A Comprehensive Analysis of the Nutritional Outcomes in the context of Urban Socio-economic Status:

A Case study of Harare and Bulawayo Metropolitan Provinces

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Acronyms

AUC	African Union Commission
CI	Confidence Interval
ENA	Emergency Nutrition Assessment
FAO	Food and Agriculture Organization
FCS	Food Consumption Score
GAM	Global Acute Malnutrition
HDDS	Household Dietary Diversity Score
IYCF	Infant and Young Child Feeding
MAD	Minimum Acceptable Diet
NCD	Non-Communicable Disease
WASH	Water Sanitation and Hygiene
WCBA	Women of Child Bearing Age
WHO	World Health Organization
ZimVAC	Zimbabwe Vulnerability Assessment Committee

Executive Summary

Background: The nutritional status of children and adolescents determines health and wellbeing outcomes later in adult life which are key for economic development. The foundation of optimal growth and development is laid before birth, during childhood, and is followed during adolescence, thus it is imperative to prevent malnutrition at every stage of the life cycle. Malnourished individuals are less likely to achieve their full potential in terms of education and economic productivity, and they earn less income than their well-nourished peers, making it difficult to break the cycle of poverty. Therefore, investing in nutrition throughout the life cycle will have both short-term and long-term benefits of economic and social significance, including large savings in health care costs, increased educability and intellectual capacity, and increased adult productivity.

Currently there is limited in-country assessments with information on nutrition status and associated factors in urban areas. Thus, the study sought to evaluate the nutrition status of children 6 to 59 months and children 5 to 9 years and adolescents 10 to19 years and associated factors in urban areas of Harare and Bulawayo Metropolitan Provinces.

Methods: A nutrition analysis was undertaken on data collected from the 2023 ZimVAC Urban Livelihoods Assessment where 2880 children 6-59 months were targeted in Harare and Bulawayo provinces. Emergency Nutrition Assessment (ENA) tool was used to calculate the target sample for anthropometric measurements. The nutrition status was determined using standard anthropometric measurements. Regression analysis model was used to establish the factors associated with the nutrition outcomes in children aged 6 to 59 months and 5 to 19 years. STATA and SPSS were used for data cleaning and analysis.

Results: Nutrition status results were based on 2768 children aged 6-59 months and 2149 children aged 5-19 years living in Harare and Bulawayo. The results showed that stunting was prevalent across all age groups: ranging from 18% to 37% for 6-59 months and 5% to 18% for the 5-19 years age group for all domains. Quality of diets was low with 3% of children 6-23months consuming a minimum acceptable diet characterised by high zero fruit and vegetable consumption and a low meat and egg consumption. The results show that households that were practising Urban Agriculture were 6 times less likely to have a stunted child (99% CI) and 3 times less likely to have a child who was underweight (95%CI) for the 6-59 months age group. There was significant association between household socioeconomic factors (income, religion, marital status), food security status, access to improved sources of water, urban agriculture, illness and dietary patterns with a presence of stunting, underweight, wasting and obesity amongst children and adolescents.

Conclusions: Household factors such as household head age, religion, socio-economic profiles (income, employment status), food security status, water sanitation and hygiene (WASH), illness and household consumption patterns influenced nutrition status in children 6 to 59 months, children 5 to 9 years and adolescents10 to 19 years.

CHAPTER 1: BACKGROUND

Introduction

Nutrition is a critical part of health and development. Better nutrition is related to improved infant, child and maternal health, stronger immune systems, safer pregnancy and childbirth, lower risk of non-communicable diseases (such as diabetes and cardiovascular disease), and longevity. Healthy children learn better. People with adequate nutrition are more productive and can create opportunities to gradually break the cycles of poverty and hunger (African Union Commission, 2019). When a high proportion of a population is malnourished, it weakens the entire economy, potentially reducing a country's Gross Domestic Product (GDP) by as much as 3 percent (World Bank 2006).

Global Perspectives on Nutrition

Food and nutrition security are crucial to the achievement of adequate child nutrition. According to FAO, food security exists in a nation or a household, when all people, at all times, have access to sufficient, safe and nutritious food to meet their food preferences for an active and healthy life (FAO, 2002) However, a household achieves nutrition security when it not only has secure access to food but also has a sanitary environment, adequate health services, and the knowledge and skills needed to provide adequate care to ensure a healthy life for all household members. Thus, both food and nutrition security are key to achieving good nutritional status (Pridmore & Hill, 2009). However, households can be vulnerable in the presence of factors that place them at risk of becoming food insecure or undernourished. The risk factors include loss of access to food and/or, proper nutritional care, or an inability to physiologically utilize available food because of infection or other disease. Most undernourished children live in vulnerable households that become food insecure. But children can also be undernourished in a food secure household if, for example, frequent and severe bouts of diarrhea mean they cannot utilise the food for growth and development (African Union Commission, 2019).

Globally, countries continue to struggle with the problems of infectious diseases and under-nutrition, at the same time there is a rapid increase in risk factors of Non-Communicable Diseases (NCDs) such as obesity and overweight, particularly in urban settings. The WHO reported that many low- and middle-income countries are faced with the triple burden of disease. This burden is caused by inadequate prenatal, infant and child nutrition, which is then followed by exposure to high fat, energy dense, micronutrient poor foods and a lack of physical activity as the child grows older (WHO, 2020).

Evidence has shown that Infant and Young Child Feeding (IYCF) is a key area to improve child survival, promote healthy growth and development. The first two years of the child's life provide a critical 'window of opportunity' to ensure survival, growth, and development through optimum infant and young child feeding practices. The World Health Organization has recommended the

initiation of breastfeeding within one hour of birth, exclusive breastfeeding for the first six months, and introduction of nutritionally adequate and safe complementary food at 6 months together with continuing breastfeeding up to two years of age or beyond (WHO, 2020). Appropriate infant and young child feeding practices help to prevent almost 19% of all under-five deaths. Improvement in infant and young child feeding practices is likely to reduce the burden of diarrhea-related morbidity and mortality. These preventable deaths, combined with cognitive losses, and health system costs of inadequate breastfeeding leads to over $340 billion in economic losses annually (Walters et al., 2019). The data calls for immediate scaling up of financing and implementation of policies, programmes, and interventions to meet the World Health Assembly's breastfeeding target by 2025.

Furthermore, adolescence chronic malnutrition and anaemia adversely impact their health and development. The high rate of malnutrition in girls not only contributes to increased morbidity and mortality associated with pregnancy and delivery, but also to increased risk of delivering low birth-weight babies. In most developing countries, nutrition initiatives have been focusing on children and women, thus neglecting adolescents. Addressing the nutrition needs of adolescents could be an important step towards breaking the vicious cycle of intergenerational malnutrition, chronic diseases and poverty (Bhutta, 2018). One recommended strategy for improved health outcomes is that children and adolescents do at least an average of 60 minutes per day of moderate- to vigorous-intensity, physical activity, across the week. The WHO estimated that four to five million deaths per year could be averted if the global population was more active. However, global estimates of physical inactivity indicate that in 2016, 27.5% of adults and 81% of adolescents did not meet the 2010 WHO recommendations (WHO, 2020).

However, prevention is the most feasible option for curbing the childhood obesity epidemic since current treatment practices are largely aimed at bringing the problem under control rather than effecting a cure. The goal in fighting the childhood obesity epidemic is to achieve an energy balance which can be maintained throughout the individual's life span. Some of the recommended actions include increase consumption of fruits and vegetables, limit energy intake from total fats and shift fat consumption away from saturated fats to unsaturated fats; limit the intake of sugars; and be physically active and accumulate at least 60 minutes of regular, moderate- to vigorous-intensity activity each day that is developmentally appropriate (Rakotomanana et al., 2017).

Women of Child Bearing Age (WCBA) are often nutritionally vulnerable because of the physiological demands of pregnancy and lactation. Requirements for most nutrients are higher for pregnant and lactating women than for adult men (Thornburg, 2021) (FAO & FHI 360, 2016) . Insufficient nutrient intakes before and during pregnancy and lactation can affect both women and their infants. Studies have shown that promotion of diverse diets is one of several approaches to improving micronutrient nutrition for WBCA. In addition, maternal access to financial resources was reported to have positive association with dietary diversity and minimum acceptable diet in nine sub-Saharan African countries (Ickes, Hurst, & Flax, 2015).

Understanding the factors associated with nutrition outcomes is critical to inform the design and implementation of effective nutrition sensitive- interventions and policies. One such area is

the Water Sanitation and Hygiene (WASH). The lack of adequate and safe water for a healthy and productive life has a negative impact on nutrition outcomes. The consequences of water insecurity on children includes diarrhoeal diseases which are a major driver of child mortality, causing half a million under-5 deaths annually, and a leading cause of malnutrition. Malnourished children are in turn more vulnerable to diarrhea, creating a precarious cycle of ill health and poor development (Editorial, 2023).

In addition, evidence has shown that religion has an effect on IYCF and caring practices. Studies in Ghana and Nigeria reported that religious practices directly and indirectly affect knowledge, attitude and practices of nursing mothers on infant feeding. The same study concluded that professionals should pay more attention to nutrition education in religious houses (Oladejo et al., 2019).

Regional Perspectives on Nutrition Situation

The Cost of Hunger studies have demonstrated that different forms of malnutrition have very significant consequences for physical, mental, cognitive and physiological development and, therefore, become a critical human rights issue. At the same time and for related reasons, malnutrition leads to decreased social and economic development of nations and, hence, becomes a very important political and economic development issue (Commission, African Union, 2019).

The Southern Africa subregion experiences a malnutrition burden among children aged under 5 years. The average prevalence of overweight is 12.1% - the second highest compared to other subregions in Africa with sufficient data. The prevalence of stunting is 23.3%, which is higher than the global average of 22.0%. Conversely, the Southern Africa subregion's prevalence of wasting is 3.2%, which is lower than the global average of 6.7%. The estimated average prevalence of infants aged 0 to 5 months who are exclusively breastfed is 33.5%, which is significantly lower than the global average of 44.0% (Commission, 2015). The Southern Africa sub region's adult population also faces a malnutrition burden: an average of 13.9% of adult women (aged 18 and over) live with diabetes, compared to 11.1% of men. Meanwhile, 41.5% of women and 17.1% of men live with obesity (Global Nutrition Report, 2022). Rural-to-urban environmental and forced migration processes might increase communicable disease and poor nutritional status from overcrowding, a lack of safe water, food, and shelter, and ability to access food (Tirado, 2012).

Zimbabwe Nutrition Situation

In Zimbabwe, the triple burden of nutritional problems is characterized by stunting 23.5% (Food and Nutrition Council, 2018); micronutrient deficiencies (iron 60% in women of child bearing age and 45% in children under 5 years, 21% in children under 5 and 24% in women of child bearing age) (MOHCC, 2015). In addition, the overweight and obesity, linked to non−communicable diseases (diabetes, obesity, cardiovascular diseases and cancers) affect able bodied and productive adults in their prime, reducing and curtailing their contributions to economic growth, through morbidity and mortality.

The Cost of Hunger study conducted in Zimbabwe in 2015, indicates that education, health and productivity loss due to the prevailing stunting levels in Zimbabwe, were estimated to amount to 10.89% of the GDP (African Union Commission, 2019). Furthermore, the potential increase in health costs because of the disease burden of diet and lifestyle related non−communicable diseases such as diabetes, cardiovascular diseases and cancers, will also take its toll on the economy since these diseases were affecting the population that is already contributing to the economy (Evans, 2013). A targeted focus on promoting and protecting the well-being of the workforce, by preventing these nutritional problems, is warranted if the industry/private sector led growth is to materialize and be sustained (Borghi et al., 2022).

The 2018 National Nutrition Survey and the Livelihood Assessments, indicated that, whilst the proportion of stunted children is less in urban areas than in the rural areas, the trend in urban areas has been increasing. Addressing urban stunting has therefore the potential to significantly lower the national average (ZimVAC, 2018).

Conceptual Framework for Urban Malnutrition in Zimbabwe

The determinants of nutrition outcomes in urban areas are shown in Figure 1. This figure presents a conceptual framework that depicts the interplay between key themes and factors that determine nutrition outcomes in urban areas. These factors affect nutrition outcomes from different ecological levels: community, family and the individual. At the centre is food security which shapes the relationship between nutrition and urban socio-economic status. These factors help explain nutritional and health outcomes in the context of urban socio-economic status including overweight and obesity, underweight, wasting and stunting. All this happens within an environment characterised by ongoing shocks and hazards and coping strategies employed by urban households to deal with food access challenges.

This report is a comprehensive analysis of the nutrition situation with a special focus on Harare and Bulawayo provinces, bringing into context the determinants of nutrition outcomes in the age groups, 6 to 59 months, 5 to 9 years and 10 to 19 years.
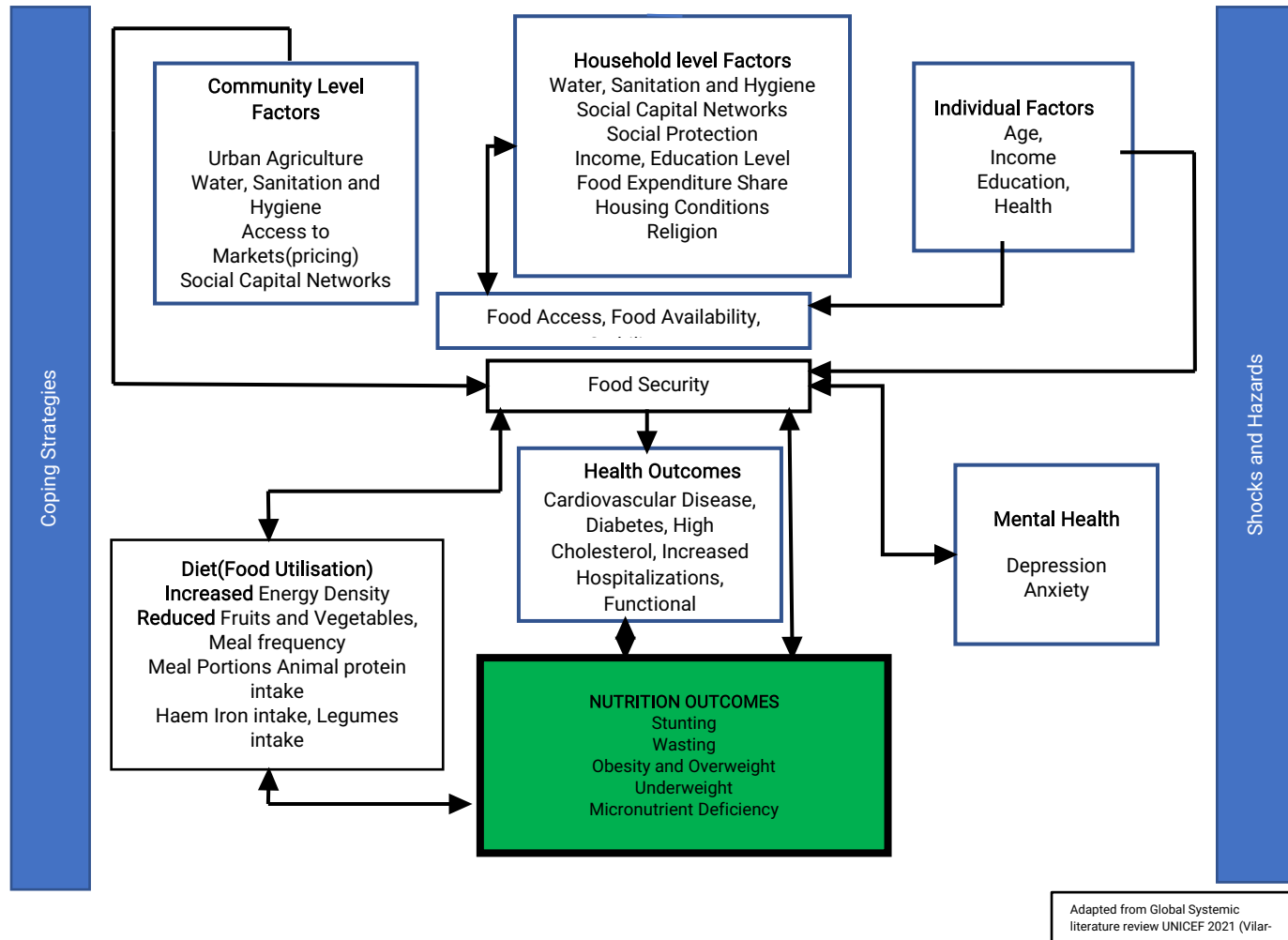
Figure 1: Conceptual Framework for the Urban Poverty and Nutrition Challenges

Rationale for a Comprehensive Nutrition Situation Analysis

The Lancet series highlights that evidence-based interventions for improving maternal and child nutrition continue to be a combination of interventions that are direct (e.g., delayed cord clamping and micronutrient supplementation, breastfeeding promotion, and counselling) and indirect (e.g., malaria prevention, and water, sanitation, and hygiene promotion) (Keats et al., 2021). However, there are still evidence gaps remaining for strategies to address malnutrition among schoolchildren and adolescents. The Lancet series highlights that the drivers of undernutrition are diverse, and novel evidence synthesis methods underscore the need for multisectoral action and coordination (Tirado, 2012,).

