

**NUTRITION SITUATION OF RECENT MIGRANTS IN SELECTED SMALL
TOWNS OF MPANDA DISTRICT, KATAVI REGION**

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**A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE
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ABSTRACT

The purpose of this study was to investigate the nutritional situation of recent migrants in 3 selected small towns in Mpanda district, Katavi region, Tanzania. The study focused on recent migrants who have stayed in the study area for 3 to 36 months. Cross-sectional design was used in a sample of 348 randomly selected respondents, whereby a semi-structured questionnaire was used to collect data. Nutrition status of adults as well as that of under-five children were assessed whereby anthropometric measurements were employed. Body Mass Index (BMI) was used for adults with WHO's criteria while WHO Anthro software was applied to assess the children. Breastfeeding practices were also investigated among the respondents. P-value of 0.05 or less was used in establishing levels of statistical significance. The results showed that 20.4% of adults were generally overweight or obese, and there was no significant difference between men and women. Stunting rate of children below five years of age was 45.1%, which is higher than both averages for Tanzania and Katavi region. Majority of mothers (85.1% and 77.3%) fed colostrum and used exclusive breastfeeding respectively. Local beliefs and taboos caused few mothers not to breastfeed as recommended. The most affected stage (age categories) of children of below five years of age by stunting is soon after 6 months, which implies that complementary foods introduced to children are probably poor in nutrients. It is therefore important to improve complementary feeding coupled with good maternal and child care practices and good hygienic conditions. Male children appear to be more prone to both stunting and underweight than female children. Also, children in Majalila small town appear to be more vulnerable to underweight than in Ikola town. Further studies are recommended to seek explanation for the observed differences. It is recommended that researchers and policy makers should pay special attention to small emerging urban

centres as they appear to be different from typical rural areas, which they are very often generalized.

Keywords: Small town, recent migrant, nutrition situation, social services and urbanization.

DECLARATION

I, Sephania, Lasima, Waya, do hereby declare to the Senate of Sokoine University of Agriculture that this dissertation is my own original work done within the period of registration and that it has neither been submitted nor being concurrently submitted in any other institution.

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DEDICATION

To my beloved wife Paskalia Samson Mtambo who allowed me to continue with my study by devoting her time to taking care of the family. Secondly to my mother Alinikisa Tendela Kaye and my father Lasima Mwaisakila Waya who gave me a better foundation of education. My mother passed away while I was undertaking this study. May the almighty God rest her soul in eternal peace. Amen!

TABLE OF CONTENTS

ABSTRACT	ii
DECLARATION	iv
COPYRIGHT	v
ACKNOWLEDGEMENTS.....	vi
DEDICATION.....	vii
TABLE OF CONTENTS.....	viii
LIST OF BOXES.....	xii
LIST OF TABLES	xiii
LIST OF APPENDICES.....	xiv
LIST OF ABBREVIATIONS AND ACRONYMS	xv
CHAPTER ONE.....	1
1.0 INTRODUCTION	1
1.1 Background Information	1
1.2 Problem Statement and Justification of the Study	2
1.3 Objectives.....	3
1.3.1 Overall objective	3
1.3.2 Specific objectives.....	3
CHAPTER TWO.....	4
2.0 LITERATURE REVIEW	4
2.1 The Concept of Urbanization	4
2.1.1 Definition of urbanization	5
2.1.2 Causes of urbanization and its challenges in Africa	6
2.2 Characteristics of Small Towns.....	9
2.3 Urbanization and Nutrition.....	11

2.3.1 Nutrition transition	12
2.3.2 Nutrition and health challenges in urbanization.....	14
2.3.3 Interventions to support nutrition in urban areas	17
CHAPTER THREE	19
3.0 METHODOLOGY.....	19
3.1 Study Location	19
3.1.1 Ikola.....	19
3.1.2 Kasekese.....	20
3.1.3 Majalila.....	20
3.2 Study Population and Design	21
3.3 Sampling Design	21
3.3.1 Sample size determination	21
3.3.2 Sampling techniques	22
3.4 Data Collection.....	23
3.4.1 Anthropometric assessment of children below five years of age.....	23
3.4.2 Determination of nutritional status of adults.....	24
3.4.3 Recruitment of research assistants and pre-testing of data collection tools.....	25
3.5 Data Analysis	25
3.6 Access and Ethical Considerations	26
CHAPTER FOUR.....	27
4.0 RESULTS.....	27
4.1 Characteristics of the Sampled Respondents	27
4.1.1 Demographic characteristics of adults	27
4.1.1.1 Sex and age.....	27
4.1.1.2 Household size, duration of stay and marital status	27
4.1.2 Socio-economic characteristics	28

4.1.2.1 Education level and occupation.....	28
4.1.2.2 Residence area and time taken to reach source of water.....	29
4.1.2.3 Reasons for migration of respondents.....	29
4.1.3 Other characteristics of sampled adult respondents.....	30
4.1.4 Characteristics of sampled underfive children.....	32
4.2 Nutrition Status.....	32
4.2.1 Nutrition status of adults.....	32
4.2.2 Nutrition status of study children.....	33
4.3 Breast Feeding Practise of Children of Below Five Years of Age.....	35
4.3.1 Colostrum feeding and initiation of breastfeeding after delivery.....	35
4.3.2 Exclusive breastfeeding and stop breastfeeding.....	36
4.4 Most Affected Stage of Underfive Children by Malnutrition.....	36
4.4.1 Height-for-Age (Stunting).....	36
4.4.2 Weight-for-Age (Underweight).....	37
4.4.3 Weight-for-Height (Wasting).....	37
CHAPTER FIVE.....	39
5.0 DISCUSSION.....	39
5.1 Overview.....	39
5.2 Nutrition Status of Adults.....	39
5.3 Nutrition Status of Children Below Five Years of Age.....	41
5.4 Breastfeeding Behavior of Children Below Five Years of Age.....	42
5.5 The Most Affected Stage (age categories) of Children of Below Five Years of Age.....	44
5.5.1 Height-for-Age (Stunting).....	44
5.5.2 Weight-for-Age (Undernutrition).....	45
5.5.3 Weight-for-Height (Wasting).....	45

CHAPTER SIX.....	47
6.0 CONCLUSION AND RECOMMENDATIONS	47
6.1 Conclusion.....	47
6.2 Recommendations	48
REFERENCES	50
APPENDICES	65

