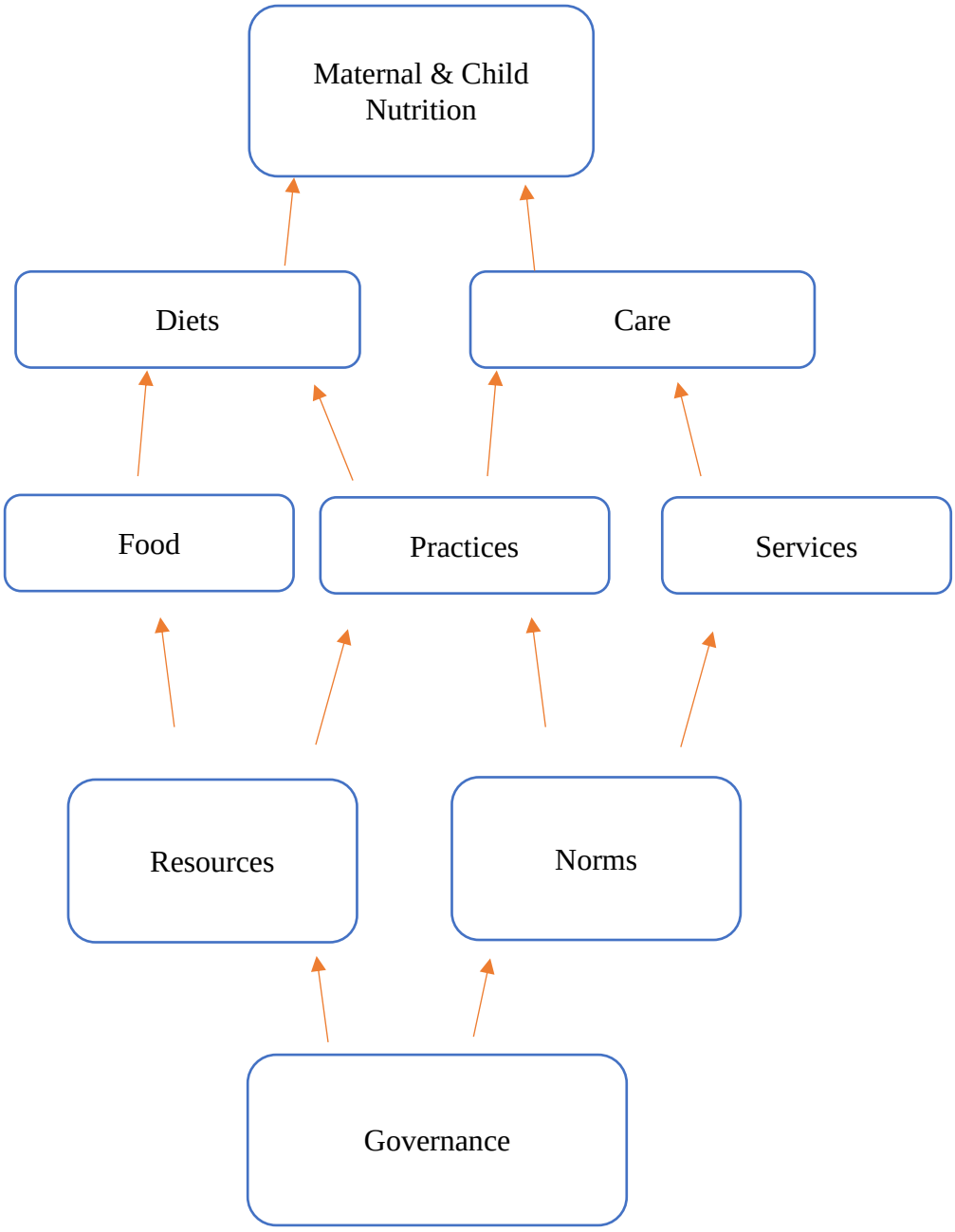

Figure 4. The UNICEF Conceptual Framework (UNICEF, 2020b)

It is estimated that at least 340 million children under the age of five years suffer from micronutrient deficiencies (UNICEF, 2019).The 2020 conceptual framework recognizes the magnitude of the triple burden of malnutrition and also highlights the importance of diet and care as immediate determinants of maternal and

child nutrition (UNICEF, 2020a). Figure 4 above shows the conceptual framework for the determinants of maternal and child nutrition.

Maternal and Child Nutrition

Maternal, infant, and young child nutrition is vital for the health and survival of children. Poor nutrition during pregnancy is significantly associated with intra-uterine growth retardation, premature deliveries, and low birth weight babies (Government of Kenya, 2013). According to the WHO (2003a), exclusive breastfeeding rates worldwide remain below 35%, especially in the first four months and complementary foods are often introduced very early or very late and foods are mostly poor in nutritional value and in safety and hygiene . It is therefore critical to ensure optimum nutrition for both the mother and the child.

The WHO (2013) confirms the first two years as a window of opportunity for the growth promotion of infants and young children. In 2019, UNICEF (2019), reported that “at every stage of childhood, children have unique nutritional needs, risks and eating behaviors” (UNICEF, 2019, p. 67). Children are particularly vulnerable because poor nutrition affects their physical growth, health, and development.

The first two years of a child’s life present part of the first 1000 days, a critical period that is associated with poor growth, high risk of morbidity and mortality, and impaired cognitive development when they are exposed to poor diets (Kemboi et al., 2020). Poor complementary feeding practices contribute to inadequate intake of nutrients by infants and young children. According to UNICEF (2021) a decline in height for age is seen during the period of complementary feeding in most countries and such children affected by stunting often grow to become stunted adults and for mothers, these may also give birth to stunted children. UNICEF (2020) further reveals

that children affected by stunting are likely to earn 20% less as adults in comparison with non-stunted peers. Furthermore, stunting can also reduce the gross domestic product of a country by 3%. The ability of a child to achieve growth standards is determined by sufficient dietary intake and minimum exposure to diseases (UNICEF, 2012).

Infant and Young Child Feeding

According to the global strategy on infant feeding (WHO, 2003a) every child has the right to nutritious foods essential for the fulfillment of their highest possible standard of health. The convention on children's rights commits governments to ensure protection and fulfilment of good nutrition for all children (UNICEF, 2021). The period from birth up to two years presents of a critical window where children need adequate nutrition for optimum growth and development. UNICEF (2020) reported that exclusive breastfeeding in the first six months and optimum complementary feeding from six up to two years provides infants and young children with all the required nutrients for them to grow and thrive.

Exclusive Breastfeeding

Breastfeeding is very important for an infant, especially during the first hour of life, a period when the first milk known as colostrum, provides protection for the infant's immune system against inflammation and infections (UNICEF, 2019). As a recommended infant and young child feeding practice, infants should be breastfed exclusively during the first six, a period during which breastmilk supplies all nutrients and water needed for the growth and development of the infant. According to UNICEF (2019) many regions have made tremendous gains in rates of exclusive breastfeeding as indicated in figure 5 shown below.

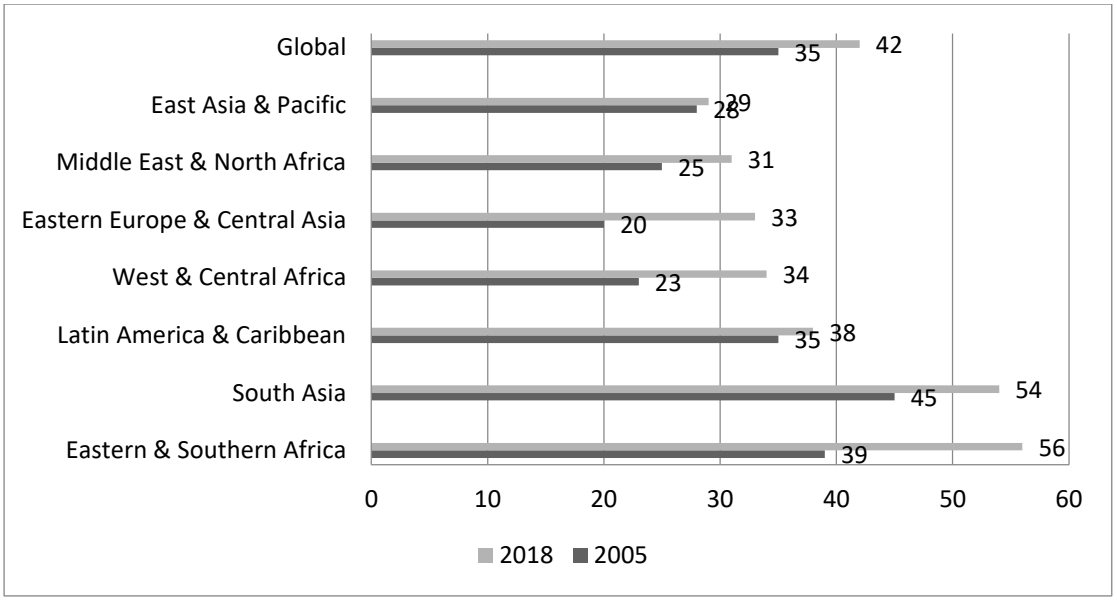

Figure 5. The Prevalence of exclusive breastfeeding by UNICEF region around 2005 and 2018 (UNICEF, 2019)

Despite the benefits of exclusive breastfeeding, only about thirty percent of infants under the age of months are exclusively breastfed in the Sub- Saharan Africa and furthermore, evidence reveals that infant mortality in this region is the highest compared to other regions (Lartey, 2008). In Zimbabwe, Gomora et at. (2019) reported that the prevalence of exclusive breastfeeding has increased over the years from 41% in 2014 to 61% in 2018, a positive stride towards World Health Assembly 2025 target. Although there is marked increase in exclusive breastfeeding rates in Zimbabwe, Nduna (2015) indicates that practices and barriers to successful exclusive breastfeeding still exist Zimbabwe. These include the use of herbs and traditional medicines, giving water to infants, lack of ample time to breastfeed for working mothers, the belief that milk is not enough, misinformation from other peers, traditional beliefs and norms, and cultural practices. However, after six months, breastmilk alone does not provide sufficient nutrients to support optimal growth and development for the children and hence the need to introduce diverse complementary foods called complementary feeding,

Complementary Feeding

Findings from Demographic and Health Surveys (DHS) data from forty-six countries reveal population-level associations between infant and young child feeding (IYCF) indicators and malnutrition levels in children (Onyango et al, 2013). Key indicators developed by the World Health Organization for assessing complementary feeding practices include continued breastfeeding at one year; introduction of solids, semi-solids, or soft foods; minimum dietary diversity (MDD); minimum meal frequency (MMF) and minimum acceptable diet (MAD). In Africa, most children between the age group 6-23 months are not fed according to global infant and young child feeding recommendations. Furthermore, children from wealthy households are consuming better quality diets compared to children from poor households. UNICEF (2022) show that children from wealthy households consume better diets than children from poor households as shown in figure 6 below:

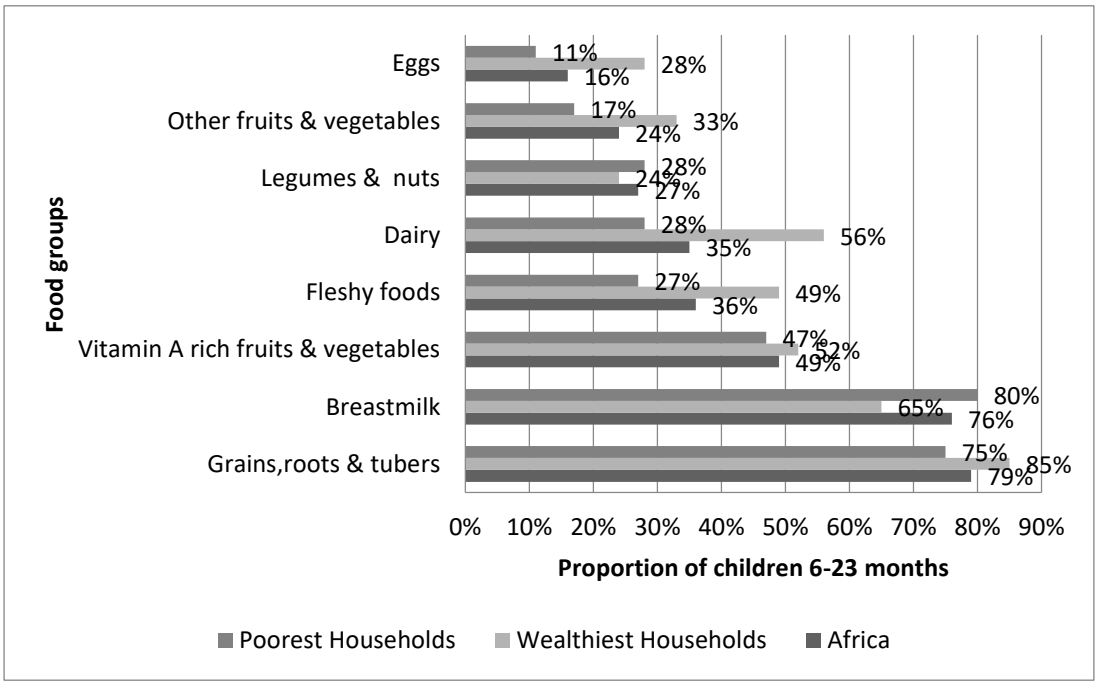

Figure 6. Proportion of Children Aged 6–23 Months Consuming Food Groups, by Type and by Poorest and Wealthiest Wealth Quintile in Africa (UNICEF, 2022)

In Zimbabwe, selected IYCF indicators especially MDD and MMF remain very low. Figure 7 below shows the performance of key IYCF indicators in Zimbabwe.

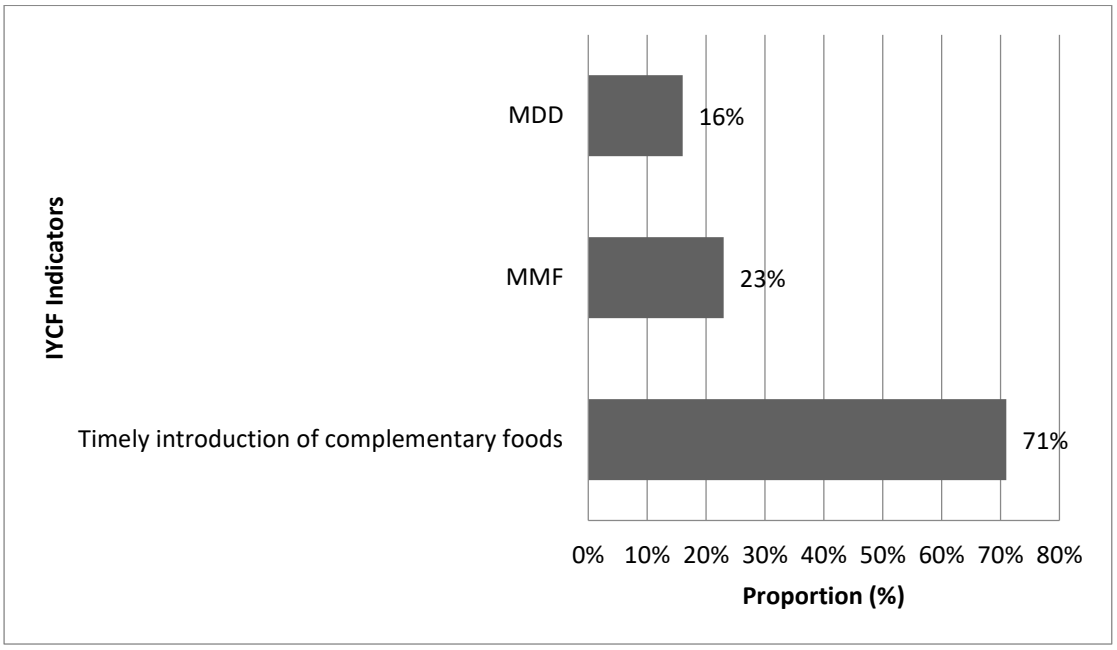

Figure 7. Performance of key IYCF indicators in Zimbabwe (Food and Nutrition Council, 2018)

The timing for introducing children to complementary foods is based on physiological, mechanical, and nutritional factors that are related to the growth of an infant (WHO, 1999). At the age of 6 months, breastmilk alone becomes inadequate to supply all nutrients to the baby although literature suggests that the supply of protein from breastmilk remains adequate until the end of the first year. The stomach of an infant at around four months is unable to hold more than 200 milliliters and this makes it difficult to swallow solid foods (WHO, 1999). The WHO (WHO, 2003a) recommends that children should begin consuming complementary foods with continued breastfeeding for up to two years or beyond. Furthermore, Dop et al. (1999) assert that at 6 months of age, an infant can begin chewing food and has a mature taste

function to consume foods with different tastes. When complementary foods are introduced too early, the infant may be exposed to poor diets that displace breastmilk while introducing foods too late can deprive children of vital nutrients leading to malnutrition (UNICEF, 2020a). The table below shows the infant's nutritional needs and energy intake from breast milk during the first year.