In line with the overarching aspiration of Zimbabwe **"to become an empowered and prosperous upper middle-income society by 2030"** as enshrined in Zimbabwe's Vision 2030, nutrition

outcome indicators particularly in urban areas have to fall within the recommended threshold or global sphere standards for the country to gain the upper middle-income status. The urban population in Harare and Bulawayo is rapidly increasing with 20.4% of total national population (15,178,979) residing in the two largest cities of Zimbabwe. The development of new residential areas has also contributed to this population expansion in the two cities. This increase has exerted pressure on the basic services and resources. Recent assessments conducted in urban areas of Zimbabwe have shown that these challenges which also include poor access to nutritious foods and poor consumption patterns might have a negative impact on growth and survival of children and adolescents. There are currently no in-country assessments with information on under five, adolescent and women nutrition in urban areas and associated factors. Considering that poor environmental, consumption and health factors during childhood and adolescence is associated with poor adulthood outcomes, a better understanding of the nutrition status of children 6 to 59 months, 5 to 9 years and 10-19 years and associated factors was required.

Moreover, addressing the needs of children 5 to 9 years and adolescents 10-19 years of age has not been a key area of focus among the stakeholders in the country. Regular growth monitoring or nutritional assessment of this age group is not being done across the health system in the country. In addition, there are no in-country estimates of physical activity and sedentary behaviour amongst adolescents and possible correlation with their nutritional status. In light of these gaps, the report presents findings from an urban livelihoods assessment that aimed to characterise the nutrition status and diet quality of children, adolescents and women residing in Harare and Bulawayo Provinces. Insights on the nutritional situation in Harare and Bulawayo will enhance focus on addressing the nutrition needs of the target age groups and possibly break the cycle of intergenerational malnutrition.

The report hence outlines the nutrition situation in Harare and Bulawayo Province and intends to guide;
- Evidence based strategic planning and programming for targeted children under 5, 5 to 9 year-olds, adolescents and women of child bearing age interventions
- Monitoring and reporting progress towards nutrition commitments within the guiding frameworks of existing national and international food and nutrition policies and strategies

OBJECTIVES

Broad Objective
The main objective of this comprehensive analysis was to determine the nutrition situation of urban households, children 6-59 months, children 5-9 years, adolescents 10-19 years and women of child bearing age (15-49 years) in Harare and Bulawayo provinces.

Specific Objectives include the following:

I. To assess the nutrition status of children of 6-59 months and 5 to 19 years' age groups

II. To determine IYCF practices and associated factors

III. To explore the socio-economic factors contributing to stunting, wasting, underweight and overweight in children aged 6-59 months and 5 to 19 years in Harare and Bulawayo;

IV. To investigate the household food security factors associated with nutrition outcomes among children aged 6-59 months ,5 to 19 years and women of child bearing age (15-49 years);

V. To assess the level of physical activity amongst children 5-9 years and adolescents 10-19 years

Research Hypotheses

The analysis aimed to answer the following question:

Do environmental factors such as household characteristics, socioeconomic profiles (income, employment status, education), household food security, water sanitation and hygiene (WASH), and household consumption patterns have any influence on nutrition outcomes in children 6 to 59 months, children 5 to 9 years and adolescents 10 to 19 years?

CHAPTER 2: METHODOLOGY

2.1 Methodology

The assessment targeted 2880 children aged 6-59 months, reached 3258 and measured 2768 living in Harare and Bulawayo Provinces. Consent to take anthropometric measurements was drawn from the respondent and caregivers. All children and adolescents aged between 5-19 year's anthropometric measurements and dietary patterns were collected from sampled households. In addition, dietary diversity for women 15-49 years was recorded for randomly selected woman from each sampled household. The state of nutrition was evaluated on the basis of 2 anthropometric parameters for both under 5's and adolescents. All children aged 6-59 months were also screened for oedema. Experienced and trained enumerators recruited from the Ministry of Health and Child Care (MOHCC) were responsible for collecting anthropometry data at household level. To ensure data quality during the survey, nutrition cluster control forms as well as feedback on quality of nutrition data through plausibility reports for the domains were shared with anthropometrists at regular intervals during fieldwork. The assessment of eating patterns and diversity was done using a standard data collection tool that included questions on feeding practices (24hr recall for U5s and 7-day, eating habits for adolescents). Adolescent engagement in physical activity over a 7-day period was also assessed. Adolescents were asked to report the number of days they were physically active for a total of at least 60 minutes per day in the 7 days preceding the survey. The environmental and food security data were collected on the basis of a questionnaire that was administered at household level. The current study utilised the nationally representative ZimVAC Urban Livelihoods Assessment (ULA) data, to examine the factors associated with malnutrition among children aged 0−59 months and adolescents in urban areas.

Sample Size and Description

Global Acute Malnutrition prevalence of 2.8% (ZimVAC 2022) was used as the key indicator to determine the sample that was used to collect weight and height measurements at every household with a child 6-59 months at domain level. Furthermore, a sample that assured 95% confidence level for the 6-59 months, 5-9 years and 10 to 19 years categories in all domains was calculated using Global Acute Malnutrition (GAM) and thinness prevalence respectively as key indicators using a design effect of 1.5. A two staged cluster sampling was used and comprised of sampling of 30 clusters, denoted as Enumeration Areas (EAs) per each of the 11 Harare domains and 7 Bulawayo domains, from the Zimbabwe Statistics Agency (ZimSTAT) 2022 master sampling frame using the Probability Proportional to Size (PPS) methodology. The second stage involved the systematic random sampling of 10 households per EA. A total of 300 households were interviewed per domain. At household level, anthropometric measurements were taken which include weight and height for children 6-59 months, 5-9 years and adolescents 10-19 years (excluding those with disabilities). For descriptive analysis, data for individual children and respective adolescents' measurements was used. Furthermore, data for children 6-

59 months and 5-19 years was collapsed and matched to their households as displayed in **Table 1**, this was used to generate analytical evidence used in this report. SPSS and STATA software packages were utilized to analyse the data for the survey. Regression analysis was used to explain the relationships between each household characteristic (such as demographics, water and sanitation, cereal insecurity, access to nutrition education) and child nutrition outcomes (such as stunting, wasting, overweight and underweight).

Table 1: Sample Characterisation

Province	Households with children, adolescents and women of child bearing age				Total number of children and adolescents							
					0-59 months surveyed		6-59 months measured		5-9yrs		10-19yrs	
	6-59 months	5-9yrs	10-19yrs	WCBA (15-49 years)	Male	Female	Male	Female	Male	Female	Male	Female
Bulawayo	843	605	866	2092	599	514	513	425	407	380	487	559
Harare	1763	1120	1391	3320	1055	1090	915	915	657	705	799	813
Total	2606	1725	2257	5412	1654	1604	1428	1340	1064	1085	1286	1372

A total of 5408 households in Harare and Bulawayo were enumerated. The average family size was 4.6 in Bulawayo and 4.5 for Harare.

CHAPTER 3: RESULTS AND DISCUSSION

3.1 Children Under 5 Years

3.1.1 Infant and Young Child Feeding Practices

The World Health Organization recommendations include breastfeeding initiated within the first hour of birth, continued breastfeeding for 24 months or beyond for improved survival and sustained breastfeeding. Figure 2 shows the core and optional indicators as per the WHO approach. The proportion of children who were ever breastfed was generally high with proportions above 90% in both Harare and Bulawayo. Exclusive breastfeeding among children 0 to 6months of age was 64.4% and 76.3% for Bulawayo and Harare Provinces, respectively. However, almost half of the children 12 to 23 months were no longer breastfeeding in both Harare (54%) and Bulawayo (53.2%) (see Annex1 for domain level disparities). This exposes children to ill health and malnutrition especially when they are exposed to poor feeding practices. The lower rate of continued breastfeeding after one year could be an interference of bottle feeding where evidence has shown that feeding an infant from a bottle with an artificial teat may also make it more difficult for the baby to learn to attach well to the breast and has been associated with earlier cessation of breastfeeding. The bottle-feeding rates were 15.7% and 13% for Bulawayo and Harare, respectively, against a WHO 2025 target of below 10%. When bottle feeding is associated with unhygienic conditions and poor preparation of infant formula, it puts the infant at a great risk of illness, resulting in increased risk of mortality. If an infant cannot feed directly from the breast, then the safest alternative is to feed expressed breast milk from a cup. The recommended practice is for children to be breastfed up to 2 years or beyond.
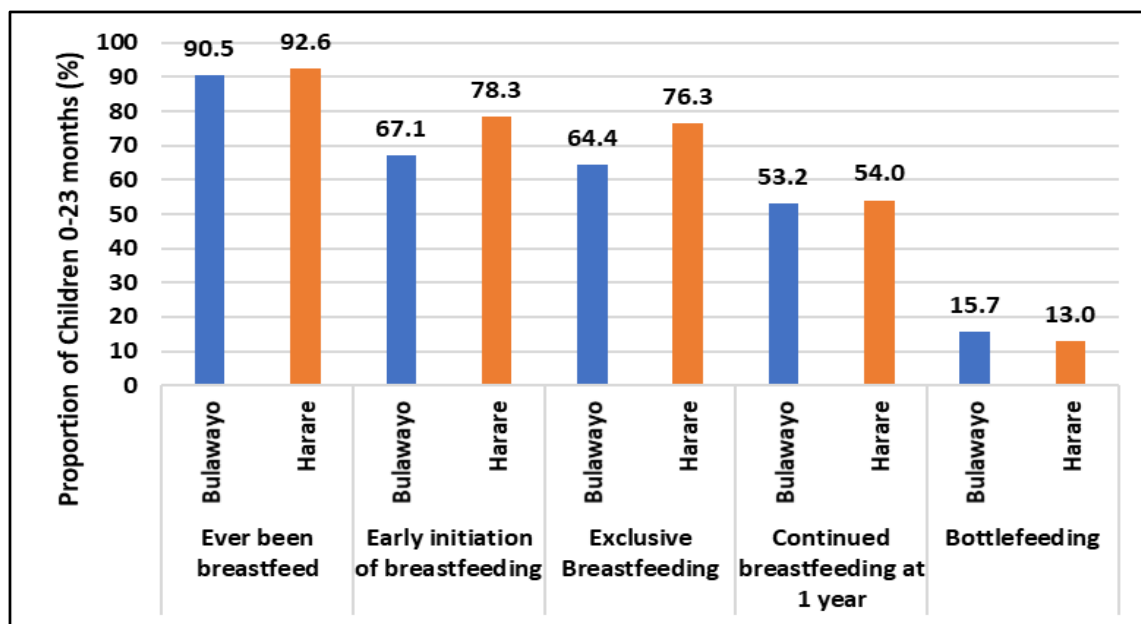
Figure 2: Breastfeeding Practices for Children 0-23 months

The feeding practice is usually disrupted by the working patterns or baby-unfriendly environment for women especially in urban areas.

A Minimum Acceptable Diet is an indicator that combines information on children who received the Minimum Dietary Diversity and the Minimum Meal Frequency (figure 3). About 3% of children aged 6-23 months in Harare were consuming a minimum acceptable diet in terms of quality and quantity. Meal frequency was better as compared to dietary diversity where feeding from at least four of the food groups listed by the WHO (minimum dietary diversity) was 5.8% in Harare and 2.4% in Bulawayo. Quality of diets consumed during the first two years of life is essential to ensure optimal growth and development for children.
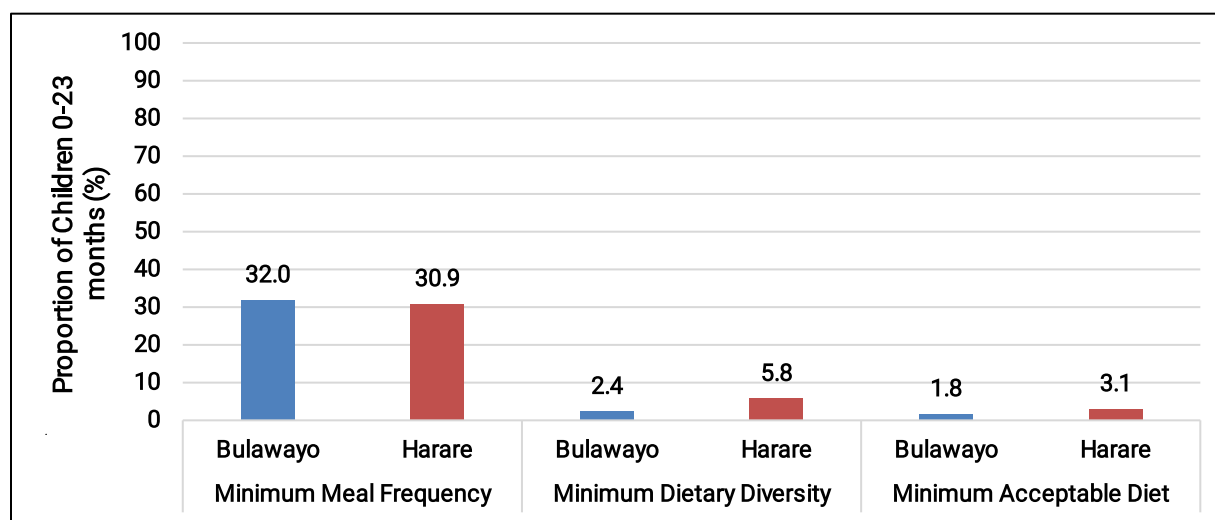
Figure 3: Children 6-23 months diets quality