LIST OF BOXES

Box 1: Calculation of proportionate samples in each study town.....23

LIST OF TABLES

Table 1: A proportionality sampling of respondents in the study small towns.....	23
Table 2: Cut-off points for WHO classification of Malnutrition	24
Table 3: Cut-off points for WHO classification of nutrition status of adults.....	25
Table 4: Distribution of sampled respondents by their sex and age categories	27
Table 5: Distribution of sampled respondents by their marital status, duration of stay and household size	28
Table 6: Distribution of sampled respondents by their education level and occupation.....	29
Table 7: Area of residence and time spent to the water source	30
Table 8: Reported main reasons for migrating of respondents	30
Table 9: Distribution of respondents according to training and source of nutrition advice they received.....	31
Table 10: Distribution of respondents according to water source and responsible person for fetching water for household use.....	31
Table 11: Reported problems faced after migrated to small town	32
Table 12: Distribution of study children by sex and age.....	32
Table 13: Percentage distribution of adult respondents according to their nutrition status	33
Table 14: t-test results for comparison of mean BMI of respondents	33
Table 15: Percent distribution of under-five children according to their malnutrition status	34
Table 16: t-test results for mean Z-scores of study children	34
Table 17: Distribution of respondents according to colostrum feeding and initiation of breastfeeding.....	35
Table 18: Distribution of respondents according to their breastfeeding behaviour	36
Table 19: t-test results for mean of Z-scores of various age categories	38

LIST OF APPENDICES

Appendix 1: Questionnaire.....65

LIST OF ABBREVIATIONS AND ACRONYMS

%	Percentage
⁰ C	Celsius
AIDS	Acquired Immunodeficiency Syndrome
BMI	Body Mass Index
Cm	Centimeter
dd/mm/yy	Date/Month/ Year
DOB	Date Of Birth
<i>et al</i>	And others
FAO	Food and Agriculture Organization of The United Nations
H/H No	Household Number.
HAZ	Height-for-Age Z-score
HIV	Human Immunodeficiency Virus
IBM-SPSS	IBM-Statistical Package for Social Science
ID	Identification
Kg	Kilogram
MSc	Master of Science
n	Sample size
NBS	National Bureau of Statistics
NCBI	National Centre for Biotechnology Information
PP	Pages
Respondent	A head of household who met the inclusion criteria of being a recent migrant.
SACCOS	Savings and Credit Cooperative Societies

SD	Standard Deviation
SMART	Standardized Monitoring and Assessment of Relief and Transitions
T2D	Type two Diabetes
TASAF	Tanzania Social Action Fund
TDHS-MIS	Tanzania Demographic and Health Survey and Malaria Indicator Survey
TZS	Tanzania shillings
UK	United Kingdom
UN	United Nations
UNAIDS	The joint United Nations Programme on HIV/AIDS
UNDP	United Nations Population Division
UN-Habitat	United Nations Human Settlements Programme
UNICEF	United Nations Children's Fund
UNSCN	United Nations Standing Committee on Nutrition
URT	United Republic of Tanzania
USA	United States of America
VICOBA	Village Community Bank
WAZ	Weight-for-Age Z-score
WHO	World Health Organization
WHZ	Weight-for-Height Z-score

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information

The United Nations projections show that more than one billion people would move from rural areas to cities and towns of third world countries by 2030, and small towns of Sub-Saharan Africa would contribute significantly to this urbanization wave (UN-Habitat, 2010). In Africa, more than half of recent migrants will live in small towns (UNDP, 2014). Definitions of what constitutes an urban centre vary between nations, and in several cases, even the definition change depending on the time. In Tanzania, small towns are generally defined as those centres with a population of not more than 10 000 inhabitants (Wenban-Smith, 2014).

Economic and social functions of small towns vary depending on the national urban hierarchy and economic base. While large cities play an important role in national and regional economies; smaller urban centres play a more direct role in the development of their rural regions (Aeroe, 1992). They provide rural- urban linkages by connecting the rural regions with a more diversified local economic base and link to wider markets (Losch and Magrin, 2013). For example, small urban centers provide an access to markets for small-scale producers who may find it difficult to attract the interest of large supply chains that require consistent quality and relatively large quantities of produce (Tschirley *et al.*, 2015).

People migrate from rural to small towns for varied and often complex reasons, such as to improve their economic situation or to pursue education (Richard, 2001). A migrant is an individual who moves around within his/her own country or from one country to another,

usually to find work, although there may be other reasons such as to join family. Some move voluntarily, while others are forced to leave because of economic hardship or other problems (Anderson and Blinder, 2012). People can migrate ‘regularly’, with legal permission to work and live in towns, or ‘irregularly’, without permission from the authority they wish to live and work. They eventually settle in some areas where they also establish other kinds of businesses such as services including shops, pubs, markets, grain milling and transportation. This situation has transformed some villages from typical rural settlements into small urbanized centres (Coast, 2000). Such small towns tend to attract many migrants to move from rural communities. While in small town, migrants face different life challenges including unusual dietary patterns and lifestyles (Satterthwaite *et al.*, 2010), such as eating of fast foods and drinks and their nutritional consequences (Ulasi *et al.*, 2010). This study intended to investigate the nutritional situation which recent migrants to small towns tend to face and attempt to draw some lessons.

1.2 Problem Statement and Justification of the Study

The underlying socioeconomic and demographic challenges associated with urbanization are known to lead to dietary changes linked with shifts in physical activities (Popkin, 2011). While dietary change is well known among dwellers in well-established urban settlements (towns and cities), it is not yet established whether same situation is also affecting the emerging small towns located in rural areas of Sub-Saharan Africa. In Tanzania, migration and urbanization have both increased over the last two decades (Wenban-Smith, 2015). Significantly, the rate of migration and urbanization has increased from 5.7% in 1967 to 29.1% in 2012 (Wenban-Smith, 2014).

According to the NBS (2015), the proportion of migrants in Dar es Salaam was 52.8%. Proportions for other regions in the country were: Mpanda district (29%), Mjini Magharibi (33.9%), Geita (39.9%), Pwani (36.3%), Arusha (38.1%) and Shinyanga (39.8%). These

areas have high proportions of migrants due to several reasons. For example, Dar es Salaam and Mjini Magharibi have booming businesses which have attracted migrants. Other reasons are richness in resources like minerals for Geita and Shinyanga, tourist attractions for Arusha and land for settlement in Katavi-Mpanda (NBS, 2015). Low income recent migrants in small towns face greater risks of their health and nutritional status partly because of changing staple foods (Satterthwaite *et al.*, 2010).