Table 1. Energy Intake Associated with Breastmilk and Nutritional Needs of Infants

Age (months)	Energy Needs (Kcal/day)	Breastmilk needed for energy requirements (ml/day)
1	458	654
2	528	754
3	593	847
4	622	888
5	700	1000
6	742	1060
12	1020	1457

(Adapted from Dop et al. (1999)*)*

Feeding frequency is an important consideration during complementary feeding. Dop et al. (1999) states that when energy density of complementary foods is increased, the requirements for energy could be met with a smaller number of meals, however when more meals are given, energy requirements can be met with foods that have low energy density. In Zimbabwe, 23% of children aged 6-23 months consume minimum number of meals (Food and Nutrition Council, 2018). The table below shows minimum energy density required from complementary foods in well-nourished children.

Table 2. Minimum Energy Density Needed to Attain Level of Energy from Complementary Foods in a Well-Nourished Child by Age and Level of Intake of Breastmilk.

Minimum energy density (Kcal/g	6-8 months			9-11 months			12-23 months		
	a	B	C	A	b	C	a	b	c
1 meal/day	2.55	1.76	0.98	3.09	2.31	1.53	3.70	2.95	
2 meals/day	1.28	0.88	0.49	1.55	1.16	0.77	1.85	1.48	1.11
3 meals/day	0.85	0.59	0.33	1.03	0.77	0.51	1.23	0.98	0.74
4 meals/day	0.64	0.44	0.24	0.77	0.58	0.38	0.92	0.74	0.55

(Adapted from Dop et al. (1999)*)*

Literature reveals that starting at six months, changes in micronutrient content of breastmilk begins. Dop et al. (1999) confirmed that at the age of six months, the micronutrient content of breastmilk diminishes, and infants become vulnerable to deficiencies in vitamin A, calcium, and iron. The table below shows the nutrient density desired for complementary foods for children six to eight months per 100 kilocalories.

Table 3. Desired Nutrient Density for Complementary Foods for Children from Six up to Eight Months per 100 Kilocalories.

	Recommended nutrient intake	Complementary foods	
	Breastmilk and complementary foods/ per day	*Estimated nutrient needs/ per day*	*Desired nutrient density/ per 100kcal*
Protein (g)	9.1	2.0	0.7
Vitamin A (µgRE)	350	13	5
Folate (µg/d)	32	0	0
Vitamin C (mg)	25	0	0
Calcium (mg)	525	336	125
Iodine (µg)	60	0	0
Iron (mg)			
-medium bioavailability	11.0	10.8	4.0
-high bioavailability	7.0	6.8	2.5

(Adapted from Dop et al. (1999)*)*

Minimum Meal Frequency

In general, minimum meal frequency (MMF) has been performing better than MDD in Zimbabwe. The national nutrition survey report (FNC, 2018) shows that 19% of children between the age 6-23 months get the minimum number of meals every day. The same report also indicates that 19.5% of children 6-23 months in Mwenezi consume minimum number of meals per day. MMF is one of the seven indicators developed by the World Health Organization to assess IYCF practices among children between the age 6-23 months (INDDEXProject, 2018). Minimum meal frequency together with minimum dietary diversity forms an important composite indicator minimum acceptable diet (MAD). According to WHO (2010) the following formula is useful when calculating MMF for children 6-23 months:

Breastfed children 6-23 months who received solid, semi-solids or soft foods the minimum number of times during the previous day/ Breastfed children 6-23 months of age and non-breastfed children 6-23 months who received solid, semi-solid or soft foods or milk feeds the minimum number of times during the previous day/ non-breastfed children 6-23 months

Dietary Diversity

According to the United Nations Children's Fund (2019), the nutritional needs of children from 6-23 months are higher than at any other stage of life making children vulnerable to growth faltering and micronutrient deficiencies. As such, the complementary feeding period presents one of the most challenging periods for ensuring adequate nutrition for children (UNICEF, 2020). Young children have very small stomachs and can hold a little amount of food leaving them vulnerable to growth faltering. According to UNICEF (2020) the growth deficit emanating from stunting cannot be reversed and furthermore, the cognitive deficits become permanent

after a child reaches two years. It is therefore vital to ensure that complementary foods satisfy the micronutrient needs of infants and young children.

Dietary diversity has long been recognized as critical in the growth and development of children. Temesgen, Negesse, Woyraw, and Mekonnen (2018) define dietary diversity as "a quantitative number of food items or groups used as a method of determining variety and nutrient adequacy of diets for an individual" (Temesgen, Negesse, et al., 2018, p. 2). One way to ensure adequate micronutrient intake in infants and young children is through ensuring diversified diets. MDD is a globally agreed population-level indicator that assesses diet diversity and nutrient quality of complementary diets consumed by children. According to WHO (2010) the following formula is useful for calculating minimum dietary diversity for children 6-23 months: Children 6-23 months who received at least 4 or more food groups during the previous day / Children 6-23 months

Table 4. Food Groups and Nutritional Benefits

Food Group	Food examples	Functions of supplied nutrients
Staple foods	Maize, rice, wheat, millet, sorghum, sweet potatoes, potatoes, cassava, and yams	Energy giving foods
Fats and oils	Vegetable oil, animal fat, butter, nuts and seeds, sunflower seeds, sesame, and soybeans	Energy giving foods
Legumes	Sugar beans, peas, cow peas, Bambara nuts, ground nuts, peanut butter	Rich in proteins for body building including repair of body tissues They also provide vitamins, minerals, and fiber
Animal products	Beef, chicken, game meat, duck, goat, sheep, and insects	Good source of proteins
Vegetables and fruits	Wild harvested fruits and vegetables, green leafy vegetables, tomatoes, pumpkins, carrots, and exotic fruits	

(*Adapted from* FAO, 2015)

Dietary data collected from children aged 6–23 months old in ten developing countries sites reveals that the consumption of foods from four or more food groups on the previous day indicates that in most populations, the children have a high chance of consuming at least an animal-source food and at least a fruit or a vegetable, in addition to a staple food (WHO, 2010). Globally, two in every three children aged 6–23 months old are not eating minimally diverse diets (UNICEF, 2019). Various studies show that diets for children in Zimbabwe are made up of same kinds of foods that are eaten daily, and this could be one of the factors why stunting rates have remained high over the past years. In Zimbabwe, only 16% of children aged 6-23 months meet the criteria for minimum dietary diversity (Food and Nutrition Council, 2018). The table above shows the different food groups and their nutritional benefits.

Micronutrient Deficiencies

Micronutrient deficiencies are also a cause of concern globally but mostly in developing countries. Micronutrient deficiencies, also known as hidden hunger, occur when infants and young children lack essential vitamins and minerals needed for optimal growth, development and to thrive (UNICEF, 2022). It is suggested that over 40 micronutrients are essential for health and a deficiency in any one of these will affect the normal functions of the body (MOHCC, 2020). In addition, vitamin and mineral deficiencies often occur simultaneously leading to irreversible lifelong damages on health (MOHCC, 2018). Micronutrients of public health importance in Zimbabwe include vitamin A, iron, zinc, and iodine. Figure 8 below shows prevalence micronutrient deficiencies in Zimbabwe among children aged 6-59 months old.

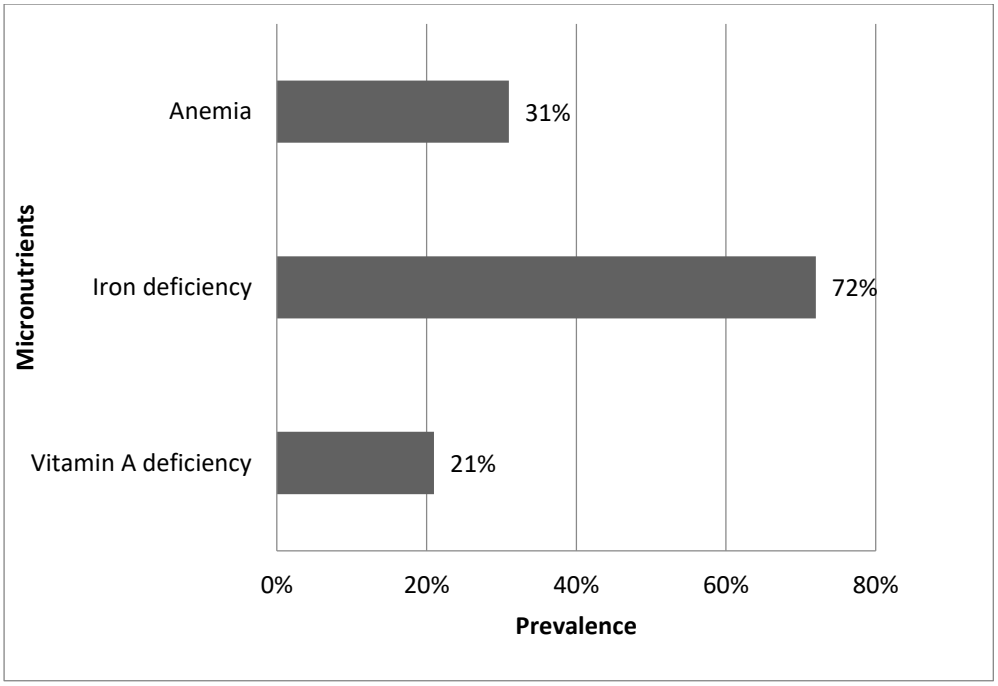

Figure 8. Prevalence of Micronutrient Deficiencies in Zimbabwe among Children Aged 6-59 Months Old (MOHCC, 2012)

In Zimbabwe, MOHCC (2018) suggests that micronutrient deficiencies possibly contribute to high stunting levels among children under the age of five years. Furthermore, diets in Zimbabwe are predominantly plant based which generally provides insufficient amounts of essential micronutrients. Micronutrients are needed in very small amounts to ensure normal body functions. Children under the age of 6 months are guaranteed of adequate intake of micronutrients from their mother's breastmilk but however, beyond 6 months breastmilk is no longer sufficient to meet micronutrient requirements of children (MOHCC,2018). According to Dop et al. (1999) vitamin A is needed in low quantities in complementary foods since its content in breastmilk is very high and generally the amounts of foods required are not large. However, information is still needed on the bioavailability of vitamin A from fruits and vegetables. The table below shows how vitamin A requirements can be met through diet.

Table 5. Foods Needed to Meet Daily Vitamin A Requirement in Children

Age	Carrots (tablespoons)	Sweet potatoes (tablespoons)	Dark green leafy vegetables (cup)
Children 6-11 months	1,5	1	1/3
Children 12-23 months	1,5	1	1/3
Children 2-6 years	1,5	1	1/3

(Adapted from Dop et al. (1999)*)*

According to Dop et al. (1999) it is practically difficult to meet iron requirements of infants and young children from complementary foods without intake of foods from animal sources. Animal source foods that are rich in iron include beef, liver, and fish. Dop and others also confirmed that it is practically difficult to meet zinc requirements for children between six and eight months from unmodified complementary foods unless there is a high intake of animal source foods such as beef, dried fish, liver, milk, and cheese. According to the Food and Agriculture Organization (2015), wildly harvested foods such as fruits, honey, tree leaves, insects and small animals are rich in vitamins and minerals such as zinc, iron, and calcium.

The Social-Ecological Model

The social-ecological model is a useful approach in studying complex issues in the public health field. This model was introduced by Bronfenbrenner in the 1970s (Mahmudiono, Segalita, and Rosenkranz, 2019) who argued that along with the growth of a human and changes in the environment, multiple interactions happen which may involve the environments which are beyond the immediate situation. Furthermore, Stokols (1992); cited by Golden and Earp (2012) further argues that even the environment itself contains multiple layers and can influence the health outcomes of people differently depending on their different beliefs and practices. Therefore, the social-ecological model provides a holistic approach to investigating

health determinants that also consider the interrelations among multiple layers of influence that affect health outcomes.

Children's dietary practices are influenced by multiple levels of influence. Contento (2015) identifies the social-ecological model (see figure 1) as a useful model for promoting optimal infant and young child feeding practices by directing interventions at multiple levels of influence. The model comprises multiple levels of influence that include individual, interpersonal, institutional, and community levels which can affect the dietary diversity of young children. Golden and Earp (2012) further assert that in addition to the multiple levels of influence, these levels display interactive and reinforcing characteristics. In this study, the social-ecological model presented child, caregiver, household, and community characteristics that affected dietary diversity among children.

As suggested by Mahmudiono et al. (2019) child-level characteristics reflect attributes of the child that are associated with dietary diversity such as age, race, weight, and sex. Caregiver characteristics are also attributes of the caregiver that are associated with child dietary diversity such as maternal age, caregiver level of education, and knowledge of infant and young child feeding.

Household-level characteristics also represent influences and interactions at a household that affect child dietary diversity and these include household income, decision-making process, and household ownership of a nutrition garden and livestock. Mahmudiono et al. (2019) also suggest that influences at community level have an impact on child dietary diversity and these include culture, religion, and participation in community initiatives including income-generating projects.

Story et al. (2008) explains that eating behavior is complex and results from the interplay of many factors emanating from different contexts. Golden and Earp

(2012) argue that physical, social, and cultural environment bears a cumulative effect on the health of individuals. Mahmudiono et al. (2019) also emphasize that when interventions are developed, considerations should also be explored on social, cultural, political, and physical environments including the abilities of individuals to change their levels of motivation. Therefore, the social-ecological model provides a framework that can guide program managers on how to focus on preventive interventions that promote dietary diversity among children.

Story et al. (2008) also explain the social-ecological model as useful to guide research and intervention efforts associated with eating behaviors. In Mwenezi, only 6% of children aged 6-23 months consume diverse diets (Food and Nutrition Council, 2018), and determinants for of such poor consumption patterns by children characterized by diets lacking in diversity has not been ascertained. This literature review focused mainly on the child, caregiver, and household characteristics that have been found to affect the dietary quality of children those aged 6-23 months.