Consumption of diverse diets is key for development whilst unhealthy eating practices interfere with optimal growth. The proportion of children aged 6-23 months who had never consumed any fruit or vegetable in the seven days preceding the survey was 87% in Bulawayo and 76.6% in Harare (figure 4). Given the nutritional and health benefits from the food groups, it remains a concern that above three quarters of children were not fed from this food group. The trend is similar for the consumption of meat and eggs food groups.
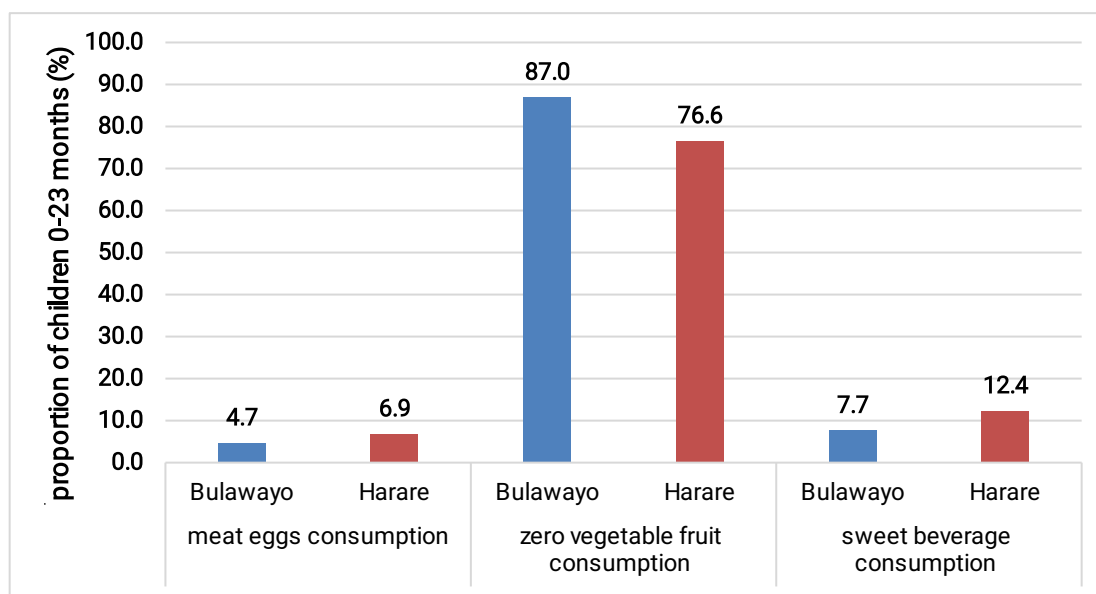
Figure 4: Characterisation of children 6-23months' diets

3.1.2 Nutrition Status of Children 6-59 months

Figure 5 shows stunting at 25.9% in Harare of which Chitungwiza St Mary's (36.8%), Caledonia (34%), Harare South (31.7%) and Epworth (30.1%) had stunting levels above 30% which is classified highest according to WHO categorisation. Bulawayo Province stunting was 22.9% (figure 6). Stunting is a reflection of chronic undernutrition which is characterised by having a low height for age. It is caused by long term cumulative effects of inadequate dietary intake and frequent infection or infections and has a consequence of poor cognitive and motor development.
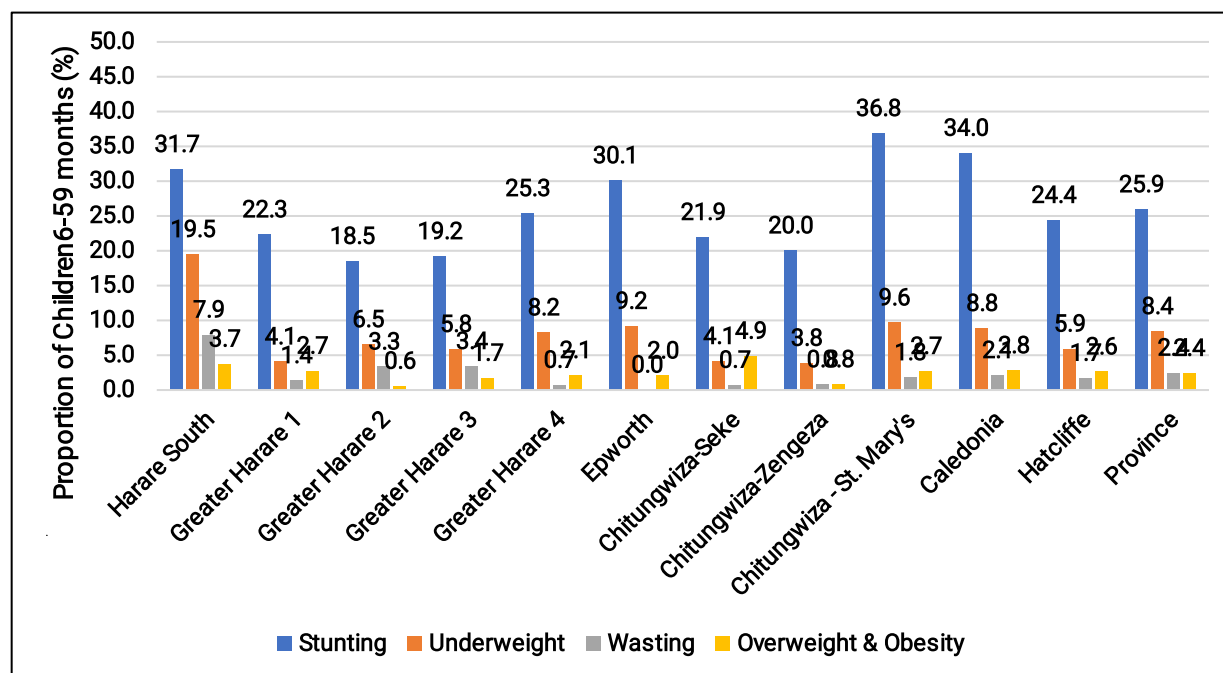
Figure 5: Nutrition Status of children 6-59 months by domains in Harare

The prevalence for Global Acute Malnutrition (GAM) was 2.5% and 2.4% in Bulawayo and Harare, respectively which is below the 5% threshold for nutrition intervention. However, the domain level disparities show levels above 5% in Harare South (7.9%) hence the need for close monitoring of the situation and implementation of programmes that reduce further deterioration of the situation. Overweight and obesity remain fairly low below the WHA 2025 targets of not increasing the prevalence in both Harare and Bulawayo Provinces (Figure 5 and 6).
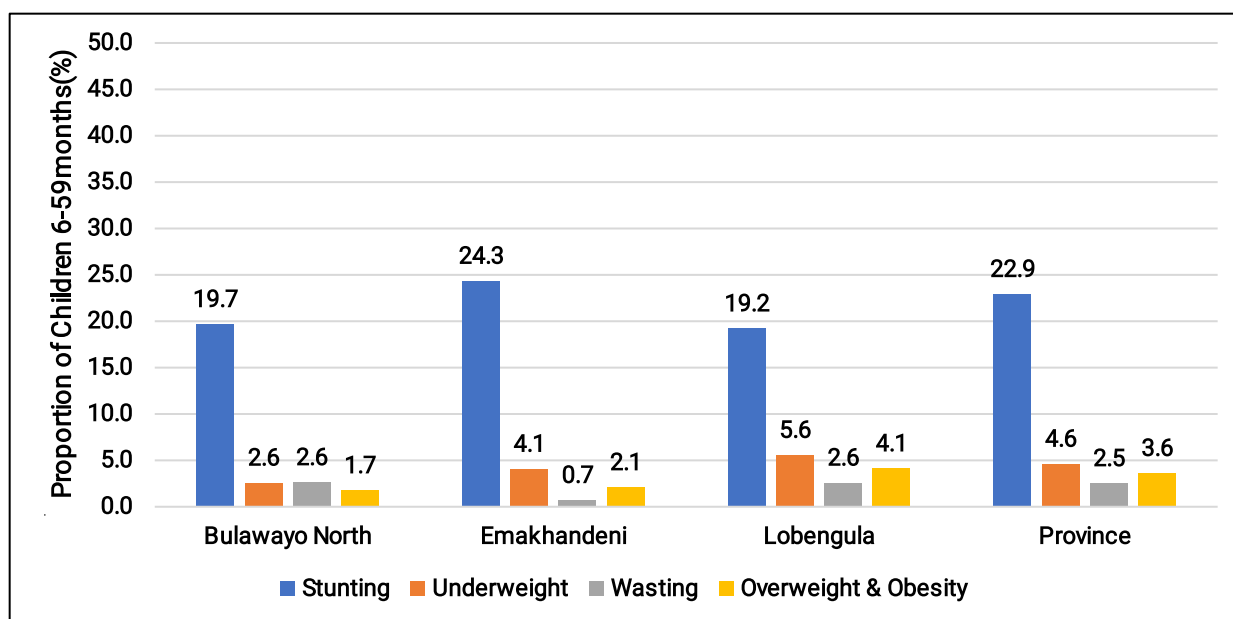
Figure 6: Nutrition Status of children 6-59 months by domains in Bulawayo

3.1.3 Determinants of Malnutrition in Children 6 to 59 Months in Harare and Bulawayo

3.1.3.1 Malnutrition in children 6-59 months by household characteristics

Table 2 shows that household head age, religion and income were the household characteristics that were significantly associated with malnutrition in children 6 to 59 months. The assessment demonstrated that age of household head, religion and income has an influence on child nutrition outcomes as depicted in the conceptual framework (Figure 1). In a study conducted in Ethiopia, increased maternal access to financial resources was reported to have positive association with dietary diversity and Minimum Acceptable Diet. These attributes are shown in the conceptual framework to have an influence on the development of nutrition and health at household level. Several studies in developing countries have shown that access to diverse nutritious foods is linked to economic barriers such as household income, implying that those with low income are likely to consume poor diets that are not diverse to support optimal child growth and survival (CR, 2014).

Table 2: Malnutrition in children 6-59 months by household head characteristics

VARIABLES	Stunting	Underweight	Wasting	Overweight/Obese
Household head age [Years]	0.000397	-0.000556	-0.000489	-0.000809**

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	(0.00117)	(0.000793)	(0.000371)	(0.000370)
Household head does not have any disability	-0.0382	-0.0365	-0.0226	-0.00455
	(0.0449)	(0.0325)	(0.0177)	(0.0182)
Household head is chronically ill	0.0277	0.0303	0.0162	0.0207
	(0.0370)	(0.0245)	(0.0124)	(0.0160)
Household size	0.0101	0.00285	0.00184	0.00261
	(0.00689)	(0.00394)	(0.00219)	(0.00242)
Number of orphaned members	0.0506	0.0223	0.00500	-0.0167*
	(0.0511)	(0.0304)	(0.0188)	(0.00948)
Pentecostal	-0.0264	-0.0284	-0.00565	0.00405
	(0.0454)	(0.0294)	(0.0195)	(0.0151)
Apostolic Sect	0.0655	-0.0131	-0.0110	0.00350
	(0.0473)	(0.0305)	(0.0196)	(0.0154)
Islam	-0.211**	-0.115***	-0.0374*	0.0763
	(0.106)	(0.0304)	(0.0195)	(0.0964)
Traditional	-0.0660	-0.0555	-0.0375**	-0.0249*
	(0.121)	(0.0705)	(0.0184)	(0.0149)
Bulawayo	-0.0449*	-0.0538***	-0.000163	0.0127
	(0.0243)	(0.0135)	(0.00865)	(0.0102)
ln(income)	-0.0264***	0.00179	0.00515	0.00506
	(0.00905)	(0.00588)	(0.00370)	(0.00381)
Observations	2,017	2,017	2,017	2,017

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

As shown in table 3, the assessment demonstrated that households that were cereal insecure were 6.7 times (99%CI) likely to have a child under 5 who was stunted. The findings are plausible with evidence from a study in Kenya that documented that in vulnerable urban

settlements, children under 5 years of age living in food insecure households were at greater risk of stunting. (Mutisiya M., 2015,)

However, households that had a positive Household Dietary Diversity Score (HDDS) (consuming 5 or more food groups) were 1.2 times less likely to have a stunted child (95% CI) or an underweight child. The likelihood of having a stunted or underweight child under five was less in households that had an acceptable Food Consumption Score. This confirms the assertion that availability of diverse food at household level has a positive outcome on nutrition. It is imperative for interventions targeted at improving household diversity to be deliberately designed to improve the nutrition outcomes of children under 5.

Table 3:Correlation of under 5 nutrition status and food security

VARIABLES	Stunting	Underweight	Obese/ Overweight	Thin
Cereal insecurity	0.0668***	0.0161	-0.00377	-0.00209
	(0.0232)	(0.0138)	(0.00793)	(0.00831)
Household Dietary Diversity Score (HDDS)	-0.0125**	-0.00778**	-0.000459	0.00390*
	(0.00576)	(0.00360)	(0.00241)	(0.00212)
Food Consumption Score (FCS)	-0.00169***	-0.000830**	-6.57e-05	0.000190
	(0.000538)	(0.000324)	(0.000206)	(0.000205)
Observations	2,021	2,021	2,021	2,021

Table 4 shows that households in Bulawayo and Harare that practised urban Agriculture were 1.7 times less likely to have a child under five who was overweight or obese. Similar results were reported from a study in Southern Ethiopia which reported that household factors influenced feeding practices. Children living in families that grew fruits and vegetables and owned livestock had higher dietary diversity scores. Etiology of undernutrition and overnutrition at individual level   is greatly affected by dietary diversity factors as depicted in the conceptual framework (Figure 1).

Table 4: Correlates of households practising urban agriculture and nutrition status for children 6-23 months

VARIABLES	Stunting	Underweight	Wasting	Overweight/Obese
Household Practice Urban Agriculture	-0.0170	-0.0226	-0.000471	-0.0170*
	(0.0296)	(0.0157)	(0.0102)	(0.00890)
Observations	2,021	2,021	2,021	2,021

Households that had a hand washing station were less likely to have a child who was stunted (99% CI) and an underweight child (95% CI) (Table 5). Hand hygiene is seen as a critical intervention strategy for pandemic public health threats such as cholera. According to evidence from systematic reviews and clinical interventions, handwashing with soap can reduce the risk of diarrheal infection by 30% to 47% (Namara, 2020) and the risk of acute respiratory infections by 16%.

Table 5: Correlation between Water, Sanitation and Hygiene Practices and Nutrition Status in children 6-23 months.

VARIABLES	Stunting	Underweight	Wasting	Overweight/Obese
Access to improved water	-0.0624	-0.0478	-0.0322	-0.00267
	(0.0585)	(0.0374)	(0.0311)	(0.0207)
Presence of hand washing station	-0.0367*	-0.0289**	0.00374	0.000428
	(0.0219)	(0.0126)	(0.00789)	(0.00836)
Observations	2,021	2,021	2,021	2,021

Table 6 shows that, as cereal insecurity increased, the quality of children's diets worsened. Children from cereal insecure households were about 6 times less likely to meet their minimum meal frequency and minimum dietary diversity at 99% CI. Minimum Acceptable Diet was more likely to improve with the increase in Food Consumption Score and HDDS.