Considering the above mentioned gap in literature, the present study aimed at understanding the nutrition situation of recent migrants from rural areas residing in selected small towns in Mpanda district in Tanzania. The findings are expected to provide useful information for policy makers in the government and development partners, which will likely help them to plan for realistic and appropriate nutrition interventions.

1.3 Objectives

1.3.1 Overall objective

The overall objective was to assess the nutrition situation of recent migrants in selected small towns in Mpanda district.

1.3.2 Specific objectives

The above overall objective was attained by undertaking the following specific objectives:-

- i. To determine the nutritional status of adult recent migrants in small towns.
- ii. To determine the nutritional status of children of below five years of age.
- iii. To assess the breast feeding practices of children of below five years of age.
- iv. To identify the most affected stage of children of below five years of age by malnutrition.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 The Concept of Urbanization

The projections of urbanization worldwide suggest that there will be an increase of urban dwellers as compared to rural dwellers at a ratio of three urban dwellers to two rural dwellers by 2025 (Satterthwaite *et al.*, 2010). Globally, agricultural production has managed to meet the demands from a rapid growth in the proportion of the workforce not producing food and rapid changes in food demands towards more energy and greenhouse gas emission-intensive food. However, hundreds of millions of urban dwellers face under-nutrition today, although this is far more related to their lack of income than to a lack of capacity to produce food (Satterthwaite *et al.*, 2010). There is a very large urban population worldwide with incomes so low that their health and nutritional status are at risk from any rise in price of staple food as became evident with the rising hunger among urban populations after the food price crisis in 2007 and the first half of 2008 (Cohen and Garrett, 2009).

In 2008, the world's urban population exceeded its rural population for the first time (Bougnom *et al.*, 2014). Less attention has been given to two other transitions: around 1980, the economically active population employed in industry and services exceeded that employed in the primary sector (agriculture, forestry, mining and fishing); and around 1940, the economic value generated by industry and services exceeded that generated by the primary sector (Satterthwaite, 2007).

For the time being, agriculture provides the livelihoods for around one-third of the world's labour force. In addition, the figure might be higher if the value of food produced by rural

and urban dwellers for their own consumption is taken into consideration (Satterthwaite *et al.*, 2010). The world's urban population will increase by more than a billion people between 2010 and 2025, while the rural population will hardly grow at all (Satterthwaite *et al.*, 2010). As the non-farm activities continue to grow, the number of middle and upper income consumers will also increase, which will cause major changes in agriculture and in the supply chain. There is also possibility that the next few decades, there will be a decline in population growth rates and the ageing of the population (UN, 2015). The ageing population will produce more people that will also cluster around urban centres with advanced medical services and other services that they want and value (Satterthwaite *et al.*, 2010). The increased urbanisation in developing countries, leads to traditional diets displacement by the Western diet providing further evidence that the nutrition transition was in full swing on the African continent (Steyn *et al.*, 2011). While underweight was still prevalent in many sub-Saharan African countries, the prevalence of overweight was a problem of significance in many developing countries (Holmes *et al.*, 2010). Longer lengths of urban residence, increases obesity among rural-to-urban migrant populations (Antiporta *et al.*, 2015) therefore, interventions to prevent obesity in urban areas may benefit from targeting migrant groups.

2.1.1 Definition of urbanization

Urbanization is the increasing share of a nation's population living in urban areas. Most urbanization is the result of net rural to urban migration (Potts, 2009). The conventional definition for urbanization is a shift in settlement patterns from dispersed to more dense settlement (Satterthwaite *et al.*, 2010). By way of contrast, much of the expansion of urban land use is the result of a shift from dense to more dispersed settlement. The term urbanization is being used to refer to two opposing spatial shifts in settlement patterns,

likely to have opposing effects on, for example, the land available for agriculture (Satterthwaite *et al.*, 2010).

National Bureau of Statistics (NBS) provides more detail on the urban definition, indicating that local judgment is also applied (NBS, 2002). Both World Bank (2009) and Wenban-Smith (2014) explored the potential for a density-based definition of 'urban' in Tanzania. Wenban-Smith (2014) offers a comprehensive compilation of the data on population growth, internal migration and urbanization in mainland Tanzania, based on the five post-Independence censuses (1967, 1978, 1988, 2002 and 2012). The movement of people from rural to urban areas leads to urban growth. The rapid growth of urban areas in Tanzania is closely linked to rural-urban migration which complements natural increase as a result of birth and death coupled with reclassification of rural areas into urban areas (Agwanda and Amani, 2014). For Tanzania, Beegle *et al.* (2011) have tracked migration in the Kagera region. At the national level, Dar es Salaam dominates with over 70% of the increase in its population between 1978 and 2012 being accounted for by in-migration. In the mid-century, Tanzania urban population is projected to increase, rising from less than 15 million people in 2012 to more than 60 million people (Worrall *et al.*, 2017). The urban areas have started with village characteristics and evolved to the level of trading centres and townships with no clear spatial plan or vision. Katavi region has also been persistent gainer but at a more moderate rate (Wenban-Smith, 2014).

2.1.2 Causes of urbanization and its challenges in Africa

Urbanization is a result of economic success (Bairoch, 1988; Clark, 2009 and Satterthwaite *et al.*, 2010), for most cities depend on success in global markets, although intense inter-city competition for markets beyond national boundaries has also been an influence for most cities for many centuries. However, (Barrios and Bertinelli, 2006)

considered that the influence of urbanization in rural-urban migration was climate change and Bruckner (2012) investigated the relationship between agriculture and urbanization with respect to climate change. Gollin *et al.* (2015) distinguished between urbanization with and without industrialization, and Christiaensen and De weerd (2013) has drawn attention on growing significance of natural population growth in urban areas, giving rise to 'urban push'. Urbanization triggers changes in occupational activities, socio economic status, and social structures that can promote illnesses such as neuropsychiatric disorders, cardiovascular disease and other non-communicable chronic diseases among urban dwellers (NCBI, 2013).

The massive rural-to-urban migration that accompanies urbanization has created particular challenges for health-care delivery in highly mobile populations. Also, urbanization has connected formerly isolated locations through rural-to-urban migration and short-term travel for commerce and recreation, with implications for the spread of communicable infections across the country (NCBI, 2013). For example, many small towns in sub-Saharan Africa have very high prevalence rates of HIV/AIDs (UNAIDS, 2016). In such situations there are large populations which are unable to get required treatments and a lack of programs to protect those most at risk, which increase small town mortality rates significantly.