Child Characteristics

The quality of children's diets is very vital during the complementary feeding period. Story et al. (2008) describe behaviors, demographic characteristics, and biological and cognition as some of the individual variables related to food choices. These factors can impact the choices of foods through motivation, self-efficacy, behavioral capability, and expectations of the outcome.

Khamis, Mwanri, Ntwenya, and Kreppel (2019) found that children who consumed diverse diets were positively associated with a reduction in malnutrition particularly child stunting, wasting, and being underweight. Evidence also exists that shows a range of factors that affect the dietary diversity of a child. UNICEF (2019)

explains that infants and young children may be fed less diversified foods because of age, sex, stigma, and disability.

Child's Age

The age of a child is a very important consideration during complementary feeding. Starting at 6 months onwards, children can consume diverse and locally available foods. To meet the nutritional needs of children, complementary foods given to children should be timely, adequate, safe, and properly fed (WHO, 2003). A growing body of evidence indicate an association between dietary diversity and child's age. A study in Kenya by Kemboi et al. (2020) found that complementary feeding practices are significantly associated with the age of a child.

It has also been found that as children get older, dietary diversity also increases. Na, Aguayo, Arimond, and Stewart (2017) showed that the age of the child (especially younger children) is associated with increased odds of not fulfilling the criteria for minimum dietary diversity. Children consuming less diverse foods are at higher risk of developing micronutrient deficiencies (Zhao, et al., 2020). In Northwest Ethiopia, Beyene et al. (2015) found that children in the age group 12-17 and 18-23 months had twice higher odds [(AOR 2.05;95% CI (1.17-3.58) and AOR 2.89;95% CI (1.69-4.93)] respectively of having a diversified diet than children in the age category 6-11 months. In another study by Iqbal, Zakar, Zakar, and Fischer (2017), the age of the child was associated with the consumption of diverse diets. A stratified analysis by Zhao et al (2020) showed an association between MDD and a reduced likelihood of delays in child development in the age group 18 – 13 months (AOR= 0.41, 95% CI [0.22, 0.78]) but this was not found in the age groups 6 – 11 and the 12 – 17 months.

Child's Sex and Gender

Gender differences in dietary patterns for children have been documented (Li, Kim, Park, Kang, & Kang, 2022). Gender describes social attributes and opportunities that are related to being a male or female and the relationships which exists between men and women and boys and girls (OCHA, 2012). Gender dictates what is expected in men and women, and it is context specific. In some settings, a boy child is fed better than a girl child. The younger age (6-11 months) as compared to age group 12 – 23 months was found as factor for not meeting MDD for both male and female children (Li et al, 2022).

According to Shafiq et al. (2021), poor households first give husbands and sons the best food and then serve female children poor-quality food later. A study in India found that male children were 4.1 times more likely to be fed with MDD than female children (Modugu et al., 2022). Consequently, several studies have shown that girls are at a higher risk of malnutrition than boys. In Nepal, Pakistan, and Cambodia Li et al. (2022) found that families that had two or more children who were under the age of five years were not likely to feed minimally diverse diets among male children compared to families that had only one child. The same study also found that among male children, mothers who safely disposed their children's stools had a high likelihood for meeting MDD than those who unsafely disposed their children's stools.

Disability

Disability is also an important determinant for optimal infant and young child feeding. Disability is described as a limitation or loss of opportunities to participate in society at a level point with others due to social and environmentally related barriers (UNHCR, 2015). It is estimated that between 30% to 90 % of infants and young children with significant motor and cognitive disabilities experience feeding

difficulties (Rabaey, 2017). According to UNICEF (2020a), disability can result in malnutrition as children with disabilities may face challenges in feeding and swallowing food and may also face challenges in nutrient absorption. Furthermore, Rabaey (2017) suggests that children affected by disabilities are at risk of micronutrient deficiencies such as iron, calcium, and vitamin C. Nutrient and growth problems are problematic in children with disabilities resulting in undernutrition. However, the WHO (2003) affirms that skilled support is vital for mothers and caregivers to sustain optimal infant and young child feeding practices when the child has disability.

Birth Order

Studies reveal an association between birth order of a child and diet quality. Birth order describes the position of a person in the age hierarchy of the children. It has been documented that children with higher birth order are associated with lower quality diets than children of lower birth orders (Howell, Holla, & Waidmann, 2016). In Ethiopia, Beyene et al. (2015) found a positive association between the birth order of children and dietary diversity. Rumicha and Gumede (2021) also found an association between birth order and child dietary diversity in a study conducted in Guto Gida in Ethiopia.

Caregiver Characteristics

Caregivers play an important role in feeding infants and young children. WHO (2004) defines a caregiver as someone responsible for the day-to-day well-being of infants and young children. Caregivers determine when to begin giving infants food, prepare meals and determine the quality and quantity of food given to children. Behaviors for caregiving mediate between the social, health and caregiver attributes

and child's growth, survival and development and they are key determinants of quality of environment provided to children (WHO, 2004). The figure below shows UNICEF's extended model of care.

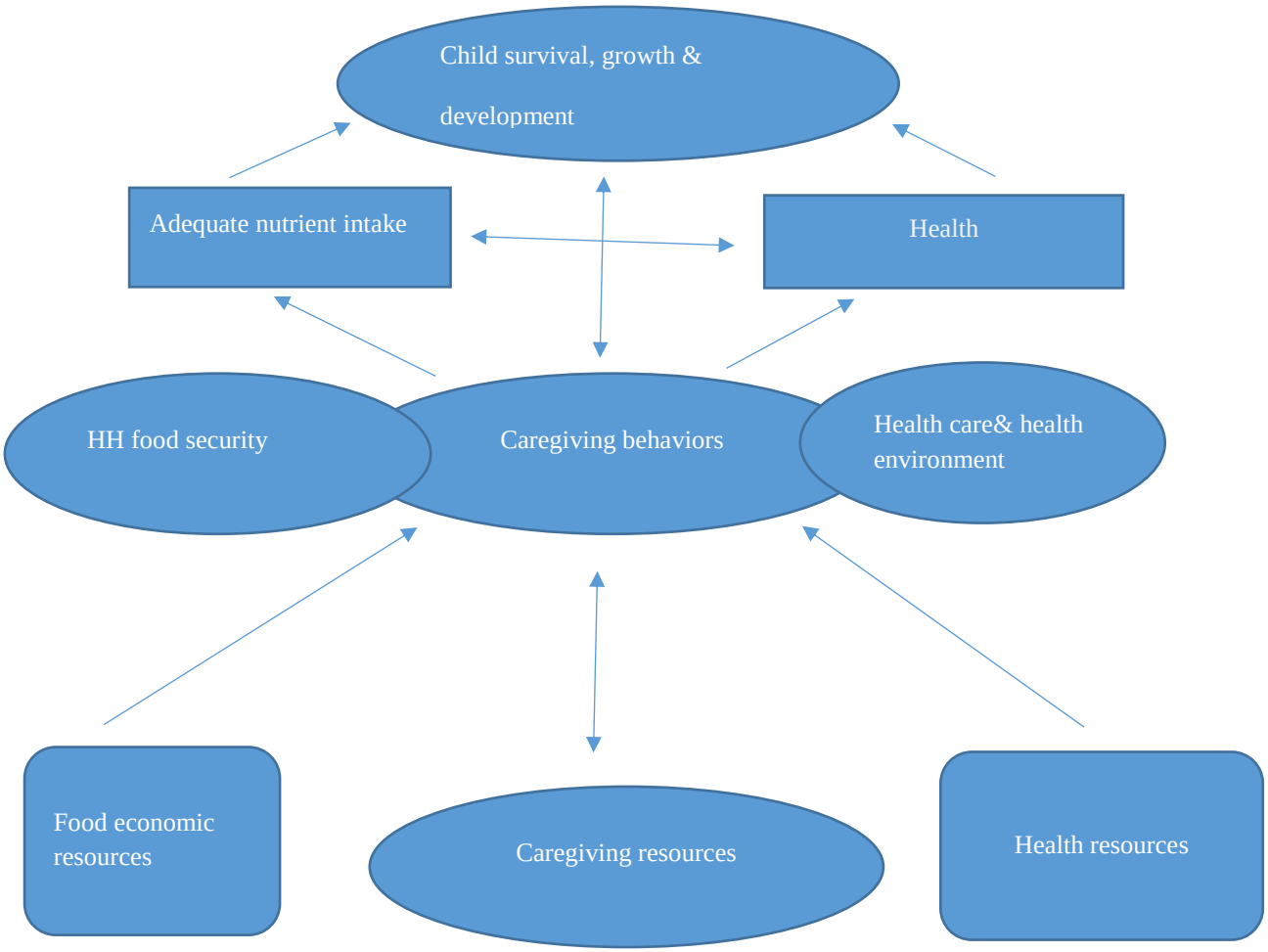

Figure 9. UNICEF's extended model of care (WHO, 2004)

Poor caregiving has detrimental consequences on the survival, growth, and development of children. According to WHO (2004), responsive and sensitive caregiving involves being sensitive to signals from the child and being able to ascertain whether a child is hungry, tired, or sick. A growing body of knowledge has shown an association between caregiver characteristics and child dietary diversity.

Caregiver Age

Maternal age is also an important characteristic that influences children's diets. A study conducted in Oromia in Ethiopia found a significant association between the age of the mother and complementary feeding practices (Rumicha & Gumede, 2021). Agize et al. (2017) showed that mothers aged 25 - 34 years were 1.82 times more likely to feed their children diverse diets than mothers aged 15-24 years [AOR=1.82,95% (CI=1.05,3.17)]. Another study by Na et al. (2017) showed that a caregiver's age was, among others, a good predictor of minimum dietary diversity and minimum acceptable diet. In Pakistan, Khan et al. (2017) found that maternal age was significantly associated with the minimum dietary diversity for children. In South Asia, in Afghanistan, Li et al. (2022) found that older maternal age (35-49 years) was a significant factor for not having minimum dietary diversity among male children compared to 24-34 years age group.

Caregiver's Education

Studies show that a mother's level of education has an impact on dietary diversity. Dop et al. (1999) assert that the more the mother is educated, the greater the chances that she will practice optimal complementary feeding for her child and the greater the chances that she will continue breastfeeding despite social constraints. Solomon, Aderaw, and Tegegne (2017) reported that mothers who attained secondary and college or higher education levels had higher odds of feeding their children diversified diets than those who had no formal education. In addition, Khan et al. (2017) also found a positive association between maternal education and diet quality in Pakistan. Sharrif et al. (2015) found that mothers who were highly educated gave their children more fruits and vegetables than mothers who had low educated.

It has been reported that uneducated mothers may lack an understanding of consequences of poor diets and nutrient requirements for children (Belew et al, 2017). In addition, Shao et al. (2021) found that educated caregivers had more access to child health information and had a better chance to make correct judgments of diets for their children. A study in Ethiopia found that mothers who attained high school level were able to feed their children recommended number of food groups more than mothers who had no formal education (Keno, Bikila, Shiribu, & Etafa, 2021). On the other hand, Kano, Tani, Ochi, Sudo, and Fujiwara, (2019) found that children who had diet qualities perceived as good by their mothers or caregivers were associated with higher consumption of vegetables, beans, and animal-source foods such as fish and shellfish than those who had diets perceived to be poor and this indicated that caregivers perceived diets of children as good when they consumed many food groups.

Caregiver's Employment Status

The employment status of the caregiver has been found to be associated with child dietary diversity. Study findings in Ethiopia show that children whose mothers were employed in agricultural production had positive association with minimum dietary diversity (Muche, et al., 2022). Many mothers carry the burden of feeding their children yet they are not autonomous in deciding what to feed their infants and young children. UNICEF (2021) reported that in some settings, mothers-in-law are the ones who have the final word in deciding what to feed children and carry out all purchasing of food. Furthermore, decisions on feeding children may also be affected by the time and work pressures on mothers as they carry the load of caring for the child but also balancing it with employment. UNICEF (2021) reported that working mothers in most times had to compromise their own health to save time and may

eventually turn to giving their children fast and processed foods. In countries such as Australia, Mexico, India, Nigeria, Serbia, Ghana and Ethiopia, UNICEF (2021) reported that one in every three children are given at least one processed food on daily basis.

As a solution to manage time pressures, UNICEF (2021) found that some mothers select nutritious food that requires less time in preparing, prepare meals well in time, and also may rely on paid caregivers for assistance. UNICEF (2020) revealed in Balkan countries mothers may have limited time or may not have other family members who can assist with preparation of food or may not even have grandparents because of changes in the support structures and that compromises the diets of children. Furthermore, UNICEF (2020) also found that women in Tajikistan have less time to take care of their children because of household chores and ever-increasing responsibilities in agricultural production as their husbands migrate to look for work in neighboring countries. Ribeli and Pfister (2022) found that caregivers avoided giving certain foods to their children as they perceived that the foods were not soft enough or were not easy to digest. The same study found that children were mostly given foods rich in carbohydrates and a few animal source foods, nuts, and legumes.

Marital Status

Studies show that the marital status of caregiver is associated with child dietary diversity. Agize et al (2017) found that married mothers who lived with their husbands were less likely to provide diverse foods to their children comparing with single mothers. The same study also found that divorced mothers were less likely to give their children diverse foods than single mothers. Furthermore, Agize et al. (2017) showed that the husband's educational attainment has a significant association with the attainment of minimum dietary diversity by children 6-23 months old. Another

study conducted by Amugsi, Mittelmark, and Oduro (2015) also showed that maternal dietary diversity is associated with child dietary diversity. In Indonesia and Cambodia, Li et al. (2022) found that delivering a child at home was a risk factor for not meeting child dietary diversity compared to delivering at a health facility.

Caregiver's Knowledge of IYCF

Among the proven preventive nutrition and health interventions, IYCF has been proven to bring greatest impact on survival of children and as such reduction in child mortality has been seen when IYCF and other key nutrition interventions are prioritized in national strategies and polices (UNICEF, 2012). Adequate knowledge in nutrition has been found as a key element for optimal infant and young child feeding practices (Kumwenda, 2017). In addition, there is a growing body of knowledge which indicates an association between caregiver's knowledge in IYCF and child dietary diversity.

In a study in Ethiopia, Edris, Atnafu, and Abota (2018), reported an association between MDD and mothers' adequate knowledge of nutrition. The same study indicated that mothers who had nutrition knowledge were more likely to practice MDD than mothers who lacked nutrition knowledge. Another study in the same country found that caregivers who were exposed to IYCF messages during ANC were able to offer their children diverse foods than mothers who did not receive any IYCF information (Keno, et al., 2021). A study in Ghana found that mothers who had delivered their babies at their homes were more likely not able to feed their children diverse foods compared to mothers who had delivered at a health facility (Issaka, Agho, Burns, Page, & Dibley, 2014). Iqbal et al (2017) found a positive association between MDD and mothers who received information about maternal and child health.