Table 6: Relationship between household food security indicators and diet quality of children 6-23 months

VARIABLES	MMF	MDD	MAD
Cereal insecurity	-0.0577***	-0.0606***	-0.0216***
	(0.0179)	(0.0101)	(0.00611)

FCS	0.00236***	0.00230***	0.000903***
	(0.000449)	(0.000300)	(0.000204)
HDDS	0.0152***	0.0266***	0.00875***
	(0.00453)	(0.00317)	(0.00195)
Observations	2,485	2,485	2,485

Table 7 shows that households with household heads who were formally employed were 5.2% (95%CI) less likely to have a 6-59 months old stunted child. This correlates with a study in Abala Town in Ethiopia where children from unemployed mothers had significantly higher stunting and underweight than those whose mothers were employed in the study town. A study done in Mali in 2004 showed that households whose level of income was higher were associated with children having the lowest prevalence of stunting and wasting. This observation could be attributed to the steady, consistent cash flow that can positively improve food access and access to basic needs at household level.

Table 7: Correlation of Nutrition Status of children aged 6-59 months and Household Head Employment status

VARIABLES	Stunting	Underweight	Wasted	Obese & Overweight
Formally employed	-0.0523**	-0.00306	-0.00344	-0.00609
	(0.0255)	(0.0153)	(0.00893)	(0.00934)
Observations	2,015	2,015	2,015	2,015

Table 8 shows that stunted children were 2.21% less likely to receive a minimum acceptable diet compared to their counterparts, this was significant at 10%. This resonates with a Demographic and Health Survey (DHS) 2009 determinants study that concluded that having a Minimum Acceptable Diet was associated with better length-for-age scores in young children from Bangladesh and Zambia. This further attests to the assertion that optimal feeding practices during the critical window of opportunity has a bearing on the nutrition outcomes.

Table 8: Correlation of children Quality of Diets and Nutrition Status of children 6-59 months

VARIABLES	Minimum Meal Frequency	Minimum Dietary Diversity	Minimum Acceptable Diet
Stunting	-0.0421	-0.0279	-0.0221*
	(0.0271)	(0.0209)	(0.0117)

Underweight	0.0351	0.0531	0.0332
	(0.0509)	(0.0425)	(0.0294)
Wasting	0.0973	0.161**	0.0847
	(0.0787)	(0.0772)	(0.0553)
Overweight &Obesity	-0.0239	-0.0487	-0.0210
	(0.0792)	(0.0484)	(0.0290)
Observations	888	888	888

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 9 shows that children aged 6-59 months who had been ill with diarrhoea during the previous 2 weeks preceding the survey were 8 times and 7 times more likely to be stunted and underweight, respectively, at 99% confidence level compared to their counterparts. Children 6-59 months who were reported to have been affected by cough during the preceding two weeks before the survey were 5 times more likely to be underweight at 99% confidence level. Children who had been ill with fever were 3 times more likely to be underweight at 90% confidence level compared to their counterparts. However, having been ill with diarrhoea and cough was less likely to be overweight and obese. This resonates with a study in Pakistan that found out a statistically significant negative association of the incidence of diarrhea and other illnesses, particularly the former, with the three anthropometric measures. It appears that morbidity adversely affects the growth of children (Saman , Satti, Farooq, & Arif, 2012) . This is so because the episodes of illness reduce the ability of a body to convert food into energy. Diarrhoeal diseases affect growth retardation in the first few years of life, with the magnitude of effect possibly modified by other factors, such as the adequacy and source of dietary intake, treatment and feeding practices during and following illness and the opportunity for catch-up growth after illness (Robert, 1991). This emphasises the importance of health care services, the environmental health and caring practices in improving child nutrition.

Table 9:Correlation of Nutrition Status of children aged 6-59 months and illnesses (diarrhoea, fever, cough)

VARIABLES	Stunting	Underweight	Wasting	Overweight/Obese
Diarrhoea	0.0815***	0.0742***	-0.00453	-0.0146*
	(0.0284)	(0.0189)	(0.00950)	(0.00832)
Cough	0.0196	0.0593***	0.00347	-0.0231***
	(0.0217)	(0.0141)	(0.00794)	(0.00685)
Fever	0.0264	0.0317*	-0.00413	-0.0119

	(0.0261)	(0.0168)	(0.00889)	(0.00848)
Observations	2,897	2,897	2,897	2,897

<div align="center">Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1</div>

3.2 Children 5 to 19 years

There is lack of nutrition policies, strategies and programmes targeting children 5-19 years mostly as a result of little information about the prevalence and consequences of malnutrition available for the age group. For children ages five to nine years, malnutrition caused by inadequate food intake and helminth infections increases the risk of underweight, anaemia, and illness; these conditions decrease attendance, performance, and years in primary school. Thus, further damage to nutritional status and cognitive function needs to be prevented.

3.2.1 Nutrition Status of Children 5 to 9 Years

The Magwegwe-Pumula domain had the highest proportion of children who were stunted 10.8% and the Nketa-Emganwini domain had the highest proportion of children who were overweight and obese (22.7%).
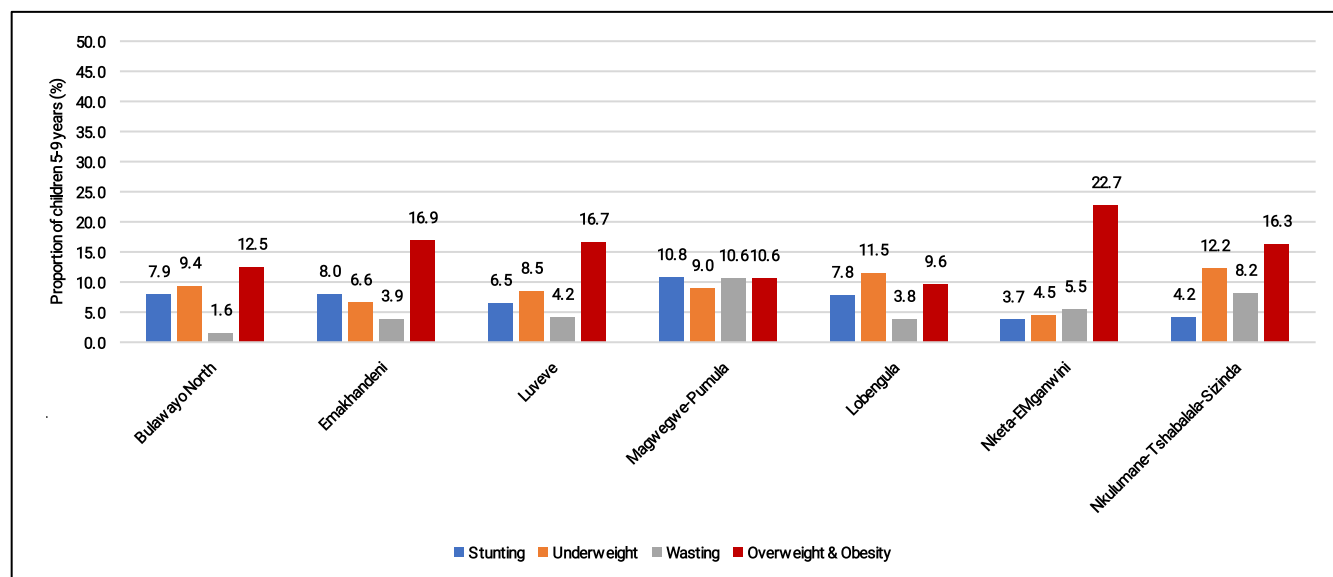
Figure 8: Nutritional Status of Children 5-9 years in Bulawayo Metropolitan Province.

Prevalence of stunting ranged from 5% to 18% across all domains in Harare. There were high levels of overweight and obesity across all domains with the highest proportion being in Greater Harare 3 (16%).
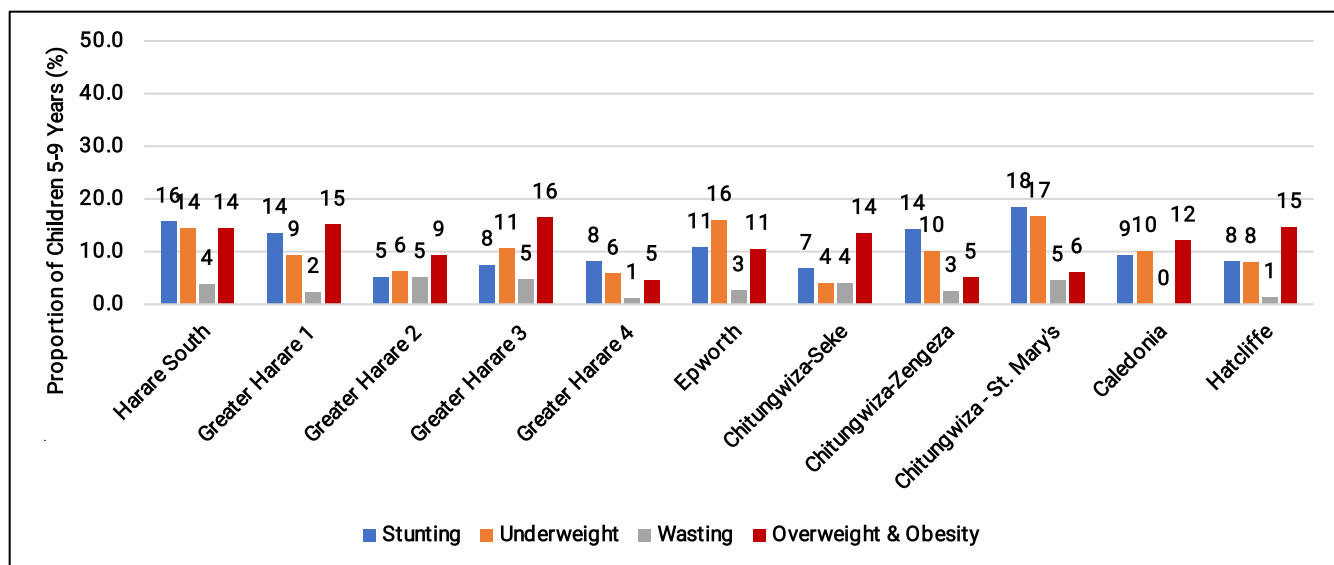
Figure 9: Nutritional Status of children 5-9 years in Harare Metropolitan Province.

3.2.2 Nutrition Status of Adolescents 10-19 Years

The presence of both adolescent stunting, overweight and obesity was reported in all the domains in Bulawayo province with the Nketa-Emganwini and the Nkulumane-Tshabalala-Sizinda domains having the highest prevalence of overweight/obesity (21%). The Nketa-Emganwini domain also had the highest prevalence of stunting (31%).
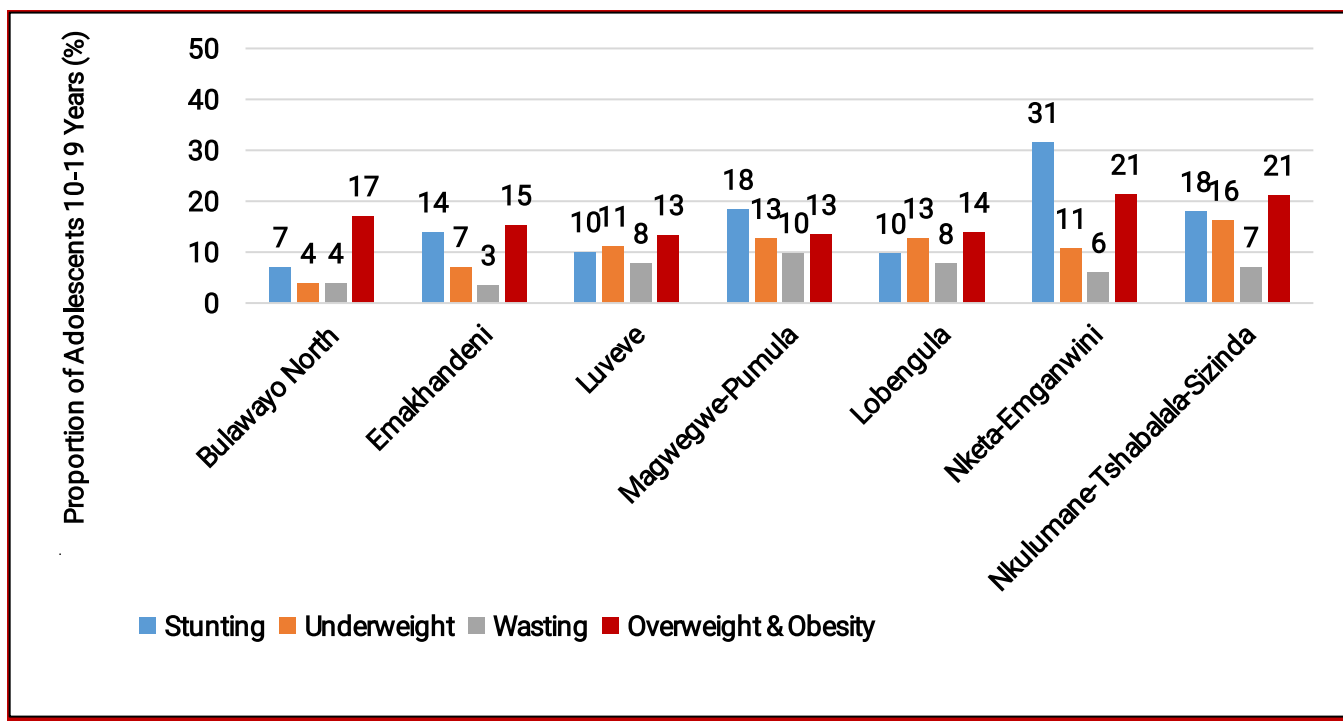
Figure 10: Nutrition Status of Adolescents 10-19 Years in Bulawayo.

Greater Harare 1(24%). had the highest prevalence of overweight and obesity in adolescents 10

to 19 years All the domains in Harare had wasting levels within the low category according to World Health Organisation thresholds for public health significance.
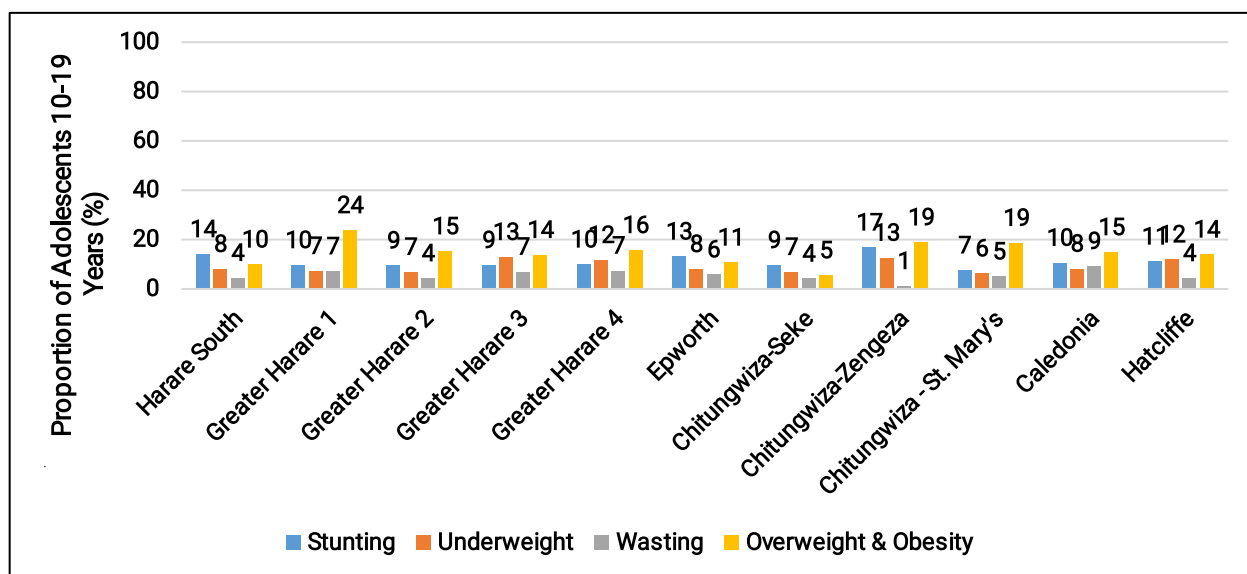
Figure 11: Nutrition Status of Adolescents 10-19 Years in Harare

3.2.3 Physical Activity amongst children and adolescents 5-19 Years

In children and adolescents, physical activity confers benefits for the following health outcomes: improved physical fitness (cardiorespiratory and muscular fitness), cardiometabolic health (blood pressure, dyslipidemia, glucose, and insulin resistance), bone health, cognitive outcomes (academic performance, executive function), mental health (reduced symptoms of depression); and reduced adiposity (WHO guidelines on physical activity and sedentary behaviour).