In most nations, the pace of economic and small town change has outstripped the pace of needed social and political reform, especially at local government levels. The consequences of most cities in Asia, Africa, Latin America and the Caribbean were the high proportion of the population living in very poor and overcrowded conditions in informal settlements lacking adequate provision of water, sanitation, drainage, healthcare, schools and the rule of law (Satterthwaite *et al.*, 2010). In Africa, the "Healthy Small

Town” model is seen to have only partly been implemented due to lack of formal networks, lack of priority given to issues of environment and health, insufficient resources, expectation of or reliance on foreign support, and other factors (Myfanwy, 2010). According to the 2012 census, around 10% of the population lived in Dar es Salaam, and at around 4.5 million this was the largest urban agglomeration in Tanzania by a huge margin. The population of Dar es Salaam grew dramatically over the past fifty years and the bulk of this growth was accounted for by in-migration (Wenban-Smith, 2014). Once cities become too big, congestion costs can cause a decline in economic growth. There are also positive spill-overs of urban centres on the rural hinterlands, through consumption linkages, urban-rural remittances, upward pressure on agricultural wages, and the generation of rural non-farm employment (Wenban-Smith, 2014). Finally, due to a series of migration barriers, poorer people, who remain largest in number in the rural areas, may find it easier to connect to growth and jobs in and around smaller urban centres nearby than when these jobs are created further away in a limited number of large cities (Wenban-Smith, 2015).

The forces of agglomeration, congestion, hinterland linkages and migration can go in opposite ways, such that the overall effect of urban composition on growth and poverty is ultimately an empirical matter. Looking at the experience in 51 countries during 1980-2004 suggests that there is an additional effect on poverty reduction when people move into secondary towns and the rural off-farm economy when they leave agriculture (Christiaensen and Todo, 2014). This suggests that the development of the rural economy and more spread out urbanization processes might be more poverty reducing. To understand the size effect, we need to understand better how migrants (especially the poor) choose their destinations. There are indeed reasons to believe that despite lower income levels and lower growth prospects, the secondary towns still make an attractive destination for the poor due to their proximity, network density, socio-cultural similarity and the like.

At the same time these smaller towns will have different linkages with the rural surroundings, being typically located closer to rural areas, as well as different effects on accumulation and congestion costs. Deepening our understanding of the drivers of destination choice can help inform on the effects of improvements in infrastructure (electricity, roads, telecommunication, health, education) on attracting rural-urban migrants to smaller towns, as well as on retaining high-skilled individuals. The retention of the latter in secondary town can be assumed to play an important role in releasing accumulation economies, with potentially important complementarities with the large pool of uneducated migrants (Jan *et al.*, 2014).

2.2 Characteristics of Small Towns

Typical characteristics of small towns in poor countries include lack of basic services (Cohen, 2006), substandard housing, unhealthy living conditions and insecure tenure (Nicchia, 2011) and poverty and social exclusion (Tschirley, 2015).

Lack of basic services is one of the most frequently mentioned characteristics of small towns in Tanzania (Li, 2013). These include lack of access to improved sanitation facilities and improved water sources as the most important feature, sometimes supplemented by absence of waste collection systems, electricity supply, surfaced roads and footpaths, street lighting and rainwater drainage.

Small town areas are associated with a high number of substandard housing structures, often built with non-permanent materials unsuitable for housing given local conditions of climate and location (Nicchia, 2011). Factors contributing to a structure being considered substandard are, for example, earthen floors, mud-and-wattle walls or straw roofs. Various spaces and dwelling placement bylaws may also be extensively violated.

Overcrowding is associated with a low space per person, high occupancy rates, cohabitation by different families and a high number of single-room units. Many small towns dwelling units are overcrowded, with five and more persons sharing a one-room unit used for cooking, sleeping and living (Nicchia, 2011).

Unhealthy living conditions are the result of lack of basic services, with visible, open sewers, lack of pathways, uncontrolled dumping of waste, polluted environments, etc. Houses may be built on hazardous locations or land unsuitable for settlement, such as floodplains, in proximity to industrial plants with toxic emissions or waste disposal sites, and on areas subject to landslip (Amobi and Agu, 2017; Mselle and Sanga, 2017). The layout of the settlement may be hazardous because of a lack of access ways and high densities of dilapidated structures.

A number of definitions consider lack of security of tenure as a central characteristic of small town, and regard lack of any formal document entitling the occupant to occupy the land or structure as *prima facie* evidence of illegality and small town occupation. Informal or unplanned settlements are often regarded as synonymous with small towns. Many definitions emphasize both informality of occupation and the non-compliance of settlements with land-use plans. The main factors contributing to non-compliance are settlements built on land reserved for non-residential purposes, or which are invasions of non-urban land (Nicchia, 2011).

Income or capability poverty is considered, with some exceptions, as a central characteristic of small town areas. It is not seen as an inherent characteristic of small town, but as a cause (and, to a large extent, a consequence) of small town conditions. Small town conditions are physical and statutory manifestations that create barriers to human and

social development. Furthermore, small towns are areas of social exclusion that are often perceived to have high levels of crime and other measures of social dislocation. In some definitions, such areas are associated with certain vulnerable groups of population, such as recent immigrants, internally displaced persons or ethnic minorities (Tschirley *et al.*, 2015).

2.3 Urbanization and Nutrition

Though urbanization is associated with economic growth, this does not mean that the number of urban dwellers facing hunger has declined in all nations. A study of 10 nations in sub-Saharan Africa showed that the proportion of the urban population with energy deficiencies was above 40 per cent in all but one nation and above 60 per cent in three (Satterthwaite *et al.*, 2010). In 12 of 18 low-income countries, food-energy deficiencies in urban areas were the same or higher than rural areas, even though urban areas have higher average incomes (Ahmed *et al.*, 2007).

The rapid increases in food prices during 2007 and early 2008 showed the vulnerability of the urban poor to price rises (FAO, 2011). Although there has been some decline in prices since mid-2008, most analysts consider that prices will not return to the levels of the early 2000s because of continued strong demand for energy and cereals for food, feed and fuel, as well as to structural land and water constraints and likely food production impacts of climate change (Cohen and Garrett, 2009). Study done by Collier and Dercon (2014) found that structural transformation of rural areas moves away from agriculture to more productive sectors of the economy, which is accompanied by internal migration from rural to urban areas.