A study in Tanzania found that children from caregivers who knew about dietary diversity had higher scores in child developmental outcomes than children from caregiver who did not know about food diversity (Russell, et al., 2022). On the other hand, the same study did not find any association between minimum meal frequency and child developmental outcomes. A study in Zimbabwe found that the odds of MDD for children were 4.7 times higher in mothers who had received nutrition counselling on IYCF compared to those who had not received IYCF counselling (Chiketa, 2019). A study in Ethiopia found that mothers who lacked knowledge in infant and young child feeding were 70% less likely to feed their children with diverse foods as compared with mothers who had adequate knowledge (Agize, Jara, & Dejenu, 2017). Another related study in the same country also found that mother's knowledge on food diversity was significantly associated with feeding children with diverse foods (Solomon, et al., 2017).

Caregiver Religion

Literature suggests that religion has an influence on how caregivers feed their children. Religion is defined as the belief in one or more gods and the activities linked to the belief. Beliefs can be hazardous for one community whilst benefiting another but depending on a particular diet and other factors such as the social and economic environment (Alonso, 2015). Furthermore, certain life events such as pregnancy and childbirth can be characterized with religious or cultural beliefs that can affect diet quality for children. In Ethiopia, fasting which practiced by the Orthodox Tewahido church congregants determines what church followers eat and what foods to avoid (Armdie, Fenta, & Shiferaw, 2022). A study by Kumera et al. (2018) found that the fasting practice of Orthodox Christian mothers affected the dietary diversity scores of their children. Armdie et al. (2022) found that the fasting practice of the Orthodox

Christians resulted in poor consumption of animal source foods such as meat, eggs, and milk but however, vegetable and fruits consumption increased. Religious beliefs may influence food and nutrition security by affecting the food quantities consumed, dietary diversity and the consumption of nutrient-rich foods (Alonso, 2015).

Household Characteristics

Studies suggest that household characteristics influence children's dietary diversity. A household is known as a group of people who live together and usually eat in the same pot. Mahmood, Flores-Barrantes, Moreno, Manios, and Gonzalez-Gil (2021) explain that the family environment plays an important role in shaping and promoting child dietary behaviors that can be sustained in their life. In the home environment, several factors are associated with eating and dietary behaviors, and these include availability and access to healthy foods, family meal frequency and caregiver's practices in feeding their children (Story et al., 2008). Therefore, availability and accessibility are important factors for healthy eating in children. According to Custodio *et al*. (2019) child dietary diversity can be influenced by household food access, intra-household food distribution, and caregiver perceptions of culture.

Monthly Income

Research findings show that the income of a household is associated with child dietary diversity. This is because some of the income is used for purchase of diverse foods for feeding children. UNICEF (2021) asserted that poor families face huge challenges in accessing nutritious foods for their infants and young children. Furthermore, the youngest children between the ages of 6 to 11 months carry the greatest risk of consuming the least diverse diets. Arimond and Ruel (2004) reported that families with higher monthly incomes and resources have more access to diverse

diets and their children grow better than those from families with lower incomes. According to Shariff et al. (2015) a high household income translates to a stronger purchasing power and ultimately better quality of foods whereas a low income is a barrier to access for nutrient dense foods. A study by Baek and Chitekwe (2019) also found that a household that has financial constraints faces challenges in accessing diverse and nutritious foods. Shariff et al. (2015) indicates that children from households with very low-income earnings are likely to suffer from deficiencies in macro nutrients such as proteins and micro-nutrients including vitamin A, B vitamins, folate, iron, and calcium. UNICEF (2021) also reiterated that in situations where the income is limited at a household, families are more likely to prioritize feeding frequency and fuller stomachs rather quality of foods for their children.

A study in Ethiopia by Solomon and colleagues found that mothers of 6-23 months old children with a monthly household income above 3000 Ethiopian Birr had a greater likelihood of feeding their children diverse diets than those with a monthly income less or equal to 1500 Ethiopian Birr. In another study by Kumera et al. (2018), mothers who had low monthly income were twice more likely to fail to feed their children diverse foods [AOR=2.2; 95% CI (1.39-3.49), P =0.001] than those with high monthly income. Na et al. (2017) found household poverty as a predictor for minimum dietary diversity among infants and young children. Therefore, increasing household income through such as cash transfers can potentially lead to improved diet quality and diversity. Bhuvanendra and Holmes (2013) further assert that uneven household decision-making, lower social status of women and limited information about nutrition is a key contributor to the inefficiencies of the types of foods consumed at the household level.

Nutrition Sensitive Agriculture

Nutrition-sensitive agriculture is vital for improved nutrition outcomes for children in developing countries particularly in rural areas. Study findings by Ribeli & Pfste (2022) show that in regions where crop diversity was more pronounced, MDD was also higher. Children staying in agrarian areas are less likely to get diverse diets than children who live in pastoralist areas indicating that this might be due a low consumption of animal source foods in agrarian areas (Muche, et al., 2022). Margolies et al. (2022) explain that nutrition-sensitive agriculture can increase household access to adequate and nutritious foods thereby improving the quality of diets for children. Studies show an important link between dietary diversity and ownership of a nutrition garden and livestock. Dangura and Gebremedhin (2017) found that for children from households where fruits and vegetables were grown and livestock owned, there were increased dietary diversity scores compared to children from households that had no fruits, vegetables, and livestock.

Nutrition Garden and Livestock Ownership

Studies show that households that are in possession of either a nutrition garden or livestock are able to feed diverse foods to their children. Beyene et al. (2015) found that children whose parents owned a nutrition garden were twice likely to have diversified diets than those whose parents did not have one [AOR 2.03; 95% CI (1.09-3.78)]. Furthermore, mothers who had milk available in their households were 2.38 more likely to feed their children diverse foods (Temesgen, Negesse, et al., 2018). The same study also reported that women who participated in making decisions in their household were more likely to feed their children diverse diets. Chiketa (2019) found that households that had a vegetable garden had 3.5 times greater chances to practice MDD compared to households which had no vegetable gardens. The same

study also found a significant association between the size of a household and child dietary diversity. Households with at most 5 members showed greater chances of providing their children minimally diverse foods than households that had at least 6 children.

Another study by Ochieng, Afari-Sefa, Lukumay, and Dubois, (2017) in Tanzania found that dietary diversity scores for children below 5 years and women were higher in male-headed households than in female-headed households. The same study also reported that gender, educational attainment of the household head, training in nutrition, and preparation of food are all important determinants of dietary diversity at the household level. Komatsu, Malapit, and Theis (2018) found that in Ghana and Mozambique, poor children had more diverse diets when their mothers spend more time cooking. In that same study, women and children in Mozambique who were involved in agricultural activities were more likely to give diverse foods to their children.

Media Exposure

Research findings show that possession of household valuables such as radio and TV at home is significantly associated with child dietary diversity. Custodio et. (2019) found that household possession of asserts including TV and radio were significantly associated with MDD. This could simply be that households with such asserts have unlimited access to nutrition information on how to optimally feed their children In Ethiopia, Beyene et al. (2015) reported an association between minimum dietary diversity and exposure to media. Belew et al. (2017) also found a significant association between exposure to media and child dietary diversity. In a meta-analysis study by Temesgen et al. (2018) caregivers who had satisfactory exposure to media such as TV, radio and newspaper were 2.79 times more likely to feed minimally

diverse foods to their children than caregivers who had minimal exposure. Therefore, it implies that a variety of media platforms can be useful for promoting optimal infant and young child feeding practices.

Household Decision Making

Evidence indicates that household or family decisions have an influence on the overall well-being of individuals (Quisumbing, 2003). In a household, it is the bargaining power that determines how resources are distributed between individuals. According to Quisumbing (2003) factors involved through the bargaining process may include legal rights, knowledge and skills and the ability to search for information, education, and the bargaining skills. Gender inequalities among households in the distribution of power often disadvantages women either economically, access and ownership of household asserts and the ability to explore opportunities outside the home and this can be due to lack of adequate time and inability to make decisions (UNECE, 2020).

Household decision making is a broad and complex phenomenon especially when at least one actor is involved such as the case of couples in a household (UNECE, 2020). Studies show that household decision making has a significant association with dietary diversity among children. Among other determinants identified in an Ethiopian study, household decision making was also found as a predictor for dietary diversity (Temesgen et al.,2018). Whilst Beyene et al (2015) did not find an association between child dietary diversity and mother's participation in household decision, they rather found a positive association between mother's decision-making and meal frequency. Collective decision making allows mothers to

contribute to household purchases and agricultural production which can lead to increased dietary diversity for children.

Community Characteristics

A community can be defined as a group of people who interact and live in a common location. A growing body of knowledge show that community-level factors influence diet quality for children. In the UNICEF causal framework for child undernutrition, community level characteristics are categorized under basic causes for malnutrition. In their report, UNICEF (2020a) asserts that the diets of children are reflective of food that is available in their communities, available resources at household levels, and also the knowledge, attitudes, beliefs, and culture of the people who look after them. According to UNICEF (2021) some of the factors that influence diets for children include national supplies shortages, seasonal scarcities, constrains in physical access and poor infrastructure such as road networks particularly in rural settings of Sub Sahara Africa and in remote countries which are commonly affected by climate change shocks and hazards, conflicts, and fragility. Furthermore, physical accesses sometimes become problematic in poor urban settings where they may be fewer shops where nutritious foods are found and sold.

A study by Custodio et al. (2019) found that child dietary diversity can be influenced by community characteristics such as availability of food, stability of supply of food, resource infrastructures, and biophysical food environment. Na et al. (2017) also found community factors which included access to health care services and geographical location as factors that influenced the dietary diversity of children in a study conducted in Pakistan. According to Custodio et al (2019), a variation in MDD in Burundi and Rwanda could be attributed to the fact that children residing in similar communities share same dietary diversity attributes as compared to children

who live in different communities, and this is indicative that efforts to improve child dietary diversity should go beyond targeting individual or households.

Presence of Growth Monitoring Services

At community level, growth monitoring services led by community-based health workers has shown to improve nutritional status of children. As a preventive intervention, growth monitoring services are linked with promotion of activities which aim to raise awareness on child growth, IYCF practices and therefore serves as an important activity in integrated maternal and child health nutrition programs. (Feleke, Adole, & Bezabih, 2017). Studies indicate that the presence of growth monitoring services in communities is significantly associated dietary diversity among children 6-23 months. A study by Belew et al. (2017) found that participation of mothers in child growth monitoring follow-ups and exposure to media were associated with higher dietary diversity scores. Growth monitoring services are important platforms where mothers and caregivers receive nutrition messages and counselling on various foods that can be fed to children for optimum growth and development. A study by Dangura and Gebremedhin (2017) found that mothers who participated in the cooking demonstration were more likely to feed their children diversified complementary foods than mothers who did not participate.

Social Norms and Culture

Other sources also suggest that social norms and culture influence children's diets. CARE (2017), describes social norms as a set of beliefs by which certain groups of people believes are appropriate and one of the ways to facilitate social transformation is through social analysis and action, a tool that enables community members to reflect, challenge social norms and practices which affect their lives.

Although mothers remain with the primary responsibility for caring and feeding children in many societies UNICEF (2021) revealed that patriarchal norms and power relations which remain unequal among families leaves mothers with little or no autonomy in the decisions of foods to purchase for children at home. Martínez Pérez and Pascual García (2013) reiterated children and their mothers are normally the victims of the environment where the quality of their diet is highly determined by food taboos and ancient customs. According to Dickin, Litvin, McCann, and Coleman (2021), dietary diversity for children is influenced by the belief that an infant cannot chew food, and giving honey to children negatively affects their speech development. In other settings, for an example, approval from someone is needed to feed children orange-fleshed sweet potatoes.

Special events and occasions may can have an effect in the diets of children. Ribeli and Pfister (2022) found that the quality of children's diets is influenced by cultural factors which include agricultural practices, food taboos, and the cultural Famadihana which is a region-specific event in the Vakinankaratra region in Malagasy. The findings of the same study revealed that dietary diversity for children increased particularly on the day of the cultural event. Dickin et al. (2021) also found that children's diets are also influenced by the belief that young children may not consume heavy food and that feeding children with eggs will result in a child becoming a thief later in adulthood. In some communities the consumption of wild harvested foods is very low, and this may impact negatively on children's diets. FAO (2015) emphasizes that such foods can provide more nutrients than exotic foods and they have an advantage that these wild-harvested foods adapt better to local environments. The table below summaries common and wild harvested foods.

Table 4. Common and Wild- Harvested Foods in Zimbabwe

Type	Examples
Insects	Caterpillars, termites, locusts, and beetles
Other small animal products	Birds, fish, and mice
Fruits	Baobab, monkey orange, buffalo thorn, snot apple
Leafy vegetables	Blackjack, amaranth, spider flower
Roots and tubers	Wild potatoes
Mushrooms	Field mushroom, termite fungi, apricot mushroom

(*Adapted from* FAO, 2015)

Dickin et al. (2021) found that nomadic cultures view livestock ownership as a sign of prestige resulting in limiting the slaughter of animals for consumption by family members and children. The Maasai nomads have a habit of moving from one place to another to search for greener pastures for their livestock and usually they take weeks and months before returning to their wives and kids. As a result, women are left alone with the burden to take care and feed children when their husbands are not around. Chege, Kimiywe, and Ndungu (2015) found that the Maasai culture disapproves selling of their animals or slaughter of animal except when they hold special events including circumcision and when there is a new birth in a family. This practice negatively influences income generation and quality of diets for household members and children. Chege and others also found that the Maasai culture prohibits the consumption of certain foods such as chicken, wild animals, and fish and this may result in food insecurity. According to the Maasai culture consumption of vegetables is also not allowed as vegetables are perceived as livestock feed and furthermore, the consumption of a meal together with milk is disallowed as that act is believed to destroy the animals and is also regarded as being disrespectful to the animals.

McNamara and Wood (2019) found that mothers-in-law had a belief that children fed with eggs will speak very late and may develop stomach problems. Lokossou, Tambe, Azandjèmè, and Mbhenyane (2021) found that fathers are served

first during family meal times and are served with the best and most nutritious parts of meat or chicken before children are fed. Dickin et al. (2021) also found that in some settings women have the responsibility to provide the family fruits and vegetables while men only provide starchy foods. Furthermore, grandmothers were found to have the final decision in determining when to give the infant the first foods.

Presence of VILLAGE SAVINGS and LENding (VSLA)

Village savings and lending association is an important community driven initiative that enables participants to save and lend money and subsequently access relevant financial resources needed to embark on sustainable income-generating activities. Some of the activities aim to improve health and nutrition outcomes of their families including children under the age of two years (Allen & Staehle., 2009; Mbiro & Tsuma., 2021). According to Beyene (2018); cited by Mbiro and Ndlovu (2021), households that have women who participate in VSLA activities are healthier than those that have no women involved in VSLA. VSLA groups in communities have an important contribution in increasing income of households and this income can be used to support household food diversity and health.

Studies indicate that presence of VSLA groups in communities is linked with improved dietary diversity for children 6-23 months. In Chimanimani district in Zimbabwe, Mbiro and Ndlovu (2021) found that during the period when women participated in VSLA, feeding patterns for children under the age of five years significantly improved with most respondents indicating that meal frequency increased to three meals from two meals a day. Another study found that participation in VSLA alone was significantly associated with improvements in the child's individual dietary diversity scores relative to the control albeit that dietary diversity

levels for children remained low. (Brunie, Fumagalli, Martin, Field, & Rutherford, 2014).

In conclusion, a detailed review of various studies on children's diets has been discussed in this chapter. Factors that have been discussed include child, caregiver, household, and community characteristics that are associated with MDD.

CHAPTER 3

RESEARCH METHODOLOGY

This chapter discusses the methodology that was employed in this study. It specifically discusses the research design, population and sampling, data collection methods, validity and reliability, data analysis, and ethical considerations.