Figure 11 shows that about 34% of children and adolescents were not engaging in any physical activity for at least sixty minutes a day in the seven days prior to the survey.
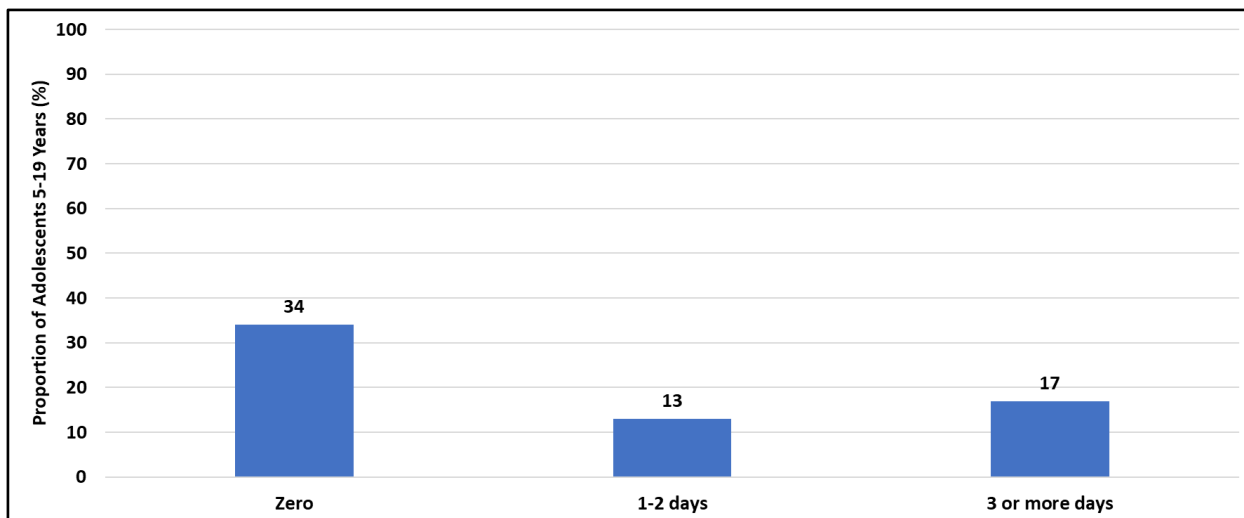
Figure 12: Physical Activity amongst children and adolescents 5-19 Years

3.2.4 Dietary Patterns of Children and Adolescents 5-19 Years

Figure 12 shows the dietary patterns of children 5 to 9 years and adolescents 10 to 19 years. The data shows that the diets of the two age groups were monotonous with mostly grains and vegetables being consumed. There was little or no consumption of other food groups such as dairy, eggs and meat. Children and adolescents were also consuming unhealthy foods such as sweet foods and fast foods.
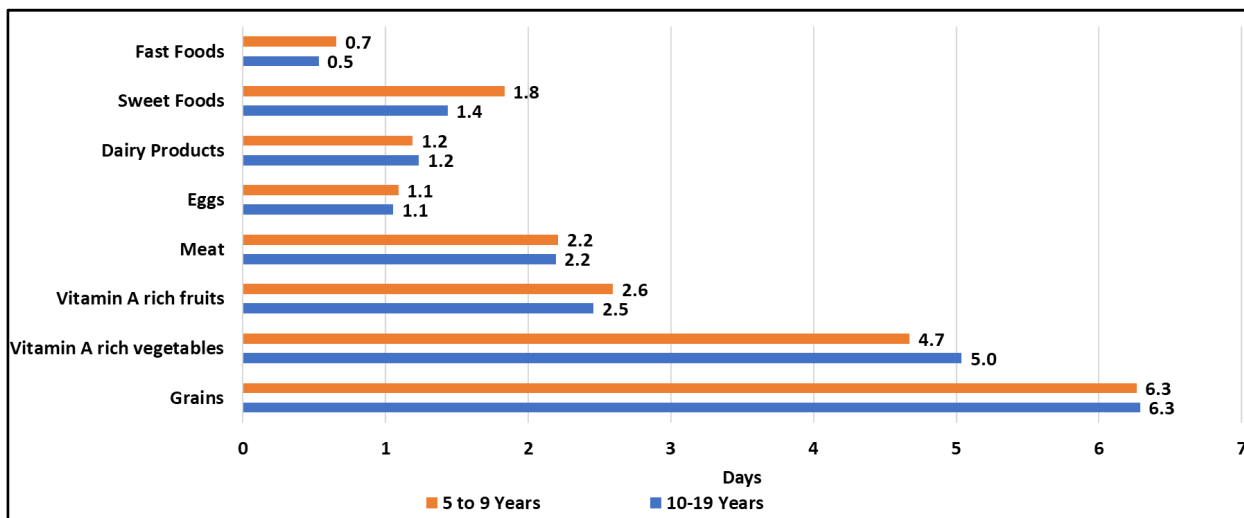
Figure 13: Dietary Patterns of children 5 to 19 years

Adolescents in Zimbabwe would benefit from increased consumption of vegetables, legumes, fish, eggs, meats (especially organ meats), and milk, and reducing consumption of energy-rich, nutrient-poor foods, such as refined flours, sugar, vegetable oils, and ultra-processed

foods—which also contain harmful substances. However, there are financial, sociocultural, and infrastructural challenges to modifying adolescent diets, and identification of bottlenecks is needed.

3.2.4 Determinants of Malnutrition in Children Aged 5 to 9 Years and Adolescents 10 to 19 Years in Harare and Bulawayo

3.2.4.1 Malnutrition In Children Aged 5-9 Years by Household Characteristics

A child 5 to 9 years who was living with a household head married and living apart had a 4% reduced likelihood (90% CI) of being obese or underweight (Table 10). There was a 9.5% (at 95% CI) likelihood of a child 5-9 years living with a divorced/separated householdhead to be stunted. There was a 8.2 times chances of a child who lived in a widow/widower headed household to be stunted. Having a widow/widower as household head also increased the likelihood of children (5-9years) to be underweight (by 6.2 times) and wasted/thin (5.1 times). A child living in a large household (95% CI) had a 1% likelihood of being stunted.

Religion was also found to be a factor that influenced nutrition outcomes for children aged 5 to 9 years at household level. Being Pentecostal reduced the likelihood of a child 5-9 years (90% CI) being stunted by 5.8%. A child also living in a Pentecostal household had a 5.4% reduced likelihood of thinness. Belonging to the Zion denomination was also associated with a 6.9% reduced likelihood of a child being underweight or thin. Consistent with what was found in the ULA 2021, children living in households belonging to Islam religion had a 12% (99% CI) reduced chance of being underweight, obese/overweight and thin.

There is evidence in literature that indicates that beliefs and attitudes about health and the environment affect food purchases and consumption. It is presumed that if these beliefs are adhered to, there could be a positive influence in the dietary preferences and caring practices hence result in optimal health and nutrition outcomes (Sibal, n.d.,2018).

Table 10: Determinants of Malnutrition in Children 5 to 9 Years in Harare and Bulawayo

VARIABLES	Stunting	Underweight	Obese/ Overweight	Thinness
Household head is female	-0.0267	0.0284	-0.0172	0.00505
	(0.0251)	(0.0252)	(0.0183)	(0.0202)
Married living apart	0.0165	-0.0207	-0.0413*	0.000685
	(0.0360)	(0.0320)	(0.0246)	(0.0291)
Divorced/separated	0.0954**	0.0151	0.0180	-0.0117

	(0.0439)	(0.0366)	(0.0288)	(0.0243)
Widow/widower	0.0820**	0.0624*	0.0178	0.0509*
	(0.0378)	(0.0367)	(0.0303)	(0.0307)
Household head does not have any disability	0.0288	0.0339	0.0394*	0.0291
	(0.0273)	(0.0245)	(0.0231)	(0.0188)
Household head is chronically ill	-0.0192	-0.0379**	0.0333	-0.00629
	(0.0220)	(0.0180)	(0.0217)	(0.0161)
Household size	0.0110**	0.00782*	-0.00529	-0.00228
	(0.00491)	(0.00441)	(0.00439)	(0.00344)
Pentecostal	-0.0582*	-0.0470	0.0240	-0.0543*
	(0.0347)	(0.0335)	(0.0283)	(0.0285)
Apostolic Sect	-0.0373	-0.0190	-0.0345	-0.0471
	(0.0365)	(0.0356)	(0.0262)	(0.0299)
Zion	-0.0293	-0.0692*	-0.0314	-0.0694*
	(0.0545)	(0.0415)	(0.0383)	(0.0360)
Other Christian	-0.0341	-0.0533	-0.0344	-0.0425
	(0.0557)	(0.0501)	(0.0419)	(0.0475)Zio
Islam	0.0195	-0.124***	-0.0781***	-0.0781***
	(0.136)	(0.0365)	(0.0282)	(0.0287)
Traditional	-0.144***	-0.132***	0.0237	-0.102***
	(0.0357)	(0.0355)	(0.105)	(0.0292)
Bulawayo	-0.0222	-0.0128	0.0208	0.0355***
	(0.0169)	(0.0150)	(0.0171)	(0.0133)
Income	-0.00118	-0.000836	0.00530	-0.00748
	(0.00731)	(0.00676)	(0.00487)	(0.00579)
Observations	1,508	1,508	1,508	1,508

As shown in table 11, the assessment also demonstrated at (90% CI) that households that had access to improved water were 9 times less likely to have a child 5-9 years who was underweight. Nutrient Utilisation at individual level is linked to illnesses and health status. Poor water quality is one of the major causes of diarrheal diseases and hence compromises nutrient utilisation. These results relate well with evidence that for children age 5-9 years, malnutrition caused by helminth infections increases the risk of underweight, anemia, and illness; these conditions decrease attendance, performance, and years in primary school. Household access to improved water was 2.5 times associated with development of obesity/overweight amongst 5-9 years.

Table 11: Prevalence of malnutrition by WASH in children 5-9 Years in Harare and Bulawayo

VARIABLES	Stunting	Underweight	Obese/ Overweight	Thin
Access to improved water	-0.0626	-0.0906*	0.0471*	-0.0564
	(0.0532)	(0.0549)	(0.0247)	(0.0398)
Practising Open Defecation	-0.0927***	0.118	-0.0794***	0.153
	(0.00798)	(0.179)	(0.00715)	(0.179)
Presence of hand washing station	-0.00581	-0.0295**	-0.00852	-0.00787
	(0.0162)	(0.0144)	(0.0143)	(0.0111)
Observations	1,516	1,516	1,516	1,516

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 12 shows that households that were practising Urban Agriculture were 6 times less likely to have a child who was stunted at 99% CI and 3 times less likely to have a child who was underweight at 95% CI. The findings are coherent with the regional study that concluded that household factors such as practising urban agriculture influence feeding practices. Children living in families that grew fruits and vegetables and owned livestock had higher dietary diversity scores in Ethiopia.

Table 12: Prevalence of malnutrition in children 5-9 Years by households practising Urban Agriculture

VARIABLES	Stunting	Underweight	Overweight/Obese	Thinness
Household Practice Urban Agriculture	-0.0616***	-0.0327**	-0.0244	0.0151
	(0.0150)	(0.0164)	(0.0166)	(0.0149)

| Observations | 1,516 | 1,516 | 1,516 | 1,516 |

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Household Dietary Diversity Score (consumption of >= 5 Food groups) was associated with a 1% decreased likelihood of a child 5-9 years being underweight (Table 13). A child living in a household with the recommended HDDS is 8% less likely to be obese/overweight. Households that had an acceptable Food Consumption Score had a 0.1% reduced likelihood of having a child being underweight at 99% CI and about 0.06% reduced likelihood of having a wasted child at 95% CI.

Table 13: Prevalence of Malnutrition in Children 5-9 years by Food Security Status

VARIABLES	Stunting	Underweight	Obese/ Overweight	Thin
Cereal insecurity	0.0154	0.0180	-0.0179	-0.0152
	(0.0166)	(0.0152)	(0.0143)	(0.0111)
Household Dietary Diversity Score (HDDS)	-0.00588	-0.0104***	-0.00851**	-0.00399
	(0.00424)	(0.00397)	(0.00371)	(0.00322)
Food Consumption Score (FCS)	-0.000492	-0.00119***	-0.000386	-0.000628**
	(0.000369)	(0.000351)	(0.000345)	(0.000266)
Observations	1,516	1,516	1,516	1,516

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

3.2.5 Determinants of Malnutrition in Adolescents 10 To 19 Years in Harare and Bulawayo

The findings in Table 14 shows that household heads that were widowers/widows were 9.4 times likely to have an adolescent 10-19 years who was stunted (95% CI). Increased monthly household income was significantly associated (90%CI) with about 9.3% decreased chance of being underweight amongst this age group. However, the likelihood of children 10-19 years (95% CI) developing obesity/overweight increased with an increase in Household income. This is in tandem with the conceptual framework determinants of nutrition status in urban areas (Figure 1) that explains that development of malnutrition is indirectly affected by household income. Household income directly affects food access, a factor that affects diet quality and

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eating patterns and ultimately nutrition outcome.

The results also show that at 99% CI, children who were not thin or wasted were 5.7 times likely to belong to a household that had a head who was married and living apart. Households that had a household head that was divorced /separated was 4 times significantly not associated with presence of thinness (wasting) amongst adolescents aged 10-19 years. Belonging to the Islam religion was significantly associated with reduced development of stunting and underweight, at 95% CI.

Adolescents living in Bulawayo were 5% more likely to be stunted as compared to Harare at 99% CI. At 95% CI, adolescents in Bulawayo were 5% more likely to be Obese/Overweight compared to those in Harare. This could be attributable to factors related to food access like markets, environment and incomes.