Urban food security depends on households being able to afford food among other needs that have to be purchased (Cohen and Garrett, 2009). Various studies have shown the extent of food insecurity among low-income households in urban areas and the many coping measures taken, including those that in the longer term compromise health and nutritional status (Tolossa, 2010). For example, in Tanzania urbanization increase socio-economic problems such as scarcity of water supply and inadequate health facilities. Education on the family planning to the society has reduced fertility rate since natural increase was another major contributor in small town (Lawi, 2013). In some nations, the provision of a regular small cash sum for low-income households (e.g. the Tanzania Action Social Affairs Fund-TASAF in Tanzania) or the provision of certain staple foods at subsidized prices has reduced hunger and malnutrition although with considerable differences in effectiveness (Edgar and Olsen, 2007). The studies show that, rural to urban migration in Tanzania has ended with changes in cardiovascular risk factors: the main determinants thought to underlie these rural to urban differences are changes in physical activity and diet, often referred to as the "nutrition transition" (Unwin *et al.*,2010). Also other studies have shown that majority of the children in Tanzania are born with recommended weights (above the level of 2.5 Kg) but growth is affected after introduction of complementary foods, during which protein, energy and micronutrient deficiencies become a serious problem because complementary foods consumed are not adequately enough to supply these nutrients (Muhimbula and Issa-Zacharia, 2010).

2.3.1 Nutrition transition

Nutrition transition is described as a shift from lack of food, to a rising problem of overabundance and obesity (Alanna, 2011). The well-known nutrition transition is “Epidemiologic transition” and “Demographic transition” (Omran, 2005). Epidemiologic transition is the shift from a pattern of prevalent infectious diseases associated with

malnutrition, periodic famine and poor environmental sanitation to a pattern of prevalent non-communicable, chronic and degenerative diseases associated with urban lifestyle. The stages of the epidemiologic transition include: The age of pestilence and famine, the age of receding pandemics and the age of degenerative and man-made diseases.

The world in general has experienced a marked shift in the global Body Mass Index (BMI) distribution towards reduced under nutrition and increased obesity (Popkin, 2010). The impacts of modern technology, globalization, government policies and food industry practices have driven to create far-reaching energy imbalance across the globe (Popkin, 2010). While it is very clear that this transition from natural foods and high physical activity to highly processed food and low physical activity is more in the developed countries, it must be noted that the developing countries are also following (NCBI, 2013).

Trends reveal that overweight and obesity are a growing problem among women and children in low and middle- income countries such as in Ghana, Kenya, Niger, Sierra Leone, Tanzania and Zimbabwe, where the prevalence among urban women is approaching 50 % (Jaacks *et al.*, 2017). Investment into reducing the tide of the transition will surely be a gainful venture because the current trend has shown that the burden will be devastating in the future if nothing is done (Azuike, 2011).

Diets differ between rural and urban areas, whereby, for example, meat consumption *per capita* is higher in urban areas (Stage and McGranahan, 2010). Foods rich in vitamins, minerals and micronutrients such as fruits, vegetables and whole grains have been substituted by foods heavy in added sugar, saturated fat and sodium. But a review of the relationship between urbanization and food prices suggests that this may be the result of higher urban incomes and not urbanization as such, as higher income rural dwellers have similar levels of increased meat consumption or of luxury goods and high income as in

urban dwellers (Stage and McGranahan, 2010). For instance, in Sri Lanka, there is considerable variation in the expenditures on meat per household in different parts of the country, but the difference between median rural and urban households conforms roughly to what might be expected given the differences in average income. In Vietnam, data from 1993 to 2004 show that all parts of the country experienced rapid income growth and increasing consumption of luxury foods, in a pattern that suggests that income, not just town living, is the driving force (Stage and McGranahan, 2010). While the small town diets are often more varied and include higher levels of animal protein and fat, rural diets may be superior in terms of calories and total protein intake (Hardoy and Satterthwaite, 1988).

2.3.2 Nutrition and health challenges in urbanization

Urbanization has led to changes in patterns of human activity, diet, and social structures with profound implications for non-communicable diseases such as diabetes, cardiovascular disease, cancer, and neuropsychiatric disorders. He *et al.* (1991) in a geographically and socially isolated ethnic minority group in southwest China provided early evidence of the effect of urbanization on chronic disease. They showed that age-related increases in blood pressure were greater in individuals who had moved to small town areas than in those who remained in rural villages (He *et al.*, 1991). Since then, researchers have suggested that Chinese town environments promote lifestyles that place people at risk of hypertension and obesity risk factors for many non-communicable diseases (Ulasi *et al.*, 2010).

Occupational physical activity is less common in urbanized areas than in rural, agricultural regions and when compounded with the declines in physical activity that accompany motorized transport and labour-saving household appliances that are common in town

areas, this deficit in energy expenditure is unlikely to be compensated for through leisure physical activities (Monda *et al.*, 2007 and Bauman *et al.*, 2008).

Although the consumption of animal protein and the proportion of calories derived from fat have increased, individuals living in urbanized areas consume greater amounts of dietary fat than do their rural counterparts (Popkin and Du, 2003). In view of the changes in diet and physical activity, the age-adjusted prevalence of adult hypertension and childhood overweight and obesity in town areas roughly double the rates in rural areas (Wu *et al.*, 2008 and Cui *et al.*, 2010).

Urbanization-associated changes in diet and physical activity have been accompanied by a rise in cancer, and differences in cancer mortality between rural and town areas have long been reported (Haynes, 1986). In Shanghai, the 3 year incidence of gastrointestinal and hormonal cancers particularly cancers of the colon, kidney, gallbladder, breast, and uterus has raised substantially since the 1970s, and nationally these incidences are higher in town areas than in rural areas (Jin *et al.*, 1999).

There is increased evidence of obesity, excess calorific intake, and declines in physical activity which are carcinogenic (Gu *et al.*, 2006). The delayed onset of childbirth and reductions in the number of offspring could contribute to the rise in breast cancer incidence. Cancer prevalence is higher in town than in rural areas, and low-income, poorly educated individuals are more likely to be diagnosed with late-stage cancers than with early-stage cancers (Sankaranarayanan, 2010 and Li *et al.*, 2011). These disparities point to the need for expanded access to cancer screening and treatment for poor populations and undeveloped regions outside town areas.