Research Design

This study was cross-sectional and quantitative and aimed at investigating determinants of dietary diversity among children aged 6 – 23 months in the Mwenezi district. This design was chosen because it allowed assessment of dietary diversity and identification of factors that influence dietary diversity. Moreover, this design is relatively cheap while efficient in generating data that answer the research questions for this study within the available time and resources.

Study Population

A Study population refers to the entire group of individuals or objects that meet specific inclusion criteria for a particular study. This group is usually defined by certain characteristics, such as age range, gender, medical condition, geographic location, or other relevant factors. The study population is the starting point for selecting participants for a study and for generalizing the findings to a larger population. It is essential to define the study population clearly to ensure that the results of the study are valid and reliable.

Inclusion Criteria

The population in this study comprised children aged 6-23 months old in the Mwenezi district. However, children younger than 8 years cannot report accurately their food intake (Livingstone, Robson, and Wallace, 2004), and therefore their mothers or caregivers reported their food intake on their behalf. Caregivers can reliably report children's food intake, particularly foods eaten at home (Basch et al., 1990; Klesges, 1988).

Exclusion Criteria

Infants younger than six months, infants not on complementary feeding at the time of data collection, and children older than 23 months were excluded from the study.

Sample Size

In this study, the number of respondents included in the sample was calculated using Fischer's formula below:

$$n = \frac{z^2 p(1-p)}{e^2}$$

Where:

n = Sample size

z = Normal deviation at desired confidence interval. In this case, it will be taken at 95%, the Z value at 95% is 1.96

p = Proportion of the population estimated to have the characteristic. P and 1-P are best assumed that they are equal to 0.5

e = Degree of accuracy desired (0.05 is usually used)

n = $(1.96)^2$ x 0.5×0.5/ $(0.05)^2$

n = 384

A 10% contingency was added to the sample (N) to factor in non-responses and the final sample size was 422 infants and young children.

Sampling Procedure

To identify the 422 children mentioned above, a multi-stage sampling technique was employed as detailed below. Mwenezi district comprises 22 health facilities and each health facility serve a catchment area made up of villages. The names and number of health facilities and the number of villages under each health facility are provided in Table 7 below.

Table 5. Health Facilities and Villages in Mwenezi District

Health Facility Category	No. of health facilities	Name of health facility	No. of villages in the catchment area
Referral Hospitals	2	Neshuro	44
		Matibi	21
Government clinics	8	Chimbudzi	17
		Chizumba	23
		Maranda sub	29
		Rutenga	179
		Chirindi	318
		Nehanda	26
		Munyamani	17
		Chingwizi	250
Council clinics	7	Manyuchi	23
		Mlelezi	110
		Mwenezi	136
		Mazetese	8
		Boterere	34
		Mushava	29
		Marinda	14
Mission clinics	2	Maranda mission	8
		Lundi mission	18
Private clinics	3	Mwenezana	4
		NRZ	3
		G & N	1

The first step involved clustering health facilities according to their categories. After the clustering process, a health facility was selected through simple random sampling from each cluster. A village was then selected through simple random sampling from the catchment area of the sampled health facility. After the selection of the village, children aged 6-23 months were then selected using a simple random sampling method, and their caregivers were interviewed by trained enumerators. Table 4 shows randomly selected health facilities and villages that participated in the study.

Table 6. Randomly Selected Health Facilities and Villages

Health facility type	Randomly selected health facility	Randomly selected village
Referral hospitals	Neshuro	Chirimigwa
Government-owned clinics	Chingwizi	Tagwirei
Council owned clinics	Mushava	Halimani
Mission owned clinics	Lundi	Chitanga
Private owned clinics	Mwenezana	Village 2

Data Collection Instruments

In the research field, questionnaires are applicable in a variety of survey situations. A questionnaire can be developed or an already pretested one could be adapted for use to measure a particular attribute when conducting a research study (Bolarinwa, 2019). In this study, data was collected using a face-to-face administered structured questionnaire which had questions and pre-arranged list of responses. The questionnaires were adopted from pre-tested and validated data collection tools from a similar study conducted by Taremba (2017) in Manicaland province which shares boundaries with Masvingo province where Mwenezi district is located. For dietary assessment, the WHO's (2010) standardized questionnaire for assessing infant and young child feeding practices was used. To ensure the quality of the data, the English

language version of the questionnaire was translated to Shona (the local language used during interviews with study participants) which was transcribed back to English to check its consistency before the actual data collection. The data collection instruments were divided into sections A, B, C, and D (see appendix A) to collect information about the child, caregiver, household, and community characteristics, respectively. Section E (see appendix A) of the questionnaire was a dietary diversity assessment tool for infants and young children.

Instrument Validity and Reliability

The reliability and validity of research instruments is vital in the field of research. Validity describes the extent to which a measurement can measure what it is supposed to measure, whereas reliability refers to the extent to which obtained results from a measurement could be replicated (Bolarinwa, 2019). Several threats to validity undermine confidence that researchers may have in study findings. As suggested by Bolarinwa (2015), a research instrument can be adapted from an already tested and validated instrument. As such sections A, B, C, and D of the instrument used in this study were adopted from a reliable, pretested, and validated instrument by Taremba (2017) who conducted a similar study in Manicaland, a neighbouring province sharing a boarder with Masvingo province in the west. Section E of the instrument was adopted from WHO's (2010) standardized questionnaire for assessing infant and young child feeding practices.

Data Collection Procedure

The principal researcher engaged 5 locally based research assistants to participate in data collection. Research assistance were trained for one day to standardize the administration of interviews to ensure collection of accurate data. To

motivate data collectors and improve the quality of data, the principal investigator provided a small incentive to them.

Research assistants were assigned to their areas of work to carry out data collection and each was required to conduct a maximum of 10 interviews per day. Data collection was completed in 10 days in the month of February 2020. Research assistants were assisted by village health workers to identify selected respondents. Caregivers were asked questions to ascertain demographic and socioeconomic household characteristics and child feeding practices. Each interview took approximately 20 to 30 minutes to complete. Caregivers recalled the foods, drinks and snacks consumed by their children aged 6-23 months during the previous 24 hours. To minimize recall bias, research assistants asked participants to report on the foods that were consumed by their children during each mealtime in the preceding or the last 24-hours. The researcher routinely supervised the administration of questionnaires by research assistants to ensure consistency. Moreover, daily during the data collection period, the principal researcher reviewed and cross-checked all filled questionnaires for completeness and data consistency.

Data Analysis

Collected data were entered and analyzed using SPSS 20 for windows. A table is used to show the demographic characteristics of caregivers and children who participated in the study. A bar chart is used to describe children's food consumption patterns. As depicted by the conceptual framework in figure 2, MDD was the dependent variable, and child, caregiver, household, and community characteristics were explanatory or independent variables. The dependent variable was dichotomous, and as a result, binary logistic regression modeling as described by Salifu, Alhassan, and Salifu (2015) below was performed to identify factors associated with it.

Logit (ρ) = $ln(p/1-p)$= β0 + $\sum_{i=1}^{n} \beta i.xi$

Where:

β0 = the model constant

β1 = the parameter estimates for independent variables

xi = the set of independent variables (i=1, 2…. n)

p = Probability ranges from 0 to 1

$ln(p/1-p)$= The natural logarithm ranges from negative infinity to positive infinity

The above model was used to determine the association between dietary diversity (dependent variable) and independent variables (child, caregiver, household, and community characteristics). A P value < 0.05 at 95% CI was considered statistically significant. The MDD is defined as the proportion of children aged 6-23 months who consumed foods from at least four food groups out of the seven referenced food groups in the last 24 hours before interview were considered as having achieved the MDD. As such, the outcome or dependent variable was categorized as i.e., adequate MDD and inadequate MDD. Using simple (i.e., bivariate) regression model, the outcome or dependent variable was then examined against the different set of independent variables (child, caregiver, household, and community characteristics) to determine those characteristics significantly associated with MDD.

Ethical Considerations

Ethical clearance was sort from the Adventist University of Africa - Research Ethics Committee of the Department of Health Sciences (Appendix E). Authority to carry out the study was sort from the District Medical Officer for the Mwenezi district (Appendix E). Informed consent was obtained from caregivers of children who participated in the study (Appendix C). Caregivers were interviewed in the comfort of

their homes to ensure confidentiality. Study participants were assured of privacy and confidentiality and were informed that their participation was voluntary and had they had the right to withdraw from the study at any time without penalty. Completed questionnaires were kept under a lockable cabinet.

CHAPTER 4

DATA PRESENTATION AND ANALYSIS

The following chapter presents the results of this research. Demographic information is shown in table 9. Logistic regression results for the child, caregiver, household, and community characteristics are shown in tables 10, 11, 12, and 13 respectively.

Demographic Characteristics of Respondents

In research surveys, at least 80% response rates are expected (Fincham, 2008). This is critical to allow generalization of the results to a target population. Response rate is generated by dividing usable responses returned during a survey by the total eligible numbers in the selected sample (Fincham, 2008). In this study, out of the 422 eligible sample participants, a total of 417 respondents participated, giving a response rate of 98.8%. Table 9 below shows the demographic characteristics of the respondents.

Table 7. Demographic Characteristics of Caregivers and Children Aged 6-23 Months

Characteristic	Category (n=417)	Frequency	Percentage (%)
Child's age in months	6-11	178	42.6
	12-17	112	26.9
	18-23	127	30.5
Child's sex	Male	165	39.6
	Female	252	60.4
Child's birth order	< 5	377	90.4
	5+	40	9.6
Child's birth weight (grams)	< 2500	61	14.6
	2500+	356	85.4
Physical disability	Yes	12	2.9
	No	405	97.1
Chronic illness	Yes	18	4.3
	No	399	95.7
Caregiver's age (years)	15-24	145	34.8
	25-34	175	42.0
	35+	97	23.2
Caregiver's marital status	Single	26	6.2
	Married	330	79.1
	Divorced	17	4.1
	Widowed	30	7.2
	Separated	14	3.4
Caregiver's education	Primary	195	46.8
	Secondary	209	50.1
	Tertiary	4	1.0
	None	9	2.1
Caregiver's religion	Apostolic sector	138	33.1
	Pentecostal	72	17.3
	Missionary established	49	11.8
	Zion	78	18.7
	African traditional religion	61	14.6
	None	18	4.3
	Others	1	0.2
Employment status	Employed	8	1.9
	Unemployed	409	98.1
Knowledge on IYCF	At least 2 questions scored correctly	391	93.8
	Less than 2 questions scored correctly	26	6.2

In this study, age category 6 -11 months had the highest number of responses (42.6%) followed by the age group 18 – 23 months (30.5%) and the least were the 12 – 17 age category (26.9%). Females (60.4%) dominated males (39.6%) in the study. Up to 85. % of the children had a birth weight of least 2500 grams while 14.6% had a birth weight below 2500grams. Disability was low with 97% of the children having no physical disability. Very few children (4.3%) had chronic illness.

Among the total number of caregivers who were interviewed, 42% were in the age category 25 – 34 years, 34.8% were in the age category 15-24 years and 23.2% had 35 or more years and of these caregivers, 79% were married, 6.2% were single, 7.2% were widows, 4.1 % were divorced while 3.4% had separated with their partners. Half of the participants (50%) had secondary level of education, (46.1%) had primary with a few (2.1%) having reached tertiary education The Apostolic sector had the highest number of caregivers who were interviewed (33.1%) followed by Zion (18.7%). Most caregivers (98%) were unemployed. About 94% of the caregivers had knowledge of IYCF.

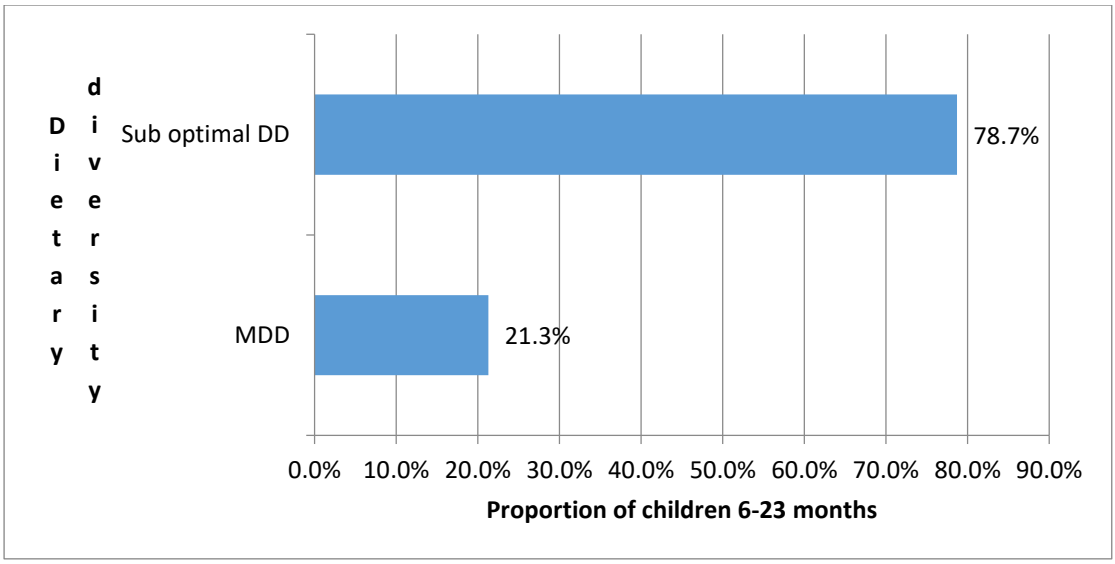

Figure 10. Proportion of Children Aged 6-23 Months Receiving Minimum Dietary Diversity in Mwenezi

The study findings show that most children aged 6-23 months in Mwenezi district consume poor diets, with only 21% of children consuming diets that meet MDD as shown in Figure 10. The implications of such sub-optimal consumption pattern are discussed in detail in the next chapter of this paper.

Figure 11 shows the food consumption patterns among children aged 6-23 months old in Mwenezi.