Table 14: Prevalence of malnutrition in adolescents 10-19 years by household characteristics

VARIABLES	Stunting	Underweight	Obese/ Overweight	Thin
Married living apart	0.0202	0.0228	0.0241	-0.0574***
	(0.0408)	(0.0350)	(0.0453)	(0.0137)
Divorced/separated	-0.0224	-0.000158	-0.0371	-0.0407**
	(0.0330)	(0.0282)	(0.0357)	(0.0192)
Widow/widower	0.0936**	0.0249	-0.00387	-0.00415
	(0.0378)	(0.0277)	(0.0377)	(0.0203)
Cohabiting	0.135	0.00991	-0.00211	-0.0626***
	(0.118)	(0.0792)	(0.108)	(0.0108)
Household head does not have any disability	0.0417	-0.0513**	0.0161	-0.0257
	(0.0267)	(0.0254)	(0.0292)	(0.0177)
Household head is chronically ill	0.0198	-0.0299*	0.0168	-0.0113
	(0.0243)	(0.0171)	(0.0262)	(0.0131)
Household size	0.00668	0.00812*	-0.00543	0.00117
	(0.00672)	(0.00457)	(0.00561)	(0.00276)
Apostolic Sect	-0.0269	-0.00533	-0.0125	0.0112
	(0.0352)	(0.0263)	(0.0357)	(0.0199)

Islam	-0.120***	-0.0985***	0.0971**	0.0702
	(0.0366)	(0.0282)	(0.159)	(0.119)
Traditional	0.257	0.217**	0.294	0.0612
	(0.158)	(0.110)	(0.189)	(0.0748)
Bulawayo	0.0516***	0.00973	0.0507**	0.0157
	(0.0188)	(0.0147)	(0.0200)	(0.0111)
income)	-0.00528	-0.00929*	0.0192**	-0.00108
	(0.00610)	(0.00486)	(0.00744)	(0.00332)
Observations	2,019	2,019	2,019	2,019

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Adolescents (10-19 years) living with a formally employed household head were 0.4% at 99% CI less likely to be underweight as shown in Table 15. Adolescents from formally employed household heads had reduced likelihood of being thin. Several studies have shown evidence that environmental conditions such as low socioeconomic status and poor nutrition may be the major cause of suboptimal growth of teenagers in less-developed countries (Rogol, 1990).

Table 15: Prevalence of Malnutrition in Adolescents 10-19 Years by Household Head Employment Status

VARIABLES	Stunting	Underweight	Thinness	Obese & Overweight
Formally Employed	-0.0358*	-0.0416***	-0.0212**	-0.00781
	(0.0207)	(0.0146)	(0.0104)	(0.0223)
Observations	2,017	2,017	2,017	2,017

Households that had a handwashing facility were 2.44 less likely to have an adolescent 10-19 years who was underweight at 90% CI (Table 16). However, most WASH indicators did not show any strong associations with the nutrition outcomes for this particular age group.

Table 16: Prevalence of malnutrition in adolescents 10-19 years by WASH in Harare and Bulawayo

VARIABLES	Stunting	Underweight	Obese/ Overweight	Thin
Access to improved water	0.0343	0.0184	0.0618	0.00615
	(0.0369)	(0.0315)	(0.0441)	(0.0247)

VARIABLES	Stunting	Underweight	Obese/ Overweight	Thin
Presence of hand washing station	0.00250	-0.0244*	0.0595***	-0.00814
	(0.0173)	(0.0131)	(0.0191)	(0.00993)
Observations	2,029	2,029	2,029	2,029

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

As shown in Table 16, there was no association between practising urban agriculture and nutrition outcomes in the 10-19 years age group. This could probably be attributed to the diverse physiological preferences on diets for the older children unlike the younger age group of 5-9 years.

Table 17: Prevalence of malnutrition in adolescents 10-19 years by households practising urban agriculture

VARIABLES	Stunting	Underweight	Overweight/Obese	Thinness
Household Practice Urban Agriculture	0.00634	0.00761	0.0148	0.00753
	(0.0207)	(0.0168)	(0.0231)	(0.0136)
Observations	2,029	2,029	2,029	2,029

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Table 18 shows that a household that was cereal insecure was 7.67 times (99 % CI) less likely to have an adolescent who was overweight or obese. Households that were consuming five or more food groups were less likely to have adolescents that were underweight or thin. In addition, households with an acceptable Food Consumption Score were significantly less likely to have an adolescent who was underweight. However, an acceptable household FCS was significantly associated (at 99% CI) with obesity/overweight amongst the 10-19 years age group.

Literature reviews on associations between urban vulnerability and nutrition outcomes found evidence which indicates that urban environments foster a greater consumption of processed foods with high content of calories, fats, salt and sugars and very low nutritional value. Urban vulnerability also brings with it major challenges for adequate food access and nutrition outcomes. Consequently, exposing them to nutritional risks with long-term consequences. These access challenges predispose them to increased risk of consuming unhealthy and energy dense foods associated with a higher prevalence of overweight and obesity (de Souza BL, 2013).

Table 18: Prevalence of malnutrition in adolescents 10-19 years by food security status

VARIABLES	Stunting	Underweight	Obese/ Overweight	Thin
Cereal insecurity	0.00905	0.0187	-0.0767***	-0.00681
	(0.0178)	(0.0142)	(0.0179)	(0.0101)
Household Dietary Diversity Score (HDDS)	-0.00598	-0.00759**	0.00577	-0.00441*
	(0.00516)	(0.00324)	(0.00478)	(0.00243)
Food Consumption Score (FCS)	0.000164	-0.000661**	0.00126***	-0.000319
	(0.000436)	(0.000316)	(0.000468)	(0.000232)
Observations	2,029	2,029	2,029	2,029

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

3.4 Descriptive for Household Consumption Patterns

3.4.1 Food Consumption Score by Domain

The food consumption score (FCS) is a composite score based on households' dietary diversity, food frequency, and relative nutritional importance of different food groups. The FCS is calculated by inspecting how often households consume food items from the different food groups during a 7-day reference period as shown below;

Food Consumption Score Groups	Score	Description
POOR	0-21	An expected consumption of staple 7 days, vegetables 5-6 days, sugar 3-4 days, oil/fat 1 day a week, while animal proteins are totally absent
BORDERLINE	21.5-35	An expected consumption of staple 7 days, vegetables 6-7 days, sugar 3-4 days, oil/fat 3 days, meat/fish/egg/pulses 1-2 days a week, while dairy products are totally absent
ACCEPTABLE	>35	As defined for the borderline group with more number of days a week eating meat, fish, egg, oil, and complemented by other foods such as pulses, fruits, milk

The results showed that most households were consuming acceptable diets in both Harare and Bulawayo (Figure 13). Greater Harare 1 had the highest proportion of households consuming acceptable diets (97%). A small proportion of households in Bulawayo and Harare Province were consuming poor diets. Chitungwiza St Mary's (6%), Harare South (6%), Bulawayo North (5%) and Caledonia (4%) had the highest proportion of households consuming poor diets.
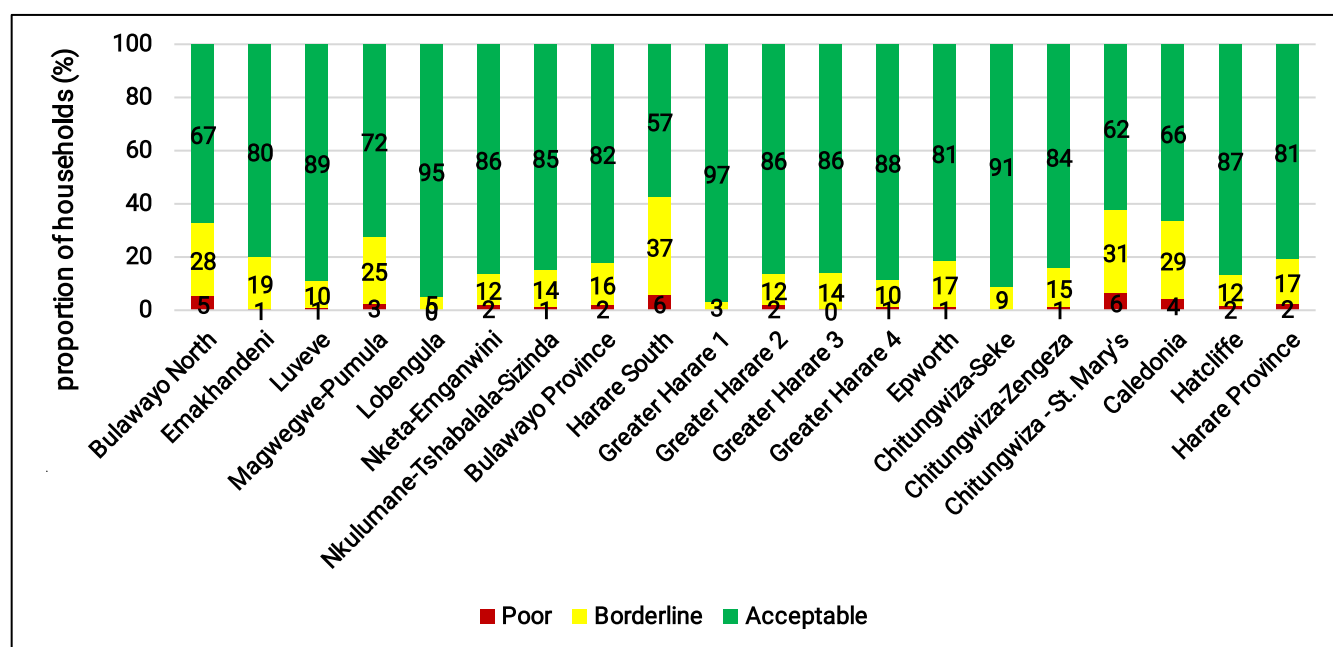
Figure 14: Household Food Consumption Score

3.4.2 Household Dietary Diversity Score (HDDS)
Dietary diversity represents the number of different foods or food groups consumed over a 24-hour recall period without frequency information or weighted categorical cut-offs. It is a proxy measure for household food access. At most 85% of households in Harare and Bulawayo were consuming 5 or more food groups as shown in Figure 14. All domains in Harare and Bulawayo had over 60% of their households consuming at least 5 food groups (see Annex 6).
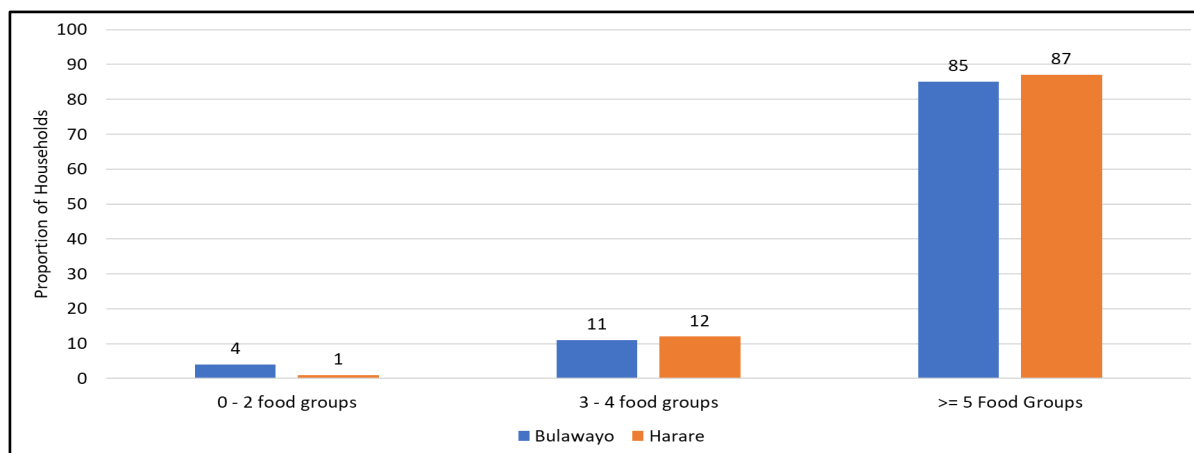
Figure 15: Household Dietary Diversity by Province

3.4.3 Minimum Dietary Diversity for Women by domain

Women have distinct nutritional requirements throughout their life especially before and during pregnancy and while breastfeeding, when nutritional vulnerability is greatest.

Before pregnancy, women need nutritious and safe diets to establish sufficient reserves for pregnancy. During pregnancy and breastfeeding, energy and nutrient needs increase. Meeting them is critical for women's health and that of their child – in the womb and throughout early childhood (UNICEF 2020).

The minimum dietary diversity for women aged 15 to 49 years was generally low across all domains with the highest in Greater Harare 4 (Figure 15). The least proportion of Women of Child Bearing Age consuming a 5 or more food groups were from Bulawayo North (1%), Hatcliffe (4%), Chitungwiza St Mary's (7%) and Emakhandeni (8%). This is an indication that only a small proportion of women were accessing quality diet to sustain positive nutrition and health outcomes for their physiological needs. Ensuring women have nutritious diets and adequate services and care is fundamental for the survival and well-being of mothers and their children. However individual diet quality varies across seasons and some foods can be available in large quantities and at low cost for short periods affecting intake.
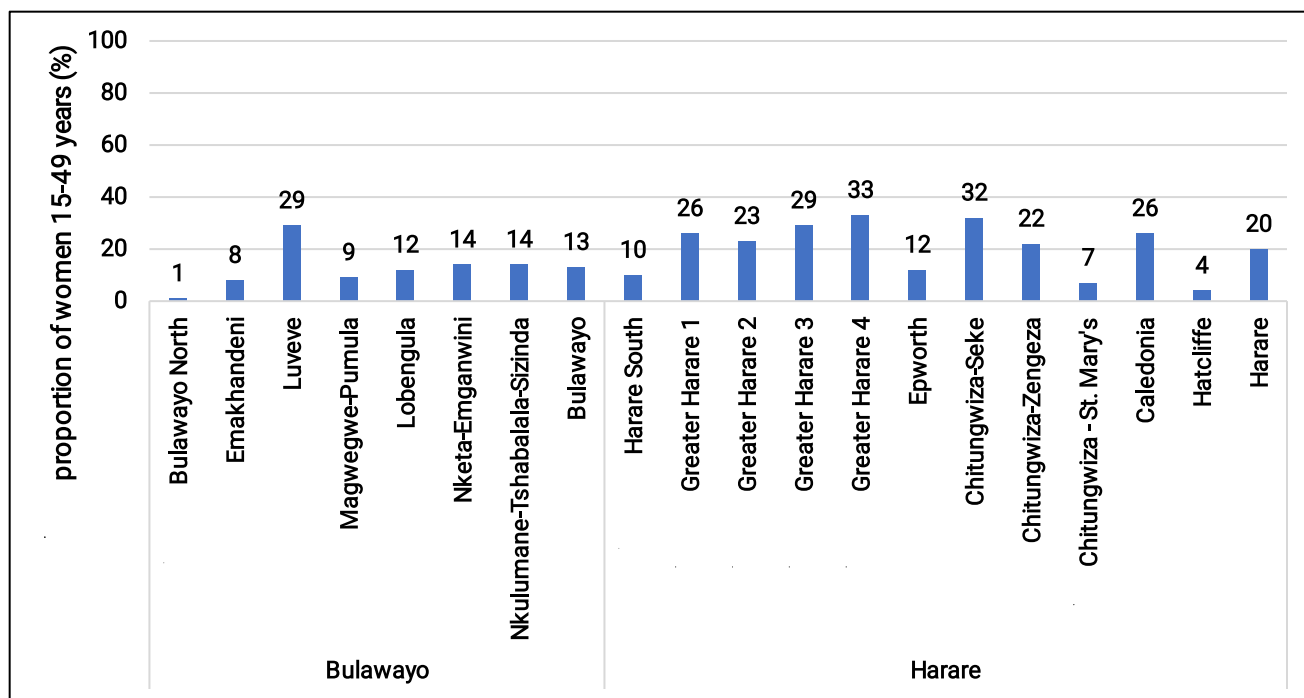
Figure 16: Minimum Dietary Diversity of Women 15-49 Years

Limitations

The main indicator used to calculate the minimum sample for under 5 nutrition outcomes was GAM (2.8%) hence the sample deduced cannot be used to confidently represent other IYCF indicators at domain level in Harare and Bulawayo.