The drivers of these trends are not well understood. Possibly, the rise in these risk factors in rural areas is an indirect result of urbanization. For example, increased socioeconomic status in rural residents resulting from financial support from family members in town areas, could affect a rural family's agricultural activities and ability to purchase processed foods. Rural areas can become increasingly urbanized over time and can acquire characteristics of small town environments that promote chronic diseases. Efforts to reduce overweight and hypertension and their related health consequences should address the dietary changes and physical activities. The behavioural interventions to reduce obesity and hypertension-related chronic disease are necessary to promote active lifestyles and agricultural policies that promote healthy diets (Hu *et al.*, 2011).

Urbanization can also promote neuropsychiatric disorders, which is a leading cause of disease burden of the adult mental disorders (Phillips *et al.*, 2009). Small town environments present psychological stressors such as noise and social isolation (Krieger and Higgins, 2002) and migrant populations could be especially vulnerable to their effects. Generally, migrant populations have better physical health than their non-migrant peers, but rural-to-small town and small town-to-small town migrants report higher psychological distress than do non-migrating populations, a trend that lessens as the length of residence in the small town destination increases (Chen, 2011).

Migrant populations could be vulnerable to discrimination and stigmatization, and also might become stressed by lacking jobs, housing, and schools for their children, as well as missing health care because they are not registered (Wang *et al.*, 2010). Shifts in family structure, as working-age adults leave rural areas, have mental health consequences for those left behind, as has been noted in children left in rural villages by rural-to-small town migrant parents (Liu and Ge, 2009). Notably, the prevalence of mental illness is similar in

rural and urban, and depressive disorders and alcohol dependency are more prevalent in rural than in small town areas, which is not explained by differential access to treatment (Mam *et al.*, 2008 and Phillips *et al.*, 2009).

2.3.3 Interventions to support nutrition in urban areas

The improvement of places that sell fresh fruits and vegetables and community gardens may help to support nutrition whereby community gardens have the potential to increase access to and consumption of fresh fruits and vegetables while reducing barriers to healthy eating, such as cost and transportation (Fisher and Griffin, 2016). Successful interventions should be heartened to make sure that owners are able to stock healthier items and post promotional signs to encourage their consumption. Some studies also indicate that engaging store owners and customers in nutrition training and education sessions can lead to increased intent to prepare and consume healthy foods among customers (Larson *et al.*, 2013). Using promotional clue to encourage consumers to choose the healthier items may further increase healthy vending purchases. Improving access to supermarkets may lead to increased consumption of fruits and vegetables, and evidence suggests that greater neighborhood availability of supermarkets is associated with lower prevalence of obesity (Cummins *et al.*, 2014). Access can be improved by encouraging the development of supermarkets in underserved areas and by increasing public transportation to supermarkets.

Mobile fruit and vegetable vendors, mobile markets and fresh food carts, offer a low cost promising method of increasing access to healthy foods in communities with limited access supermarkets and grocery stores. Evidence suggests that the establishment of mobile fruit and vegetable markets or carts is associated with increased purchasing and

consumption of fresh produce and reduced food insecurity, especially when these vendors can accept payment using government nutrition assistance programs (Pingali, 2007).

Healthy Foods should be more affordable by reducing the price of such foods. Reducing the price of healthy foods, especially in comparison to the price of unhealthy options, has been found to increase consumption of fruits, vegetables, water, and other healthy items among adolescents and adults (Heese *et al.*, 2005). This type of competitive pricing can be achieved through discounts on healthy items or through subsidies and incentives. Emerging evidence indicates that enabling participants of government-sponsored nutritional assistance programs to use their benefits at farmers' markets increases access to and may increase consumption of fruits and vegetables (Herforth, 2015).

Reducing the availability of unhealthy food has been found to decrease consumption of such foods and increase consumption of healthier products, especially in schools (Fisher and Griffin, 2016). Policy makers, health care practitioners, and individuals have to recognize that, in order to improve the health of population, they must look beyond the walls of the traditional health care system to impact health. To that end, several policies should be enacted and proposed at the local, region and national level to explicitly increase access to healthy and nutritious foods, particularly for low-income urban residents and to increase physical activity or exercises.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Study Location

Mpanda district is located in Katavi region in Tanzania. It consists of 7 small towns which are Karema, Ikola, Sibwesa, Kasekese, Majalila, Ifumbula and Kabungu. Three small towns were purposively selected for this study namely: Ikola, Kasekese and Majalila because of the varying activities that tend to attract the migrants. For example, Ikola town is surrounded by fishing activities and it is a landing site; Kasekese town is famous for maize and paddy production, while Majalila town is famous for tobacco production. Each of these three small towns is described below.

3.1.1 Ikola

Ikola small town is located on the coastal area of Lake Tanganyika with a total population of about 20 030. It has one health center, 2 primary schools, 1 secondary school, 18 shops, 8 chemist shops, 4 guest houses, 2 pubs, 5 cafes and a landing site. Fishing is the main economic activity in the area. The main means of transportation at Ikola small town is through water way and ground transportation. Water way transport is mainly used to transport both commodities and people to Kigoma and Democratic Republic of Congo while ground transport is for transporting people and commodities to Mpanda Municipal town and other places within the country. Most of recent migrants are engaged in casual labour, agriculture, fishing, water vending and fish mongering. Ikola landing site has attracted many recent migrants to move to Ikola small town purposely for business and fishing activities. Ikola small town is one of important source of revenue for Mpanda District council. It contributes about 2.8% of the total revenue of the council.

Recent migrants to Ikola small town buy things like mangoes from farmers and exchange with fish and later on sell to businessmen and other people. Some are engaged as farm labourers and house maids. Commodity exchange is done depending on the season and the commodity availability. Sometimes people exchange fish for mangoes and fish for oranges. Most parents are highly engaged in barter trading, which results to poor breastfeeding of their children. Some children do not attend school because of involvement in this barter trading in order to earn money. Another common economic activity for earning income is water vending (for drinking water), whereby 20 litres of water is sold for TZS. 500/=.

3.1.2 Kasekese

Kasekese small town is located on the road to Ikola. It is bordered by several wards, namely Sibwesa eastward, Ikola North West and Kapalamsenga southwest. It is also near Nkamba forest reserve and Katavi national park. Kasekese small town has a population of 18 716, one health center, 22 shops, one market, 14 chemist shops, 3 guest houses, 10 pubs, 3 cafes, one primary school and a bus station. However, these facilities are not sufficient due to the increased population. For example, Kasekese primary school has a total of 1300 pupils and it has only seven classrooms. There is only road transport. The town is surrounded by seasonal rivers which dry up during dry season and causes hardship to the dwellers of Kasekese small town. There is only one deep well source of water which does not satisfy the whole population. Due to scarcity of water, it causes mothers to spend a lot of time fetching water instead of doing production activities.