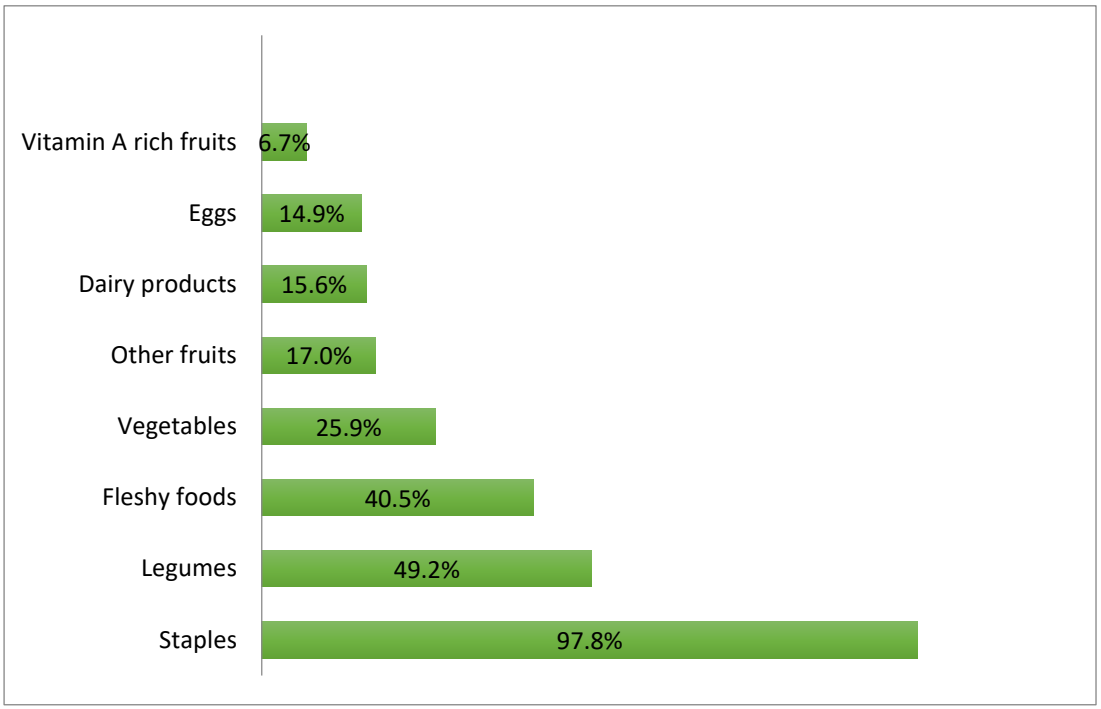

Figure 11. Food Groups Consumed by Children Aged 6-23 Months in Mwenezi

Staples were the most consumed food group (97.8%) in this study. Nearly half of the target children in this study (49.2%) consumed legume, followed by those that consumed fleshy foods (40.5%), vegetables (25.9%), other fruits (17.0%), dairy products (15.6%), eggs (14.9%). Vitamin A rich fruits (6.7%) were the least consumed.

Table 8. Logistic Regression Modeling of Child Characteristics

	B	S.E.	Wald	Sig.	OR	95% CI for OR	
						Lower	Upper
Age	1.976	.982	4.053	.044	1.026	.988	1.065
Sex							
Male	Ref	-	-	-	-	-	-
Female	.734	.249	8.675	.003	.480	.294	.782
Birth	-.126	.072	3.095	.079	.882	.766	1.014
Birth Weight	2.434	1.168	4.339	.037	1.403	.999	1.906
Disability							
No	Ref	-	-	-	-	-	-
Yes	1.880	.977	3.701	.054	.551	.181	1.364
Chronic							
No	Ref	-	-	-	-	-	-
Yes	-1.070	.625	2.934	.087	.343	.101	1.167

Ref =Reference group, OR=Odds ratio, CI=Confidence Interval.

This study found that age, sex, and birth weight had a significant association with MDD after a multivariate logistic regression analysis. Birth order, disability, and chronic illness had no significant association with MDD.

Table 9. Logistic Regression Modeling of Caregiver Characteristics

	B	S.E.	Wald	Sig.	OR	95% CI for OR	
						Lower	Upper
Age	.006	.013	.238	.626	1.006	.981	1.032
Marital							
Single	Ref						
Married	.590	.335	3.098	.078	1.803	.935	3.477
Divorced	2.952	1.715	2.962	.085	1.141	0.952	1.715
Widowed	-.341	.649	.276	.599	.711	.199	2.538
Separated	.737	.711	1.074	.300	2.089	.519	8.411
Education							
None	Ref						
Primary	.125	.072	3.028	.082	1.583	.767	1.016
Secondary	.243	1.657	.022	.883	.784	.031	20.163
Tertiary	.120	.072	2.771	.096	.887	.770	1.022
Physical							
No	Ref						
Yes	-1.406	.830	2.869	.090	.245	.048	1.247
Religion							
None	Ref						
Apostolic	1.522	1.174	1.681	.195	.218	.022	2.179
Pentecostal	.583	.347	2.815	.093	1.791	.907	3.538
Missionary	.382	.298	1.641	.200	1.466	.817	2.631
Zion	.598	.336	3.177	.075	1.819	.942	3.511
African Trad	.581	.347	2.823	.093	1.795	.901	3.544
Other	.037	.164	.051	.821	1.038	.753	1.431
Employment							
Unemployed	Ref						
Employed	-1.506	.833	3.267	.071	.222	.043	1.135
Knowledge of IYCF	1.418	.907	9.780	.000	.493	0.241	1.547

Ref =Reference group, OR=Odds ratio, CI=Confidence Interval.

In this study, the variable caregiver knowledge of IYCF was the only one significantly associated with MDD. Age, physical disability, and religion were not associated with MDD.

Table 10. Logistic Modeling of Household Characteristics

	B	S.E.	Wald	Sig.	Exp(B)	95% CI for OR	
						Lower	Upper
Cattle							
No	Ref						
Yes	-1.534	.826	3.450	.063	.216	.043	1.088
Number Cattle	.387	.232	2.782	.095	1.472	.934	2.320
Goats							
No	Ref						
Yes	.107	.057	3.578	.059	1.113	.996	1.243
Number Goats	.698	.408	2.931	.087	2.011	.904	4.473
Poultry							
No	Ref						
Yes	-1.926	.949	4.116	.042	.146	.023	.937
Number Poultry	.825	.380	4.722	.030	2.282	1.084	4.802
Decision maker							
Mother	Ref						
Father	2.384	.967	6.082	.014	10.851	1.631	72.184
All	.553	.279	3.926	.048	1.739	1.006	3.006
Radio							
No	Ref						
Yes	.096	.158	.372	.542	1.101	.808	1.500
TV							
No	Ref						
Yes	.614	.584	1.107	.293	1.848	.589	5.803
Garden							
No	Ref						
Yes	.532	.258	4.248	.039	1.703	1.026	2.824
Income Previous Month	.419	.538	.606	.436	1.520	.530	4.361

In this study, possession of poultry, nutrition garden, and joint decision-making were significantly associated with MDD.

Table 11. Logistic Regression of Community Characteristics

	B	S.E.	Wald	Sig.	OR	95% CI for OR	
						Lower	Upper
Growth Monitoring							
Never	Ref						
Frequently	-.817	.394	4.301	.038	.442	.204	.956
Sometimes	.240	.071	11.293	.001	.843	.640	1.109
Rarely	.611	.219	7.801	.005	.543	.354	.833
VSLA							
No	Ref						
Yes	.548	.233	5.545	.019	.578	.366	.912
The child fed better.							
Girl	Ref						
Boy	.406	.218	3.461	.063	.666	435	1.022
All (boys and girls)	.421	.216	3.819	.051	.656	.430	1.001

In this study participation in growth monitoring, and in VSLA, had a significant association with MDD.

Discussion of Results

Whilst there have been studies such as those by the Zimbabwe vulnerability assessment committee led annual rural livelihood assessment and sporadic nutrition surveys that have assessed consumption patterns among children in Mwenezi district, to my knowledge, this is the first study to examine determinants of minimum dietary diversity in the district. From six months onwards, children need diverse complementary foods in addition to breast milk to ensure optimal dietary intake and subsequently growth and development. This study employed a social-ecological approach to examine child, caregiver, household, and community characteristics that affect MDD among children aged 6-23 months in Mwenezi district, Zimbabwe. The study determined food consumption patterns in particular the determinants of dietary diversity of these children. Characteristics significantly associated with dietary diversity in this study were child's age, sex, birth weight, caregiver knowledge of

IYCF, possession of poultry, possession of a nutrition garden, joint decision making, participation in child growth monitoring, and in VSLA.

This study found that that nearly 79% of the children had sub-optimal dietary diversity, with only 21% of children in Mwenezi consuming diet that meet MDD. This finding is consistent with those by Temesgen, Yeneabat, et al. (2018) assertion that, less than one-fourth of the children aged 6 – 23 months get the recommended minimum dietary diversity feeding practice globally (Temesgen, Yeneabat, et al., 2018). Although this finding is higher than that of the 2018 national nutrition survey (Food and Nutrition Council, 2018), it is comparable with the 2019 multiple indicator cluster survey (ZIMSTAT, 2019), which found that only 17% of children aged 6-23 months in Zimbabwe had sufficed minimum dietary diversity. In a related study conducted in Chivi, a district in the same Masvingo province in Zimbabwe in which Chiketa (2019) reported that 26.3% of children had MDD. Elsewhere outside Zimbabwe, this study findings are comparable to that of several similar studies in Ethiopia (Belew et al., 2017; Temesgen, Yeneabat, et al., 2018) in Rwanda and Burundi by Custodio et al. (2019).

Food Consumption Patterns in Mwenezi District

The food group that was consumed the most was staples (97.8%) comprising mainly Sadza. Staples are an important food group as they are a source of energy for young children and examples of staples include sadza, rice, sweet potatoes, bread, and cereals. High consumption of staple foods among infants and young children aged 6 - 23 months was also reported in the Zimbabwe Vulnerability Assessment Committee (2015) rural livelihoods assessment findings. In addition, staple consumption is comparable with other studies in Rwanda and Burundi (Custodio et al., 2019) and North-West Ethiopia (Belew et al., 2017). A high staple consumption seen in among

children could be since staples are the major crop grown in Mwenezi. Furthermore, during the lean season period, caregivers are likely to prioritize feeding frequency instead of diet quality due to limited food stocks. There is need to promote biofortification of staple crops in the district to ensure that children benefit from micronutrients from staples.

Legumes and nuts (49.2%) were the second highest food group consumed by children followed by fleshy foods (40.5%). Legumes and nuts are vital in children as they are a good source of proteins and other important micronutrients such as iron and zinc. Legumes and nuts include sugar beans, ground nuts, round nuts, and peas. According to Saha et al (2022) children who do not consume any legumes and nuts, dairy and fleshy foods are at a very high risk to become severely wasted. Furthermore, the same study found that the likelihood of becoming severely underweight is higher among children who do not consume dairy foods than children who consume them. Fleshy foods include meat and meat products such as meat, fish, liver, pork, and chicken and these are an important source of first-class protein. Saha et al (2022) found that children who do not consume fleshy foods, eggs and other fruits and vegetables have a high likelihood of becoming severely underweight. In this study, legume and fleshy foods (meat) consumption among children in the district was higher than the findings of the Zimbabwe Vulnerability Assessment Committee (2015). There is need to further explore social norms and other barriers that hinder consumption of animal source foods by children during the complementary feeding period. A study in Zimbabwe found that children are not allowed to consume meat because it will lead to public embarrassment as children begin to cry demanding more meat (Maguranyanga & Chigumira, 2012).

The food group which had the least consumption was the vitamin A-rich fruits (6.7%). Vitamin A is nutrient of public health concern in Zimbabwe with the recent report showing that many children are affected with vitamin A deficiency. A low intake of vitamin A-rich fruits was also reported in studies done in Kenya and Nepal. In a related study by Paul et al. (2012) in Zimbabwe, some of the barriers to the consumption of diverse foods include the beliefs of mothers that infants are not able to chew and also that some foods are associated with diarrhea and constipation in children. Johns, Booth, and Kuhnlein (1992) also explain that some of the factors which influence the consumption of vitamin A-rich foods include seasonal availability, economic factors, the ability to gather and prepare foods, and dietary beliefs that may delay the introduction of vitamin A rich foods during complementary feeding. It is critical for nutrition education programs to emphasize the importance of consuming vitamin A-rich fruits by children during the complementary feeding period. This message should be promoted both at health facilities and in the communities to ensure saturation and repeated exposure for better impact.

The study found a very low consumption of eggs (14.9%) among infants and young children. In the Matabeleland province of Zimbabwe, Nduna (2016) found a low intake of eggs in children's diets. A low egg consumption could be due the fact that caregivers may prefer to sell their eggs to earn income thereby limiting egg consumption in children. Low egg consumption was found in similar studies in Ghana, Ethiopia, and in Nepal. In a Tajikistanian study, McNamara and Wood (2019) found that taboos and health beliefs hinder the consumption of eggs during the complementary feeding period. Some of the beliefs are that if children consume eggs, they may delay speaking and have stomach problems. A qualitative study in Zimbabwe found that children are not allowed to eat eggs which are believed to cause

hallucinations (Maguranyanga & Chigumira, 2012). Furthermore, in a Kenyan study, Chege et al. (2015) found that the Maasai culture inhibits the consumption of chicken and its products as they perceive it as a bird. In addition, a South African study led by Chakona (2020) found that young women prefer to feed their children chips such as *niknaks* than other foods because their children love them and are also cheap. Therefore, intensifying social behavior change and communication programs in communities could help to increase the consumption of eggs and other animal source foods. This could be achieved by rolling out a care group model which involves forming neighbour women groups, elderly women groups, and men's fora in communities as a strategy for dissemination of behavior changes massages to improve child feeding practices.

Child Characteristics Affecting MDD in Children in Mwenezi district

The current study found that age, sex, and birth weight had a significant association with MDD after a multivariate logistic regression analysis. Growing older was linked to high MDD while birth order was linked to low MDD. The odds ratio of 1.403 indicated that children with increasing weight were more likely to have MDD. The odds ratio of 0.551 and 0.343 also indicated that children who had no disabilities and not suffering from a chronic illness respectively were less likely to have MDD. In the same province Chiketa (2019) found that as the child's age increased, MDD also increased. A significant association in child's age was also found by Custodio et al. (2019) in Rwanda; Baek and Chitekwe (2019) in Nepal; Iqbal et al. (2017) in Pakistan; Ariff et al. (2020) in urban Pakistan; Dangura and Gebremedhin (2017) in Southern Ethiopia.

Caregiver Characteristics Affecting MDD among Children in Mwenezi District

More than 90% of caregivers in this study were knowledgeable of IYCF practices. This finding is comparable with that by Chiketa (2019) in a study conducted in Chivi district in the same province of Masvingo. In this study, only Knowledge of IYCF was significantly associated with MDD. This is comparable with findings by Dangura and Gebremedhin (2017) in Southern Ethiopia and Agize et al. (2017) in the same country.

Knowledge empowers caregivers and it drives and facilitates the process of making an informed decision. Caregivers who are well informed on feeding their infants and young children's diverse foods have the potential dietary diversity practice to ensure adequate growth and development of their children. It is vital to strengthen social behavior change and communication to promote the consumption of nutritious foods among infants and young children. This should include the formation of care groups led by community volunteers in communities that regularly visit neighborhood households to educate caregivers on feeding their children diverse and nutritious foods.

More than half of the caregivers in this study had secondary education. In this study education level of the caregiver was not significantly associated with MDD after binary regression modeling. However, other studies such as the ZIMSTAT (2019) multiple indicator cluster survey findings revealed that babies from educated mothers are more likely to receive MDD than babies from non-educated mothers in Zimbabwe. Other findings which show significant association include a study by Custodio et al. (2019) in Rwanda and Burundi and Beyene et al. (2015) in North West Ethiopia. The level of education could translate into the caregiver's ability to comprehend information and understand concepts hence its association with

minimum dietary diversity feeding practice. In addition, educated mothers tend to be more concerned with the health and nutritional well-being of their children and will therefore feed their children diverse foods. In a Nepalese study, Baek and Chitekwe (2019) found that the education of the mother had a significant association with the consumption of dairy products and fruits and vegetables.