The study involved a single cross-sectional design. Hence, causal inference might not be strong. Recall and reporting bias might also affect for dietary diversity & food frequency questions. Therefore, further studies combining both the quantitative and qualitative approach might be necessary for better understanding of the nutrition situation of the three target groups in the country.

CHAPTER 4. CONCLUSIONS AND RECOMMENDATIONS

Generally, household socioeconomic factors (income, religion, marital status), food security status, illness episodes, access to improved sources of water, urban agriculture and dietary patterns had significant association with presence of stunting, underweight, wasting and obesity amongst children 0-19 years in Harare and Bulawayo provinces. However, the associated factor and nutrition outcome differed with age group. Specifically,

1. The assessment demonstrated that age of household head, religion and recent illness episodes had an influence on nutrition outcomes. A further study is warranted to understand the Knowledge, Attitudes and Practices (KAP) in religion that are driving the positive nutrition outcomes particularly for the Islamic and African Tradition Religion.

2. Households that had a hand washing station were less likely to have a child who was stunted (99% CI) and underweight (95% CI) whilst access to improved water services was associated with decreased likelihood of negative nutrition outcomes. To sustain positive nutrition outcomes, local authorities are recommended to strengthen provision of improved water services in urban areas. Moreso, the department of environmental health should scale up participatory health and hygiene education (PHHE) in urban communities.

3. The results show that households that were practising Urban Agriculture were 6 times less likely to have a child who was stunted at 99% CI and 3 times less likely to have a child who was underweight at 95% CI for the 6-59 months age group. It is therefore recommended that food systems within urban areas should take a value chain approach, in ensuring access to nutritious, diverse, safe, affordable and sustainable diets. However, this should be augmented by creating healthy food environments, for instance by the private sector, limiting access and promotion of high sugar and high salt, and other highly processed low-nutrient dense foods.

4. The significant factors driving poor nutrition outcomes were deeply rooted within the household environment. Increase in household income, dietary and consumption patterns were significantly associated with positive nutrition outcomes across all age groups. However, increase in household income was associated in overweight and obesity. Resilience building interventions targeting households are therefore recommended to be nutrition sensitive whilst addressing issues of income, diet and cereal insecurity. Nutrition-sensitive Social Protection interventions such as cash transfers (conditional or unconditional), can help increase household income, improve access to preventive health care and support the procurement and consumption of diverse and nutrient-rich diets.

5. The analysis outlined a significant association that exists between households' characteristics, dietary patterns and nutrition outcomes particularly for the 5-19 years. In light of the absence of policies, strategies and in country programmes supporting nutrition and health of this very important age group, it is recommended that Ministries responsible for health, primary and secondary education and youth should commit to formulate consolidated multisectoral **policies and strategies targeting adolescents in urban settings.**

6. Stunting was prevalent across all age groups: ranging from 18% to 37% for 6-59 months and 5% to 18% for the 5-19 years age group for all domains. Stunting increases the risk of subsequent obesity and non-communicable diseases later in life. It is therefore recommended that high impact multi sector interventions targeting the "window of opportunity" be strengthened in urban areas of Harare and Bulawayo. To ensure a continuum provision of interventions, a systems approach is recommended grounded on common delivery platforms including capacitation of urban Food and Nutrition Security Committees at domain level.

7. Physical Activity was found to be low across the 5-19 years age group. With more than a third of the sampled 5-19 years age group reporting to not have engaged in physical activity. In light of this finding the Ministry responsible for Primary and Secondary Education is urged to revitalize cost effective school-based interventions such as regular nutrition screening and ensuring acceptable consumption and nutrition behaviour development whilst monitoring adherence to set physical activity guidelines as per WHO guidelines within schools. As complementary efforts, local urban authorities should resuscitate already existing recreation centres whilst creating a conducive environment to sustain physical activity within the community.

8. Given the limitations to causality and domain level reporting for some indicators such as exclusive breastfeeding and minimum acceptable diet, it is recommended to undertake a comprehensive National Nutrition Survey to establish these core indicators at domain/district level. This should be coupled with ongoing implementation of research to identify and address context-specific operational, utilisation and compliance barriers to optimal uptake and coverage of high-quality nutrition programmes and interventions.

References

i. ECSA, (2022),*Adolescent nutrition: a review of the situation in selected South-East Asian Countries.* (n.d.). Retrieved February 24, 2023, from World Health Organization (WHO): https://apps.who.int/iris/handle/10665/204764

ii. *WHO,(2020), BACKGROUND - WHO Guidelines on Physical Activity and Sedentary Behaviour.* (2020). Retrieved February 24, 2023, from NCBI: https://www.ncbi.nlm.nih.gov/books/NBK566039/

iii. Belachew, T., Lindstrom, D., Jira, C., Hattori, M. K., & Lachat , C. (2012). Predictors of chronic food insecurity among adolescents in Southwest Ethiopia: a longitudinal study. *BMC Public Health*, 12(1):604.

iv. Bhutta, Z. (2018). *Nutrition in Middle Childhood and Adolescence - Child and Adolescent Health and Development.* Retrieved February 24, 2023, from NCBI: https://www.ncbi.nlm.nih.gov/books/NBK525242/

v. Bonwit, K. (2019, February 26). *Who Is An Orphan? – ONETrack International.* Retrieved February 23, 2023, from ONETrack International: https://onetrackinternational.org/who-is-an-orphan/

vi. Borghi, E., Domínguez, G. G., & Humphreys, A. (2022). *2022. The State of Food Security and Nutrition in the World 2022. Repurposing food and agricultural policies to make healthy diets.* Retrieved February 23, 2023, from Food and Agriculture Organization of the United Nations: https://www.fao.org/3/cc0639en/cc0639en.pdf

vii. Commission, A. U. (2015, June 2015). *AFRICA REGIONAL NUTRITION STRATEGY.* Retrieved February 15, 2023, from African Union: https://au.int/sites/default/files/pages/32895-file-arns_english.pdf

viii. Commission, A. U. (2019, May). *African Union.* Retrieved February 23, 2023, from African Union: https://au.int/sites/default/files/documents/41660-doc-COHA_CONTINENTAL_REPORTEnglish20211.pdf

ix. Compte, M. V., Mendez, S. B., Marrufo, A., Eguiluz, I. F., Flores, D., Rossi, P. G., & Teruel, G. (2021, January 20). *Urban poverty and nutrition challenges associated with accessibility to a healthy diet: a global systematic literature review.* Retrieved February 23, 2023, from NCBI: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7816472/

x. *Contrasting causal pathways contribute to poorer health and nutrition outcomes in orphans in Zimbabwe.* (n.d.). Retrieved February 23, 2023, from NCBI: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3668532/

xi. CR, H. (2014). The effect of Mexican household food security status and income distribution on food access. *Food Stud Interdiscip J, 3:3*(2014), 1549-54.

xii. de Souza BL, C. d. (2013). Factors associated with food insecurity in households of public school students of Salvador City. *J Health Popul Nutr.*, 471-9.

xiii. Editorial. (2023, February). Water insecurity: an urgent threat to child health. *The Lancet Child & Adolescent Health, 7*(2), 77. Retrieved from VOLUME 7, ISSUE 2, P77, FEBRUARY 2023

xiv. Evans, D. B. (2013, August 16). *The financial burden from non-communicable diseases in low- and middle-income countries: a literature review - Health Research Policy and*

Systems. Retrieved February 23, 2023, from Health Research Policy and Systems: https://health-policy-systems.biomedcentral.com/articles/10.1186/1478-4505-11-31

xv.   Evans, D. B. (2013, August 16). *The financial burden from non-communicable diseases in low- and middle-income countries: a literature review - Health Research Policy and Systems.* Retrieved February 23, 2023, from Health Research Policy and Systems: https://health-policy-systems.biomedcentral.com/articles/10.1186/1478-4505-11-31

xvi.   Evans, D. B. (2013, August 16). *The financial burden from non-communicable diseases in low- and middle-income countries: a literature review - Health Research Policy and Systems.* Retrieved February 23, 2023, from Health Research Policy and Systems: https://health-policy-systems.biomedcentral.com/articles/10.1186/1478-4505-11-31

xvii.   FAO, & FHI 360. (2016). *Minimum Dietary Diversity for Women: A Guide to Measurement.* Rome: FAO/USAID.

xviii. Keats, E. C., Das, J. K., Salam, R. A., Lassi, Z. S., Imdad, A., & Black, R. E. (2021). *The Lancet Series on Maternal and Child Undernutrition Progress.* Retrieved February 15, 2023, from 1000 Days: https://thousanddays.org/wp-content/uploads/Lancet_Backgrounder_3.3.pdf

xix.   M. m. (2015). Household food (in) security and nutritional status of urban poor children aged 6 to 23 months in Kenya. *BMC Public Health, 15*(2015).

xx.   Ministry of Health and Child Care. (2015). *National Micronutrient Survey Results.* Ministry of Health and Child Care.

xxi.   Mireya Vilar-Compte. (n.d.).

xxii.   Namara, F. (2020). Access to Functional Handwashing Facilities and Associated Factors among. *Journal of environmental and public health*.

xxiii. Oladejo, A. T., Elizabeth, A. T., & Isaac, A. O. (2019). *Role of Religion on Knowledge, Attitude and Practices of Lactating Mothers on Infant Feeding.* Retrieved February 24, 2023, from Open Access Pub: https://openaccesspub.org/ijn/article/1091

xxiv.   Owen, H., Gregson, S., Saito, S., & Lopman, B. A. (2017, June).

xxv.   Owen, H., Nyamukapa, C., Beasley, M., Wambe, M., Jukes, M., Mason, P., & Gregson, S. (2009, november). *Contrasting causal pathways contribute to poorer health and nutrition outcomes in orphans in Zimbabwe.* Retrieved February 23, 2023, from NCBI: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3668532/

xxvi.   Pridmore, D., & Hill, P. C. (2009). *Addressing the Underlying and Basic Causes of Child Undernutrition in Developing Countries: What Works and Why?* University of London. Retrieved from https://www.oecd.org/derec/denmark/43962804.pdf

xxvii. Rakotomanana, H., Gates, G. E., Hildebrand, D., & Stoecker, B. J. (2017). Situation and determinants of the infant and young child feeding (IYCF) indicators in Madagascar: analysis of the 2009 Demographic and Health Survey. *BMC Public Health, 17*(812), 2-9. Retrieved from https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-017-4835-1

xxviii. Report, G. (2022, June 2022). *Country Nutrition Profiles - Global Nutrition Report.* Retrieved February 15, 2023, from Global Nutrition Report | Country Nutrition Profiles - Global Nutrition Report: https://globalnutritionreport.org/resources/nutrition-profiles/africa/southern-africa/

xxix. Rogol, A. D. (1990). Growth and pubertal development in children and adolescents: effects of diet and physical activity. *Clinical Nutrition, 72*(1990), S521-8.

xxx. *Role of Religion on Knowledge, Attitude and Practices of Lactating Mothers on Infant Feeding.* (n.d.). Retrieved February 23, 2023, from Open Access Pub: https://openaccesspub.org/ijn/article/1091

xxxi. Sibal, V. (n.d.). Food: Identity of Culture and Religion. *Research Gate*.

xxxii. Stevens, G. A., Beal, T., Mbuya, M. N., Luo, H., & Neufeld, L. M. (2021, February 23). *Prevalence and factors associated with triple burden of malnutrition among mother-child pairs in India: a study based on National Family Health Survey 2015−16.* Retrieved February 23, 2023, from NCBI: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7901069/

xxxiii. *The Cost of Not Breastfeeding.* (n.d.). Retrieved February 15, 2023, from Alive & Thrive: https://www.aliveandthrive.org/en/the-cost-of-not-breastfeeding

xxxiv. *The cost of not breastfeeding: global results from a new tool.* (2019, June 24). Retrieved February 24, 2023, from NCBI: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6735804/

xxxv. Thornburg, K. L. (2021, December 27). *The importance of nutrition in pregnancy and lactation: lifelong consequences.* Retrieved February 24, 2023, from NCBI: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9182711/

xxxvi. Tirado, M. (2012). Climate change and nutrition in Africa With a focus on Sub-Saharan Africa. *Climate Change and Nutrition in Africa, 1*(1), 8.

xxxvii. UNICEF. (2021, November). *UNICEF Conceptual Framework.pdf.* Retrieved February 15, 2023, from UNICEF: https://www.unicef.org/media/113291/file/UNICEF%20Conceptual%20Framework.pdf

xxxviii. Vilar-Compte, M. (n.d.). Urban poverty and nutrition challenges associated with accessibility to a healthy diet: a global systematic literature review. *International Journal for Equity Health*.

xxxix. Walters, D. D., Phan, L. T., & Mathisen, R. (2019).

xl. WHO. (2020, October 19). *Noncommunicable diseases: Childhood overweight and obesity.* Retrieved February 15, 2023, from World Health Organization (WHO): https://www.who.int/news-room/questions-and-answers/item/noncommunicable-diseases-childhood-overweight-and-obesity

xli. *WHO Guidelines on physical activity and sedentary behaviour for children and adolescents, adults and older adults.* (2020, March 26). Retrieved February 24, 2023, from World Health Organization (WHO): https://www.who.int/docs/default-source/physical-activity/call-for-consultation/draft-guideline-on-physical-activity-and-sedentray-behaviour.pdf?sfvrsn=ddf523d5_4

xlii. ZimVAC. (2018). *FNC National Nutrition Survey 2018_web.cdr.* Retrieved February 23, 2023, from UNICEF: https://www.unicef.org/zimbabwe/media/1056/file/Zimbabwe%202018%20National%20Nutrition%20Survey%20Report.pdf

Annex 1: Summary of Nutrition Status, Morbidity and IYCF Indicators in children 6-59 months