3.1.3 Majalila

Majalila is located on the road to Mishamo ward. It is bordered by Mlele district north-east, Ifukutwa southward and it is near Tongwe forest reserve. The area is famous for cash

crop and food crop cultivation. It has a population of 28 689 consisting of 20 shops, 2 chemist shops, 1 health center, 6 cafes and 1 pub. The main cash crop grown is tobacco. The recent migrants are attracted to Majalila small town due to activities related with tobacco production, where they work as casual labourers for weeding, harvesting and tobacco curing.

3.2 Study Population and Design

The study involved a representative sample of migrant households who were identified by community leaders in the study area. Cross-sectional study design, according to Kothari (2004), was considered favourable for this study because it is relatively less expensive in terms of time. It is also more flexible and minimizes bias, while maximizes reliability.

3.3 Sampling Design

All recent migrants' heads of households (from the age of 18 years and above) who have stayed in the study area for 3 to 36 months and who have at least a child of less than five years of age were considered. The individuals who had stayed for more than 36 months were not included in the study. Pregnant women were excluded in this study due to complications of assessing their nutrition status.

3.3.1 Sample size determination

Desired sample size was obtained by using the SMART (2012) formula:

$$N = \frac{Z^2 P(1 - P)}{d^2} \dots\dots\dots(1)$$

Where: N= Estimated sample size

d = Degree of accuracy desired (precision level) (acceptable error 0.0477),

P = The prevalence of migrants in Katavi Region (0.29 or 29%),

Z= Confidence interval (1.96),

$$N=1.96^2 * 0.29 (1- 0.29)/0.0477^2 = 348$$

The estimated sample size was 348 households.

3.3.2 Sampling techniques

A purposive sampling technique was applied to select three small towns in Mpanda district. The reasons for selecting those small towns are the varying economic activities done at each of the particular small town (for example fishing activities at Ikola, maize production at Kasekese and tobacco production at Majalila) as mentioned in section 3.1. Community leaders from the three small towns were involved to assist in identifications of respondents who met the inclusion criteria, as described earlier. A total of 512 households from three small towns were identified by using resident register books. Respondents were randomly selected by assigning them with numbers from the table of random numbers. Proportionate sampling was applied to obtain appropriate sample from the three sites as summarized in Box 1. From the total number of registered respondents within the three study small towns Kasekese had 282 respondents, Ikola had 110 and Majalila had 120 (Table 1). Accordingly, the sample then included 192 respondents from Kasekese, 75 from Ikola and 81 from Majalila making a total of 348 respondents for the three small towns selected (Table 1).

Box 1: Calculation of proportionate samples in each study town

Calculation of the proportionate samples was done by the following equation as follows:

$$n_1 = \frac{P_1 X_n}{P_2} \dots\dots\dots(2)$$

Where:

n_1 =Expected sub-sample

X_n = Total sample

P_1 = Population of recent migrants in small town

P_2 = Total number of households in the three sampled small towns

Table 1: A proportionality sampling of respondents in the study small towns

Small town	Number of Households	Proportion percentage	Number of Sampled Households
Kasekese	282	55.1	192
Ikola	110	21.5	75
Majalila	120	23.4	81
Total	512	100	348

3.4 Data Collection

Semi-structured questionnaire (Appendix 1) was used to interview the respondents face-to-face. The questionnaire sought information about socio-demographic characteristics, breastfeeding behavior and nutrition status. Anthropometric assessment was used for measuring nutrition status of both adults and underfive children.

3.4.1 Anthropometric assessment of children below five years of age

Each child's height/length and weight were measured by metric system using the WHO (2006) guidelines. In order to measure height, length board was used where the parent or an assistant lay the child on his back in the center of the board with the head touching the fixed headboard, the body straight in line with the board and the shoulders and buttocks flat against the surface. The assistant held child's head gently against headboard with

child's eyes looking straight up. Gently, but firmly press the child's knees down with their left hand to fully extend both legs. The right hand was used to slide the moveable foot board firmly against the feet. The toes of the child point straight up. Weight was measured by using standard SECA digital weighing scale and recorded to the nearest 0.1g according to WHO (2006) standards. The mother is weighed first and then mother with child pair. Both mother and child were required to wear light clothes when measured. WHO Anthro software (version 2.2) was used for determining the nutrition status by considering weight, height, age and sex. The WHO classification was used in determining the nutrition status of children (Table 2).

Table 2: Cut-off points for WHO classification of Malnutrition

Z-score	Classification
+2 to -2 SD	Normal
-3 to -2 SD	Moderate chronic malnutrition
<-3 SD	Severe under nutrition
>+2 SD	Overweight in children

Source: WHO (2006)

3.4.2 Determination of nutritional status of adults

In order to determine the nutrition status of adults, height and weight measurements were considered. Subjects were required to remove coats, jackets, shoes and any hair ornaments or braids on top of head. Height was measured by length board (stadiometer) whereby a stadiometer was placed against a wall firmly. Then the subject was asked to stand straight with the head positioned such that the Frankfurt plane is horizontal, feet together, knees straight and, heels, buttocks and shoulder blades in contact with the vertical surface of the wall. Hands hang loosely with palms facing the thighs. The movable headboard was then lowered until it touches the crown of the head; height was taken to the nearest 0.1cm. The height measurement was taken for each subject and recorded.

Weight was measured by using SECA digital weighing scale where the scale was placed on solid level floor (hard surface, not carpeting), balanced and set at zero before the subject step on it. Then subject was requested to remove shoes and bulky clothing, empty out pockets if any objects and all the accessories. The subject stood and faced straight forward, both feet on the center of the platform, and not touching other objects or persons. Lastly the measurements were recorded in kilogrammes. The weight and height were used for calculating the Body Mass Index (BMI) and classify the nutritional status of the adults using the WHO criteria as shown in Table 3. BMI is calculated as Weight in Kilogram/Height in meter square.

Table 3: Cut-off points for WHO classification of nutrition status of adults

BMI Status	BMI categories
Underweight	<18.5
Normal	18.5 – 24.9
Overweight	25 – 29.9
Obese	30 – 39.9
Morbidity Obese	>40

Source: WHO (2006)

3.4.3 Recruitment of research assistants and pre-testing of data collection tools

The investigator recruited 4 local women and 5 local men who were living in the study area to assist with interviews of the respondents. This was particularly important to allow for understanding the Sukuma and Bende languages. The assistants were trained by the investigator before carrying out the interviews. All data collection tools were pilot-tested in Kabungu small town outside of the study area and the necessary modifications were made after that.