The study found that children from employed caregivers were less likely to have MDD than unemployed people as indicated by the odds ratio of 0.222. Employed caregivers tend to have huge work pressures on them and have limited time to adequately care for their infants and young children. It is therefore vital for employed mothers to select nutritious foods for their children that require less preparation time and to rely on paid caregivers for assistance in feeding their children. The odds ratio of African traditional religion, Zion, and Pentecostal (1.795, 1.819, and 1.791) also indicated that those from the mentioned religious sects were more likely to have MDD than those who do not belong to any religion while those from apostolic sect had less MDD than those belonging to none of the religious groups. The study also found that the married and widowed caregivers were more likely to have MDD than those who were single as indicated by an odds ratio of 1.803 (married) and 1.141 (widowed).

Household Characteristics Affecting MDD among Children in Mwenezi District

This study found that, possession of poultry, possession of a nutrition garden, and joint decision-making had a significant association with MDD. An increase in the number of poultry was highly linked with MDD. Similar findings were reported by Chiketa (2019) in the Chivi district of Zimbabwe, Baek and Chitekwe (2019) in Nepal, Mitchodigni et al. (2017) in Southern Benin, Solomon et al. (2017) and

Kumera et al. (2018) in Ethiopia. Temesgen, Yeneabat, et al. (2018) also found that cow's milk availability in a household had a significant association with MDD.

In this study, household monthly income did not show any significant association with MDD. This could have been attributed to the fact that data collection was done when there were intense lock downs because of the covid-19 pandemic. However, several studies have shown that income is associated with MDD. According to Baek and Chitekwe (2019), a lack of income at the household level can be a barrier for mothers and caregivers to access diverse foods for their children. Programs that increase household incomes such as cash transfers, village savings and lending associations (VSLA), and resilience initiatives could strengthen the capacities of households to access diverse foods at their local markets for their families including infants and young children. In a Colombian evaluation, Leroy, Ruel, and Verhofstadt (2009) found that the cash transfer program yielded a positive impact through increasing consumption of vegetables and animal sources of foods among children aged between 24 to 60 months old. Furthermore, a Mozambican study by Brunie, Fumagalli, Martin, Field, and Rutherford (2014); cited by Kabore (2016) found a positive relationship between the participation of households in savings groups and the improvement of nutrition indicators. Increasing household income levels would mean that the minimum expenditure needed for every household member to consume a minimum food basket is achieved.

Community Characteristics Affecting MDD among Children in Mwenezi District

The current study found that participation in growth monitoring, presence of VSLAs had a significant association with MDD. Community variables in the multivariate regression model included child growth monitoring, VSLA groups, and

culture. The presence of growth monitoring services would mean caregivers would benefit from nutrition education sessions when they attend sessions. The presence of VSLA in community helps caregivers to access income through taking loans which they can use to start their income generating initiatives and purchase of food for their children. Under the care group model, caregivers are encouraged to venture into VSLAs as groups where they can raise their incomes to start livelihood projects in addition to nutrition sessions which they benefit from their meetings. A study in Southern Ethiopia by Dangura and Gebremedhin (2017) showed a significant association between participation in community cooking demonstrations, nutrition gardens, and livestock production and MDD among children. Another study in the same country by Belew et al. (2017) also found that the participation of mothers in growth monitoring activities and exposure to media had a significant association with MDD. Culture also influences feeding children as boys children tend to be fed more nutritious foods than girls.

CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter summarises the entire research and its chapters and makes a conclusion and recommendations as determined by the major findings in chapter 4.

Summary

The study aimed to identify determinants of dietary diversity among children aged 6-23 months old in Mwenezi district. The study examined characteristics that affect MDD at the level of child, caregiver, household, and community. In addition, the study determined food consumption patterns and assessed diversity of children's diets. A very small proportion of children (21%) in the Mwenezi district consume foods from the minimum recommended number of food groups. Except for staples (grains, roots, and tubers), the consumption of other food groups remains below 50%. Vitamin A-rich fruits, eggs, and dairy products were least consumed by children.

At the level of child characteristics, sex, age and birth weight were associated with MDD. Caregiver knowledge of IYCF was the only caregiver-level characteristic associated with MDD. Poultry ownership, possession of a nutrition garden and joint decision-making by both spouses were the household characteristics associated with MDD. At community level, presence of growth monitoring activities and VSLAs were associated with MDD.

Conclusion

A very small proportion of children (21%) in the Mwenezi district consume food from the minimum recommended number of food groups. Except for staples (grains, roots, and tubers), the consumption of other food groups remains below 50%. Vitamin A-rich fruits, eggs, and dairy products were least consumed by children. Child-level determinants for dietary diversity were age, sex, and birth weight. Caregiver determinants only had caregiver knowledge of IYCF. Household determinants for dietary diversity were possession poultry, possession of nutrition gardens and joint decision-making. Community determinants were participation in growth monitoring and in VSLAs.

Recommendations

The study recommendations are summarized in Table 10.

Table 12. Study Recommendations

Research Objectives	Findings	Recommendations
What are feeding consumption patterns among children in the Mwenezi district?	The most consumed food group was the staples followed by legumes and nuts and then fleshy foods. The study identified low consumption of vitamin A-rich fruits and eggs.	1. The Ministry of Health and Child Care should strengthen nutrition education programs at health facilities and in the community to emphasize the importance of the consumption of vitamin A-rich foods, eggs, and other animal-source foods.
What child characteristics affect MDD among children in the Mwenezi district?	Child age, sex, and birth weight were significantly associated with MDD	2. MOHCC and partners should conduct social analysis and action sessions to tackle social norms and barriers that hinder the consumption of diverse foods among children
What caregiver characteristics affect MDD among children in the Mwenezi district?	Caregiver knowledge of IYCF was significantly associated with MDD.	3. MOHCC should spearhead the rollout of the care group model as an approach to disseminate nutrition messages in communities targeting mothers and caregivers of children between 6-23 months old.
What household characteristics affect MDD among children in the Mwenezi district?	Household's poultry ownership, possession of a nutrition garden, and joint decision-making were significantly associated with MDD	4. Interventions should be targeted at household level to improve quality of children's diets. Government and development partners at district level should strengthen programs such as promotion of small livestock, crops diversification men engagement for joint decision-making.
What community characteristics affect MDD among children in the Mwenezi district?	Presence of growth monitoring activities and participation in VSLAs was significantly associated with MDD.	5. Efforts should be directed towards improving community level service provision to include growth monitoring 6. Ministry of Youth should initiate the formation of VSLA groups in communities to increase household's access to loan facilities and income

Suggestions for Further Research

Mixed methods research could have allowed a deeper understanding of the research problem. However, further research could utilize an interpretivist approach to understand barriers that hinder the consumption of diverse foods by children in Mwenezi.

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APPENDICES

APPENDIX A

QUESTIONNAIRE

QUESTIONNAIRE: DETERMINANTS OF DIETARY DIVERSITY

[Caregivers of children 6-23months]

Introduction

Hello, my name is Tarusenga Huturume. I am collecting data as part of my research study with the Adventist University of Africa. The purpose of the study is to establish factors affecting dietary diversity among infants and young children to better inform the planning, design, and development of programs aimed at improving dietary diversity in the Mwenezi district. Your participation is voluntary and would be much appreciated. You are free to withdraw from the study at any time during the interview if you no longer feel comfortable participating. No names shall be written down and the information gathered in this study is for academic purposes only and will be treated with utmost confidence. This interview will take approximately 15 and 30 minutes to complete the questionnaire.

Yes, Permission Given……1 No, Permission Not Given…….2

Section A: Child characteristics

1a) What is the age of the child in completed months? *(If the child is < 6 months or 2 years or more, end the interview and proceed to the next interview)*	
b) What is the sex of the child?	1 = Male 2 = Female
c) What is the birth order of the child?	
d) What is the birth weight of the child in grams?	
e) Does the child have any physical disability?	1 = Yes 2 = No
f) Does the child have any chronic illness?	1 = Yes 2 = No
g) Is the biological mother of the child alive?	1 = Yes 2 = No
h) Is the biological father of the child alive?	1 = Yes 2 = No

Section B: Caregiver characteristics

2a) What is the age of the primary caregiver in completed years?	
b) What is the marital status of the primary caregiver?	1 = Single 2 = Married 3 = Divorced 4 = Widowed 5 = Separated
c) What is the highest educational attainment of the primary caregiver?	1 = Primary 2 = Secondary 3 = Tertiary 4 = None 5 = Other (specify)…….
d) Does the primary caregiver have any physical problem to the extent that she is not able to work?	1 = Yes 2 = No
e) What is the religion of the primary caregiver?	1 = Apostolic sector 2 = Pentecostal church 3 = Missionary established church 4 = Zion Church 5 = African traditional religion 6 = None 7 = Other (specify)……
f) What is the employment status of the primary caregiver?	1 = Employed 2 = Unemployed
g) At what age should a child be introduced to complementary foods?	1= Correct age specified 2= Correct age not specified
h) What constitutes a four-star diet?	1= Four food groups listed 2 = Food groups not mentioned
i) What is the recommended breastfeeding period for infants and young children?	1= correct age given 2= Wrong age
j) What is the consistency of porridge recommended for infants and children	1= Thin porridge 2= Thick porridge

Section C: Household characteristics

3a) What is the family size of this household?	
b) What is the income source for this household?	1= Remittance 2= Crop production /sales 3= Livestock production/sales 4= Casual labor 5= Normal salary/wages 6= Pension 7= Skilled trade/artisan 8= Petty trade

	9= Own Business 10= Small scale mining 11= Others (specify)……
c) Opening balance at the beginning of the month of the previous month?	_____RTGS
d) What was your income for the previous month?	Income as cash_____ In-kind_____
e) Do you own a garden?	1 = Yes 2 = No *(If the answer is No, proceed to question g)*
f) If yes to the question above what crops are currently in the garden?	1 =Legumes 2 =Cereal crops 3=Green leafy vegetables 4=Orange/yellow leafy vegetables 5=Fruits 6=Other specify…….
g) Do you have livestock?	1 = Yes 2 = No *(If the answer is No, proceed to question k)*
h.1) If yes to the question above does the HH have cattle	1 = Yes **h.2)** How many_____ 2 = No
i.1) If yes to the question above does the HH have goats	1 = Yes **i.2)** How many_____ 2 = No
j.1) If yes to the question above does the HH have poultry	1 = Yes **j.2)** How many_____ 2 = No
k) Who makes decisions on household expenditure?	1 = Mother 2 = Father 3 = All 4 = N/A
l) Do you own a radio?	1 = Yes 2 = No
m) Do you own a television?	1 = Yes 2 = No
n) In the past 3 months, did you or anyone from the household receive and share information on complementary feeding?	1 = Yes 2 = No *(If the answer is No, proceed to question p)*
o) If yes to the above question from which source, did you receive the information	1=Radio 2=Television 3=Newspaper/magazine 4=Health center 5=Community health worker 6= Other (specify)…….
p) What is the highest educational attainment of the family head?	1 = Primary 2 = Secondary

	3 = Tertiary 4 = Other (specify)……

Section D: Community characteristics

4a) How often do you take your child for growth monitoring at your nearest health center/VHW?	1 = Frequently 2 = Sometimes 3 =Rarely 4= Never
b) In the past 3 months did your household receive any credit in form of cash from a formal institution	1 = Yes 2 = No
c) Is any member of your household part of the village savings and loan (VS&L) group	1 = Yes 2 = No *(If the answer is No, proceed to question f)*
d) If yes, who?	1 = Mother, 2 = Father, 3 = Daughter, 4 = Son, 5 = Other relative 6 = N/A
e) What did you use your most recent share for?	1 = Food 2 = Other items
f) In your culture, which child is fed better than the other?	1 = Girl child 2 = Boy child 3 = All children

Section E: Individual Dietary Diversity (6 – 23months)

This section will ask about foods (meals and snacks) the child ate or drank yesterday during the day and night whether at home or outside the home. Did the child eat any of the foods listed below?

No.	**Food examples**	**Responses**	**Food Group**
1	Sadza, rice, wheat, sorghum, millet, or any other grains or foods made from these (e.g., bread, noodles, porridge, or other grain products) White potatoes, white yam, white cassava, or other foods made from roots	0 = No 1 = Yes	*Grains, roots & tubers*
2	Dried beans, dried peas, lentils, nuts, seeds, or other foods made from these such as peanut butter	0 = No 1 = Yes	*Legumes & nuts*
3	Milk, cheese, yogurt, and other milk products	0 = No 1 = Yes	*Dairy products*
4	Beef, pork, lamb, goat, game meat, chicken, duck, other birds, insects, and organ meats	0 = No 1 = Yes	*Flesh foods*
5	Eggs	0 = No 1 = Yes	*Eggs*
6	Ripe mango, pawpaw, orange, pumpkin, carrots, squash, orange-colored sweet potatoes,	0 = No 1 = Yes	*Vitamin A-rich fruits*
7	Green-leafy vegetables, orange/yellow-colored vegetables e.g., red pepper	0 = No 1= Yes	*Vegetables*
8	Other fruits & vegetables such as wild fruits, tomatoes, onion e.tc.	0 = No 1 = Yes	*Other fruits & vegetables*

APPENDIX B

QUESTIONNAIRE IN LOCAL LANGUAGE

QUESTIONNAIRE: DETERMINANTS OF DIETARY DIVERSITY
[Caregivers of children 6-23months]
Introduction
Makadini? Zita rangu ndinonzi Tarusenga Huturume. Ndirikuita tsvakurudzo senzira yokuzadzikisa chidzidzo changu ne Adventist University of Africa. Tsvakurudzo iyi yakanangana nokuda kuona zvimhingamupinyi zvinokanganisa vana vacheche kuti vawane kudya kwakasiyana siyana. Izvi zvichabatsira pakuronga zvirongwa zvakanangana nokuvandudza kudya kwakasiyana siyana kwevana vadiki munharaunda ye Mwenezi. Munokumbirwa kupinda mutsvakurudzo iyi nokuzvipira kwenyu uye pasina muripo wamunotarisira. Makasununguka kubuda mutsvakurudzo iyi chero nguva yamakasununguka mushure mokunzwa kuti hamusisina kusununguka kuenderera mberi. Hapana mazita achatorwa kana muchinge mapinda mutsvakurudzo iyi uye hapana achaziva zvatinenge takurukura. Hurukuro yedu inogona kutora maminutes gumi nemashanu kusvika pama minutes makumi matatu tichiita hurukuro. Mbvumo yatenderwa……1 Mbvumo yarambiwa…….2
Section A: Child characteristics

1a) Mwana ane mwedzi mingani yakazara? *(If the child is < 6 months or 2 years or more, end the interview and proceed to the next interview)*	
b) Mwana murudzii?	1 = Mukomana 2 = Musikana
c) Mwana ndewechingani?	
d) Mwana akagwaza huremu hwakadii paakazvarwa?	
e) Mwana anehurema hwaanorarama nahwo here?	1 = Hongu 2 = Kwete
f) Does the child have any chronic illness?	1 = Hongu 2 = Kwete
g) Mai vakabereka mwana vapenyu here?	1 = Hongu 2 = Kwete
h) Baba vakabereka mwana vapenyu here?	1 = Hongu 2 = Kwete

Section B: Caregiver characteristics

2a) Muchengeti wemwana anemakore mangani akazara?	