	Nutrition Status				Morbidity			IYCF indicators*							
	Stunting	Under weight	Wasting	Over weight & Obesity	Diarhoea	Cough	Fever	Ever breastfed	Exclusive breastfeeding	MMF	MDD	MAD	Egg and or flesh food consumption	Zero vegetable and fruit consumption	Sweet beverage consumption
National	23	2.9	6.9	3.1	17.3	31	19.6	89.9	78.4	30.1	3.1	1.3	5.1	86.2	9.7
Bulawayo Province	22.9	4.6	2.5	3.6	9	20.2	10.2	90.5	64.4	32	2.4	1.8	4.7	87	7.7
Bulawayo North	19.7	2.6	2.6	1.7	18.6	17.1	20								
Emakhandeni	24.3	4.1	0.7	2.1	22.9	18.4	12.5								
Luveve	32.9	6.6	1.4	1.4	1.4	11.4	16.3								
Magwegwe-Pumula	23.6	4.5	3.4	6.8	15.7	17.1	3.8								
Lobengula	19.2	5.6	2.6	4.1	34.3	18.4	17.5								
Nketa-Emganwini	24.6	4.9	5.0	6.7	4.3	7	8.8								
Nkulumane-Tshabalala-Sizinda	22.8	4.3	3.3	4.3	2.9	10.8	21.3								
Harare Province	25.9	8.4	2.4	2.4	20.2	35.4	21.1	92.6	76.3	30.9	5.8	3.1	6.9	76.6	12.4
Harare South	31.7	19.5	7.9	3.7	20.1	15.9	12.5								
Greater Harare 1	22.3	4.1	1.4	2.7	9.4	9	7.6								
Greater Harare 2	18.5	6.5	3.3	0.6	7.9	14	13.1								
Greater Harare 3	19.2	5.8	3.4	1.7	3.3	7.8	10.2								
Greater Harare 4	25.3	8.2	0.7	2.1	8.5	9.9	6.1								

Epworth	30.1	9.2	0.0	2.0	15.5	12.1	11.7
Chitungwiza-Seke	21.9	4.1	0.7	4.9	2.7	2.4	2.6
Chitungwiza-Zengeza	20.0	3.8	0.8	0.8	8.5	7.5	12.2
Chitungwiza - St. Mary's	36.8	9.6	1.8	2.7	12.2	8.3	13.4
Caledonia	34.0	8.8	2.1	2.8	9.7	6.6	5.5
Hatcliffe	24.4	5.9	1.7	2.6	2.1	6.4	5

VARIABLES	Stunting	Underweight	Wasting	Overweight/Obese
Household head is female	0.0256	0.0236	0.00377	-0.00991
	(0.0354)	(0.0206)	(0.00989)	(0.0119)
Household head age [Years]	0.000397	-0.000556	-0.000489	-0.000809**
	(0.00117)	(0.000793)	(0.000371)	(0.000370)
Married living apart	0.0802	-0.0183	-0.0132	-0.0198
	(0.0626)	(0.0321)	(0.0148)	(0.0130)
Divorced/separated	-0.0662	-0.00803	0.00207	0.0221
	(0.0477)	(0.0297)	(0.0168)	(0.0202)
Widow/widower	-0.0565	-0.0193	-0.0178	0.0105
	(0.0508)	(0.0310)	(0.0147)	(0.0183)
Cohabiting	0.108	0.0853	0.00865	0.00951
	(0.0986)	(0.0695)	(0.0378)	(0.0396)
Never married	0.0905	0.0179	0.00323	0.0147
	(0.0646)	(0.0379)	(0.0209)	(0.0265)
Household head does not have any disability	-0.0382	-0.0365	-0.0226	-0.00455
	(0.0449)	(0.0325)	(0.0177)	(0.0182)
Household head is chronically ill	0.0277	0.0303	0.0162	0.0207
	(0.0370)	(0.0245)	(0.0124)	(0.0160)
Household size	0.0101	0.00285	0.00184	0.00261
	(0.00689)	(0.00394)	(0.00219)	(0.00242)
Number of orphaned members	0.0506	0.0223	0.00500	-0.0167*
	(0.0511)	(0.0304)	(0.0188)	(0.00948)
Protestant	-0.0172	-0.0204	-0.00604	0.0220
	(0.0492)	(0.0312)	(0.0203)	(0.0179)
Pentecostal	-0.0264	-0.0284	-0.00565	0.00405
	(0.0454)	(0.0294)	(0.0195)	(0.0151)

Apostolic Sect	0.0655	-0.0131	-0.0110	0.00350
	(0.0473)	(0.0305)	(0.0196)	(0.0154)
Zion	0.0385	0.0511	0.00740	0.0197
	(0.0643)	(0.0452)	(0.0278)	(0.0279)
Other Christian	-0.107	-0.0184	0.0431	-0.0297**
	(0.0688)	(0.0482)	(0.0427)	(0.0150)
Islam	-0.211**	-0.115***	-0.0374*	0.0763
	(0.106)	(0.0304)	(0.0195)	(0.0964)
Traditional	-0.0660	-0.0555	-0.0375**	-0.0249*
	(0.121)	(0.0705)	(0.0184)	(0.0149)
Other religion	-0.149	0.00902	-0.0312*	0.0216
	(0.0904)	(0.0712)	(0.0181)	(0.0490)
No religion	0.0344	-0.0419	-0.00510	-0.0146
	(0.0619)	(0.0352)	(0.0238)	(0.0175)
Bulawayo	-0.0449*	-0.0538***	-0.000163	0.0127
	(0.0243)	(0.0135)	(0.00865)	(0.0102)
ln(income)	-0.0264***	0.00179	0.00515	0.00506
	(0.00905)	(0.00588)	(0.00370)	(0.00381)
Constant	0.580***	0.128	0.00143	-0.0160
	(0.135)	(0.0847)	(0.0474)	(0.0463)
Observations	2,017	2,017	2,017	2,017

Annex 3:Correlation between Household Head Employment status and Nutrition Status in children 5-9 years.

VARIABLES	Stunting	Underweight	Thinness	Obese & Overweight
hhemploy_d2	-0.000849	-0.0155	-0.00211	-0.00351
	(0.0193)	(0.0165)	(0.0132)	(0.0173)
Observations	1,515	1,515	1,515	1,515
R-squared	0.000	0.001	0.000	0.000

Annex 4:Determinants of Malnutrition in Children 5 To 19 Years in Harare and Bulawayo

VARIABLES	Stunting	Underweight	Obese/ Overweight	Thinness
Household head is female	-0.0267	0.0284	-0.0172	0.00505
	(0.0251)	(0.0252)	(0.0183)	(0.0202)
Household head age [Years]	-0.000742	-0.000707	-0.000326	-0.000555
	(0.000733)	(0.000675)	(0.000722)	(0.000550)
Married living apart	0.0165	-0.0207	-0.0413*	0.000685
	(0.0360)	(0.0320)	(0.0246)	(0.0291)
Divorced/separated	0.0954**	0.0151	0.0180	-0.0117
	(0.0439)	(0.0366)	(0.0288)	(0.0243)
Widow/widower	0.0820**	0.0624*	0.0178	0.0509*
	(0.0378)	(0.0367)	(0.0303)	(0.0307)
Cohabiting	-0.0293	-0.0255	0.0313	0.0516
	(0.0576)	(0.0562)	(0.0733)	(0.0769)
Never married	0.0476	-0.0223	-0.0106	-0.00155
	(0.0423)	(0.0352)	(0.0365)	(0.0337)
Household head does not have any disability	0.0288	0.0339	0.0394*	0.0291
	(0.0273)	(0.0245)	(0.0231)	(0.0188)
Household head is chronically ill	-0.0192	-0.0379**	0.0333	-0.00629
	(0.0220)	(0.0180)	(0.0217)	(0.0161)
Household size	0.0110**	0.00782*	-0.00529	-0.00228
	(0.00491)	(0.00441)	(0.00439)	(0.00344)
Number of orphaned members	0.00299	-0.00695	-0.0127	0.0306
	(0.0351)	(0.0238)	(0.0176)	(0.0288)
Protestant	-0.0462	-0.0490	-0.0104	-0.0481
	(0.0366)	(0.0353)	(0.0300)	(0.0304)
Pentecostal	-0.0582*	-0.0470	0.0240	-0.0543*

	(0.0347)	(0.0335)	(0.0283)	(0.0285)
Apostolic Sect	-0.0373	-0.0190	-0.0345	-0.0471
	(0.0365)	(0.0356)	(0.0262)	(0.0299)
Zion	-0.0293	-0.0692*	-0.0314	-0.0694*
	(0.0545)	(0.0415)	(0.0383)	(0.0360)
Other Christian	-0.0341	-0.0533	-0.0344	-0.0425
	(0.0557)	(0.0501)	(0.0419)	(0.0475)Zio
Islam	0.0195	-0.124***	-0.0781***	-0.0781***
	(0.136)	(0.0365)	(0.0282)	(0.0287)
Traditional	-0.144***	-0.132***	0.0237	-0.102***
	(0.0357)	(0.0355)	(0.105)	(0.0292)
Other religion	-0.0202	-0.0758*	0.0115	-0.0679
	(0.0661)	(0.0460)	(0.0638)	(0.0437)
No religion	0.0412	-0.0115	0.0269	-0.0389
	(0.0587)	(0.0492)	(0.0424)	(0.0352)
Bulawayo	-0.0222	-0.0128	0.0208	0.0355***
	(0.0169)	(0.0150)	(0.0171)	(0.0133)
Income	-0.00118	-0.000836	0.00530	-0.00748
	(0.00731)	(0.00676)	(0.00487)	(0.00579)
Constant	0.0866	0.0795	0.0182	0.174*
	(0.112)	(0.103)	(0.0768)	(0.0887)
Observations	1,508	1,508	1,508	1,508
R-squared	0.023	0.021	0.018	0.023

VARIABLES	Stunting	Underweight	Obese/ Overweight	Thin
Household head is female	0.0107	0.0224	0.0208	0.0214
	(0.0271)	(0.0207)	(0.0272)	(0.0150)
Household head age [Years]	-0.000236	0.000663	0.000423	-0.000228
	(0.000814)	(0.000581)	(0.000948)	(0.000443)
Married living apart	0.0202	0.0228	0.0241	-0.0574***
	(0.0408)	(0.0350)	(0.0453)	(0.0137)
Divorced/separated	-0.0224	-0.000158	-0.0371	-0.0407**
	(0.0330)	(0.0282)	(0.0357)	(0.0192)
Widow/widower	0.0936**	0.0249	-0.00387	-0.00415
	(0.0378)	(0.0277)	(0.0377)	(0.0203)
Cohabiting	0.135	0.00991	-0.00211	-0.0626***
	(0.118)	(0.0792)	(0.108)	(0.0108)
Never married	0.0577	0.0164	-0.0120	-0.0272
	(0.0463)	(0.0318)	(0.0426)	(0.0255)
Household head does not have any disability	0.0417	-0.0513**	0.0161	-0.0257
	(0.0267)	(0.0254)	(0.0292)	(0.0177)
Household head is chronically ill	0.0198	-0.0299*	0.0168	-0.0113
	(0.0243)	(0.0171)	(0.0262)	(0.0131)
Household size	0.00668	0.00812*	-0.00543	0.00117
	(0.00672)	(0.00457)	(0.00561)	(0.00276)
Number of orphaned members	0.0466	-0.0242	0.0453	-0.0180
	(0.0407)	(0.0191)	(0.0403)	(0.0128)
Protestant	-0.0292	-0.0172	0.00233	-0.000586
	(0.0367)	(0.0264)	(0.0371)	(0.0198)

Pentecostal	-0.00832	0.00530	-0.0148	-0.00659
	(0.0354)	(0.0259)	(0.0349)	(0.0190)
Apostolic Sect	-0.0269	-0.00533	-0.0125	0.0112
	(0.0352)	(0.0263)	(0.0357)	(0.0199)
Zion	0.0592	0.0660	0.00975	0.0115
	(0.0590)	(0.0470)	(0.0577)	(0.0325)
Other Christian	-0.0174	-0.0523	0.0516	-0.00742
	(0.0567)	(0.0349)	(0.0751)	(0.0319)
Islam	-0.120***	-0.0985***	0.0971**	0.0702
	(0.0366)	(0.0282)	(0.159)	(0.119)
Traditional	0.257	0.217**	0.294	0.0612
	(0.158)	(0.110)	(0.189)	(0.0748)
Other religion	0.0344	-0.0172	-0.0228	0.0261
	(0.0737)	(0.0467)	(0.0745)	(0.0440)
No religion	-0.00702	0.00702	0.0501	0.0107
	(0.0456)	(0.0339)	(0.0498)	(0.0262)
Bulawayo	0.0516***	0.00973	0.0507**	0.0157
	(0.0188)	(0.0147)	(0.0200)	(0.0111)
ln(income)	-0.00528	-0.00929*	0.0192**	-0.00108
	(0.00610)	(0.00486)	(0.00744)	(0.00332)
Constant	0.0963	0.161**	-0.0936	0.0847
	(0.100)	(0.0802)	(0.117)	(0.0538)
Observations	2,019	2,019	2,019	2,019

Annex 6: Household Dietary Diversity Score by Domain

Domain	HDDS Categories		
	0 - 2 food groups	3 - 4 food groups	>5 food groups
Bulawayo North	5.1	24.6	70.4
Emakhandeni	2.0	16.3	81.7
Luveve	1.0	7.1	91.9
Magwegwe-Pumula	1.3	10.3	88.4
Lobengula	1.7	4.4	93.9
Nketa-Mganwini	15.7	8.9	75.4
Nkulumane-Tshabalala-Sizinda	0.7	9.6	89.7
Bulawayo	**3.8**	**11.6**	**84.6**
Harare South	6.0	26.5	67.4
Greater Harare 1		2.3	97.7
Greater Harare 2	0.7	8.3	91.0
Greater Harare 3	0.3	9.6	90.1
Greater Harare 4	1.3	9.6	89.1
Epworth		7.0	93.0
Chitungwiza-Seke		7.3	92.7

Chitungwiza-Zengeza	1.0	9.7	89.3
Chitungwiza - St. Mary's	3.2	24.0	72.7
Caledonia	2.0	18.7	79.3
Hatcliffe	1.3	6.9	91.8
Harare	**1.5**	**11.8**	**86.7**

Glossary of Terms

Nutritional status: The physiological condition of an individual that results from the balance between nutrient requirements and intake and the ability of the body to use these nutrients.

Undernutrition: A condition in which the body does not have enough of the right kind of food to meet its energy, macronutrient (proteins, carbohydrates and fats) and micronutrient (vitamins and minerals) needs. Children can still be undernourished even if they have enough food to meet their energy requirements if that food lacks essential micronutrients.

Overnutrition: A condition where the body has too much food, especially fats and sugars. Both under- and overnutrition are forms of malnutrition.

Overweight- Overweight and obesity is when a person is too heavy for his or her height. Abnormal or excessive fat accumulation can impair health. Overweight increases the risk of diet-related non-communicable diseases later in life.

Regular physical activity is a known protective factor for the prevention and management of noncommunicable diseases such as cardiovascular disease, type-2 diabetes, breast and colon cancer. Physical activity also has benefits for mental health, delays the onset of dementia, and can contribute to the maintenance of healthy weight and general well-being.

Severe Acute malnutrition- Defined by a very low weight for height (below -3z scores of the median WHO growth standards.

Stunting - Stunting refers to a child who is too short for his or her age. These children can suffer severe irreversible physical and cognitive damage that accompanies stunted growth. The devastating effects of stunting can last a lifetime and even affect the next generation.

Underweight-underweight is defined as low weight for age.

Wasting-Wasting refers to a child who is too thin for his or her height. Wasting is the result of recent rapid weight loss or the failure to gain weight. A child who is moderately or severely wasted has an increased risk of death, but treatment is possible.

Women of Childbearing Age- an age when women are normally able to give birth to children 15-49 years as defined by the World Health Organisation.

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