b) Muchengeti wemwana akaroorwa here?	1 = Single 2 = Married 3 = Divorced 4 = Widowed 5 = Separated
c) Muchengeti wemwana akadzidza kusvika papi?	1 = Primary 2 = Secondary 3 = Tertiary 4 = None 5 = Other (specify)…….
d) Muchengeti wemwana anehurema hwaanorarama nahwo here hungamutadzisa kuita mabasa mazuva ose?	1 = Hongu 2 = Kwete
e) Muchengeti wemwana anopinda chitendero chipi?	1 = Apostolic sector 2 = Pentecostal church 3 = Missionary established church 4 = Zion Church 5 = African traditional religion 6 = None 7 = Other (specify)……
f) Muchengeti wemwana anoshanda here?	1 = Anoshanda 2 = Haashandi
g) Mwana mucheche anotanga kupiwa zvekudya kana akura sei?	1= Agona mubvunzo 2= Akonewa mubvunzo
h) Chikafu chinemapoka mana yakamira sei?	1= Mapoka mana ataurwa 2= Akonewa mapoka ese
i) Vana vacheche vanokurudzirwa kunwa mukaka wamai kwenguva yakareba zvakadii?	1= Agona mubvunzo 2= Akonewa mubvunzo
j) Bota rinopiwa vana rinofanira kuva rakakora zvakadii?	1= Bota rakatetepa 2= Bota rakakora

Section C: Household characteristics

3a) Musha uno unogara vanhu vangani vanodya nokurara pano?	
b) Mhuri ino inowana mari yokushandisa kupi?	1= Kutumirwa 2= Kurima nokutengesa 3= Kupfuya nokutengesa 4= Maricho 5= Muhoro 6= Mudyandigere 7= Mubato yemaoko 8= Kushava shava 9= Bhizimusi 10= Zungura 11= Zvimwewo

	(specify)……
c) Mari yaiva muchikwama pakatanga mwedzi wadarika yakawanda zvakadii?	_____RTGS
d) Mari yamakabata mwedzi wapera imarii?	Income as cash_____ In-kind_____
e) Mune gadheni yokurima here?	1 = Yes 2 = No *(If the answer is No, proceed to question g)*
f) Kana munayo, ndezvipi zvirimwa zvirimo mazuva ano?	1 =Legumes 2 =Cereal crops 3=Green leafy vegetables 4=Orange/yellow leafy vegetables 5=Fruits 6=Other specify…….
g) Mune zvipfuyo here?	1 = Yes 2 = No *(If the answer is No, proceed to question k)*
h.1) Kana munazvo zvipfuyo, mune mombe ngani?	1 = Yes **h.2)** How many_____ 2 = No
i.1) Mune mbudzi ngani?	1 = Yes **i.2)** How many_____ 2 = No
j.1) Mune huku ngani?	1 = Yes **j.2)** How many_____ 2 = No
k) Ndiyani anesimba rokutaura mashandisirwo emari pamba pamo?	1 = Mother 2 = Father 3 = All 4 = N/A
l) Pamba pano pane radhiyo here?	1 = Yes 2 = No
m) Pamba pano pane terevhizhoni here?	1 = Yes 2 = No
n) Pamwedzi mitatu yadarika, pane mugari wepano akambopiwa ruzivo rwechikafu chinopiwa vana here?	1 = Yes 2 = No *(If the answer is No, proceed to question p)*
o) Kana aripo, ruzivo urwu rwakabva kupi?	1=Radio 2=Television 3=Newspaper/magazine 4=Health center 5=Community health worker 6= Other (specify)…….
p) Mukuru wemusha uno akadzidza kusvika papi?	1 = Primary 2 = Secondary 3 = Tertiary 4 = Other (specify)……

Section D: Community characteristics

4a) Munoenda nemwana kusikero kakawanda zvakadii kuchipatara kana kuna mbuya hutano?	1 = Nguva nenguva 2 = Dzimwe nguva 3 =Nenguva dzirikure 4= Handiendi
b) Mumwedzi mitanhatu yapfuura musha wenyu wakambotora chikwereti here kune vanokweretesa mari munharaunda yamunogara.	1 = Hongu 2 = Kwete
c) Pane mugari wepano pamusha here arimumukando munharaunda yenyu?	1 = Hongu 2 = Kwete *(If answer is No, proceed to question f)*
d) Kana aripo, ndiyani?	1 = Mai, 2 = Baba, 3 = Mwanasikana, 4 = Mwanakomana, 5 = Hama yepedyo 6 = N/A
e) Makatengei pamba pano nemari yamakawana kumukando?	1 = Zvokudya 2 = Zvimwe zvinhu zvepamba
f) Mutsika nemagariro enyu, ndeupi mwana anokosheswa pakudya kudarika umwe?	1 = Mwana musikana 2 = Mwana mukomana 3 = Vana vese

Section E: Individual Dietary Diversity (6 – 23months)

This section will ask about foods (meals and snacks) the child ate or drank yesterday during the day and night whether at home or outside the home. Did the child eat any of the foods listed below?

No.	Food examples	Responses	Food Group
1	Sadza, mupunga, gorosi, mapfunde, mhunga kana kumwe kudya kunobva muzvikafu izvi se chingwa, manodhorosi nezvimwe zvakadaro. Matapura, mujimbura nezvimwe zvikafu zvinobva mumidzi.	0 = Kwete 1 = Hongu	*Kudya kunopa simba kunobva mumbeu dzetsanga diki kana midzi* ***(Grains, roots, and tubers)***
2	Beans dzakaomeswa, peas, nyimo, nzungu, nyemba kana zvokudzya zvinobva muchikafu ichi zvakaita se dovi.	0 = Kwete 1 = Hongu	*Zvekudya zvinobva dzinomenywa* ***(Legumes and nuts)***
3	Mukaka nezvokudya zvinobva kumukaka	0 = Kwete 1 = Hongu	*Kudya kunobva kumukaka* ***(Dairy foods)***
4	Nyama yemombe, nguruve, gwai, mbudzi, mhuka dzemusango, huku, dhadha kana dzimwewo shiri dzinodyiwa nekumwe kudya kunobva kuzvipukanana zvakaita se ishwa, majuru, harurwa nezvimwe zvakadaro.	0 = Kwete 1 = Hongu	*Kudya kunobva kunyama* ***(Fleshy foods)***
5	Mazai	0 = No 1 = Yes	*Mazai* ***(Eggs)***

6	Mango dzakaibva, mapopo, ma orange, manhanga, carrots, mbambaira dzakatsvukuruka mukati madzo	0 = Kwete 1 = Hongu	*Michero yakatsvukuruka* ***(Vitamin A rich fruits)***
7	Mirivo yose (Green-leafy vegetables), mirivo yakatsvukukuruka (orange/yellow-colored vegetables)	0 = Kwete 1= Hongu	*Mirivo*
8	Mimwevo mirivo nemichero se madomasi, hanyanisi nezvimwevo zvakadaro.	0 = Kwete 1 = Hongu	*Mimwevo mirivo nemichero* ***(Other fruits & vegetables)***

APPENDIX C

INFORMED CONSENT FORMS

Student researcher: Tarusenga Fast Huturume

Title of study: Determinants of dietary diversity in infants and young children in Mwenezi district, Zimbabwe

I am taking this study as a requirement of the Master in Public Health degree program that I am undertaking at the Adventist University of Africa. I am asking for your voluntary participation in my research work. Please read the following information about the research and if you would like to participate, please sign in the appropriate box below.

Purpose of the research study: The purpose of the study is to establish factors affecting dietary diversity among infants and young children to better inform the planning, design, and development of programs aimed at improving dietary diversity.

Time required for participation: This interview will take approximately between 15 and 30 minutes to complete the questionnaire

Risks: This research has no conspicuous risks, yet you may encounter some discomfort from the personal questions being inquired

Benefits: There are no benefits or incentives that will be given to you for participating in this study.

How confidentiality will be maintained: Any information that is given by you will be viewed as private, and it will be accessible just to the researcher. Information you give will not be discharged without your consent. After the study, it will be destroyed. If you have any questions about this study, feel free to contact me at (Phone +263 774 434 515). Email: huturumet@aua.ac.ke

Voluntary participation: Participation in this study is completely voluntary. If you decide not to participate there will not be any negative consequences. Please be aware that if you decide to participate, you may stop participating at any time and you may decide not to answer any specific question.

By signing this form, I am attesting that I have read and understood the information above, and I freely give my consent/assent to participate or permission for my child to participate.

Adult informed consent: Date reviewed _____

Signed: _____

Printed Name (Optional): _____

APPENDIX D

INFORMED CONSENT FORMS IN THE LOCAL LANGUAGE

Student researcher: Tarusenga Fast Huturume

Title of study: Determinants of dietary diversity in infants and young children in Mwenezi district, Zimbabwe
Ndirikuita tsvakurudzo senzira yokuzadzikisa chidzidzo che Master of Public Health chandirikuita ne Adventist University of Africa. Ndinokumbira kuita nemi hurukuro yetsvakurudzo iyi nokuzvipira kwenyu uye pasina muripo wamunotarisira Makasununguka kuverenga zvirimutsvakurudzo iyi kana muchinge magudzikana, uye muchinge mazvipira kupinda mutsvakurudzo iyi munokumbirwa kunyora runyoro rwenyu panotevera.
Purpose of the research study: Tsvakurudzo iyi yakanangana nokuda kuona zvimhingamupinyi zvinokanganisa vana vacheche kuti vawane kudya kwakasiyana siyana. Izvi zvichabatsira pakuronga zvirongwa zvakanangana nokuvandudza kudya kwakasiyana siyana kwevana vadiki munharaunda ye Mwenezi.
Time required for participation: Hurukuro yedu inogona kutora maminutes gumi nemashanu kusvika pama minutes makumi matatu.
Risks: Mutsvakurudzo ino, hamuna nyodzi yamuchasangana nayo kunze kwemimwe mibvunzo ichanangana nezvakadzika dzika zveupenyu hwenyu.
Benefits: Kana muchinge mapinda mutsvakurudzo iyi, hapana mubhadharo wamunopiwa kana kutarisira kuzowana.
How confidentiality will be maintained: Hapana mazita achatorwa kana muchinge mapinda mutsvakurudzo iyi uye hapana achaziva zvatinenge takurukura. Kana tsvakurudzo iyi ichinge yapera, zvese zvichaparadzwa. Kana mune mibvunzo yamunoda kunzwisisisa nezvetsvakurudzo iyi, makasununguka kundifonera pa number dzinotevera (Phone +263 774 434 515). Email: huturumet@aua.ac.ke
Voluntary participation: Kana muchinge masarudza kupinda mutsvakurudzo iyi, munenge mapinda nokuzvipira kwenyu uye hapana chakashata chinozoitika kwamuri kana marimba kupinda mutsvakurudzo iyi. Makasununguka zvakare kubuda mutsvakurudzo iyi panguva ipi zvayo kana mafunga kubuda mutsvakurudzo iyi.
By signing this form, I am attesting that I have read and understood the information above and I freely give my consent/assent to participate or permission for my child to participate.
Adult informed consent: Date reviewed _____
Signed: _____

Printed Name (Optional): _____

APPENDIX E

CORRESPONDENCES

Telephone:
+ 263 782 799 065/6
Telegraphic Address
E-Mail
mwenezihospital@gmail.com

MIINISTRY OF HEALTH AND CHILD CARE
MWENEZI DISTRICT HOSPITAL
P. O. BOX 27
NESHURO

ZIMBABWE

30 January 2020

TO WHOM IT MAY CONCERN

RE: CLEARANCE LETTER FOR TARUSENGA HUTURUME (S2018092) TO CARRY OUT A STUDY ON DETERMINANTS OF DIETARY DIVERSITY IN INFANTS AND YOUNG CHILDREN IN MWENEZI DISTRICT

This letter serves to inform you that the District Medical Officer-Mwenezi has granted permission to Huturume Tarusenga, a Master of Public Health student at Adventist University of Africa to carry out a study on Determinants of dietary diversity in infants and young children in Mwenezi district.

The findings of his study are purely for academic purposes only and may you pleases assist him to collect data on the target group. Please note that no publication shall be done whatsoever without the permission of the District Medical Officer.

Thank you for your usual cooperation

MWENEZI DISTRICT HOSPITAL
DISTRICT MEDICAL OFFICER
30 JAN 2020
P.O. BOX 27, NESHURO
ZIMBABWE

Dr M. Manjeya
DISTRICT MEDICAL OFFICER

AUA
Adventist University of Africa

Private Bag Mbagathi
00503 Nairobi, Kenya
Tel (254) 254 733-
333-451/452
Fax: (254) 20 660 3150
Email: info@aua.ac.ke
WEB: www.aua.ac.ke

Location:
Advent Hill, Magadi Road, Ongata Rongai

January 23, 2020

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

INTRODUCTION OF HUTURUME TARUSENGA FAST

Greetings from the Adventist University of Africa (AUA), Kenya. This letter is to introduce to you **Huturume Tarusenga Fast** who is a student at the Adventist University of Africa, School of Postgraduate Studies located in Ongata Rongai, Kenya with student identification number **S2018092** offering Master of Public Health degree at AUA.

Huturume is currently undertaking a research leading to the production of a thesis on the subject: ***"Determinants of dietary diversity in infants and young children in Mwenezi District, Zimbabwe"***. As part of the research process, he needs to conduct a survey by distributing questionnaire. His proposal has been approved by the research panel and he is ready to gather data for his study.

May I request your kind assistance in granting Huturume whatever help he may need to enable him gather data for his research work. Be assured that any information that Hututume will gather for his research will be treated in the strictest confidence and none of his participation.

Thanking you in advance for your assistance and support in furthering this research endeavor.

Yours faithfully,

Dr. Daniel Ganu
Dean, School of Postgraduate Studies

CURRICULUM VITEA

TARUSENGA FAST HUTURUME

8701 Victoria Ranch, Masvingo thuturume@gmail.com
+263774434515 /+263714643525

Profile

A versatile and result oriented nutrition practitioner with diverse experience in nutrition specific and nutrition sensitive programing both in government and non-governmental organizations. Equipped with a Post Graduate Diploma in Project Planning, Monitoring and Evaluation, a Bachelor of Science Degree in Nutrition and near completion of a Master of Public Health Degree, I have gained a wealth of exposure in planning, implementation including monitoring and evaluation of food security and nutrition programs and projects. I have strong interest in building food and nutrition resilience of communities affected by shocks and hazards. I am effective communicator with excellent facilitation skills. Ability to navigate complex situations to maximize results with flexibility to work in remote areas. Highly computer literate with very good command of statistical analysis packages, Ms word, Excel, and Power Point.

Experience

01 March 2022 - To date: Nutrition Action Zimbabwe: Takunda Resilience Food Security Project; Nutrition & Health Assistant: Buhera
27 June 2011 - 28 February 2022: Ministry of Health & Child Care: Mwenezi District; District Nutritionist

Education

Great Zimbabwe University: Post Graduate Diploma in Project Planning, Monitoring and Evaluation 2021
University of Zimbabwe BSc. Degree in Nutrition 2010
Adventist University of Africa Master of Public Health (Ongoing)

Skills

Team player, Effective communicator, Research skills, Excellent computer skills Highly flexible, Adaptive

Certifications

Certificate in M&E Fundamentals, Certificate in Data Use for Program Managers, Certificate in Nutrition in Emergencies

References

Charity Chikwiriro - Nutrition Specialist; Nutrition Action Zimbabwe; charity. chikwiriro@gmail.com +263773198750
James Masimba – Youth Officer; International Youth Foundation; j.masimba@iyfnet.org 0774411243
Zanele Moyo - Masvingo Provincial Nutritionist; Ministry of Health and Child Care; zanmoyo@yahoo.com 0785072975