3.5 Data Analysis

The collected data were coded, cleaned and then analyzed using IBM-SPSS computer Statistical Package version 20. Descriptive statistics and frequencies were computed to

determine the nutrition status of adults and children below five years of age. Individual variables included the age, sex, education of the mother and the head of household, time of stay in small town, occupation, area of residence, the number of children in the household, marital status and BMI. T-test was used for comparison of means whereby significance level was set at p-value 0.05 or less.

3.6 Access and Ethical Considerations

Permission to conduct the study was sought from the Sokoine University of Agriculture and from the respective local government authorities of the study sites in Katavi (Ikola, Kasekese and Majalila). Confidentiality of the data collected was assured and no one outside the research team was able to access the information.

CHAPTER FOUR

4.0 RESULTS

4.1 Characteristics of the Sampled Respondents

4.1.1 Demographic characteristics of adults

Demographic variables included sex, age, household size, marital status and length of stay in the study area.

4.1.1.1 Sex and age

About three quarters (73.3%) of the respondents were female and about a quarter (26.7%) were male (Table 4). Age distribution of the respondents, as portrayed in Table 4, appears to be evenly distributed among the categories included.

4.1.1.2 Household size, duration of stay and marital status

The results in Table 5 show that about one third (35.3%) of respondents have stayed for between 28 and 36 months followed by those of 3 to 9 months (26.7%) and between 10 to 18 months (21.3%). Few respondents (16.7%) stayed between 19 and 27 months. Majority were in monogamous marriage while few were in polygamous marriage, widowed, single or divorced. About half (49.4%) of respondents were from households with 5 to 8 members and 27.6% were from households with 9 to 13 members (27.6%). Other categories were only few (Table 5).

Table 4: Distribution of sampled respondents by their sex and age categories

Characteristic	Number	Percentage
Sex		
Male	93	26.7
Female	255	73.3
Total	348	100
Age in years		
18 – 24	78	22.4
25 – 29	72	20.7
30 – 35	86	24.7
36 – 45	58	16.7
Above 45	54	15.5
Total	348	100

Table 5: Distribution of sampled respondents by their marital status, duration of stay and household size

Characteristic	Number	Percentage
Duration of stay in months		
3 – 9	93	26.7
10 – 18	74	21.3
19 – 27	58	16.7
28 – 36	123	35.3
Total	348	100
Marital status		
Divorced	10	2.9
Single	16	4.6
Widowed	25	7.2
Married (monogamous)	254	73.0
Married (polygamous)	43	12.4
Total	348	100
Household size (numbers of individuals)		
Less than 5	52	14.9
5 – 8	172	49.4
9 – 13	96	27.6
Above 13	28	8.0
Total	348	100

4.1.2 Socio-economic characteristics

Socio-economic variables that were considered include education level, occupation, area of residence, time taken to reach water source and reasons for migrating to the study area.

4.1.2.1 Education level and occupation

The findings in Table 6 indicate that about 65% of the respondents attended primary school education only while 24% have no formal education. More than half (55.8%) were peasants while others were tobacco labourers, livestock keepers or lived by doing fishing. Very few reported to be housewives, employed in formal sector or self-employed in non-agricultural activities.

4.1.2.2 Residence area and time taken to reach source of water

The findings in Table 7 show that more than a half (55.2%) of the respondents was from Kasekese small town and the remaining half was distributed in Majalila and Ikola. On the other hand, more than half (52.9%) of the respondents walked a long distance from their homestead to the source of drinking water for more than 30 minutes while very few (17.5%) walked for less than 5 minutes.

4.1.2.3 Reasons for migration of respondents

Findings in Table 8 show that 48% of the respondents migrated due to settlement restriction by Government while 15.5% did so due to searching land for agriculture. Other reasons included searching for business establishment, pasture for livestock, family reunion or access to education.

Table 6: Distribution of sampled respondents by their education level and occupation

Characteristic	Number	Percentage
Education level		
Non formal education	82	23.6
Adult education	22	6.3
Primary school only	226	64.9
Secondary school	15	4.3
Diploma/certificate	1	0.3
University	2	0.6
Total	348	100
Occupation		
Housewives	1	0.3
Employed in formal sector	7	2.0
Self – employed	17	4.9
Livestock keeper	48	13.8
Peasant	194	55.8
Fishing	28	8.0
Tobacco labourers	53	15.2
Total	348	100

Table 7: Area of residence and time spent to the water source

Characteristic	Number	Percentage
Resident area/Location		
Ikola	75	21.6
Majalila	81	23.3
Kasekese	192	55.2
Total	348	100
Duration in minutes to the source of water		
Less than 5	61	17.5
6 – 30	103	29.6
31 – 60	105	30.2
Above 60	79	22.7
Total	348	100

Table 8: Reported main reasons for migrating of respondents

Reasons mentioned	Number	Percentage
Admired the area	4	1.2
Formal employment	8	2.3
Fishing activity	13	3.7
Family union	32	9.2
Access to education	19	5.5
Searching pastures for livestock	23	6.6
Business establishment	28	8.0
Searching land for agriculture	54	15.5
Settlement restrictions by government	167	48
Total	348	100

4.1.3 Other characteristics of sampled adult respondents

The findings in Table 9 indicate that more than three quarters (79.6%) of the respondents have not received any nutrition training, and the majority (92.5%) sought nutrition advice from hospital / health facilities.

Table 10 indicates that about two thirds (63.5%) of respondents obtained water from shallow wells, followed by one quarter who relied on tap water. On the other hand, the majority (89.9%) of the respondents relied on women to fetch water.

Table 11 shows that all (100%) of respondents faced problems of lacking shelter and high prices of food in the market. Other problems faced by majority included food shortage (98.3%), and lacking access to health services (94.8%).

Table 9: Distribution of respondents according to training and source of nutrition advice they received

Characteristic	Number	Percentage
Receiving training on nutrition		
Received some training	71	20.4
Have not received any training	277	79.6
Total	348	100.0
Seeking of nutrition advice		
From friends	10	2.9
From relatives	16	4.6
From Hospital/health facility	322	92.5
Total	348	100

Table 10: Distribution of respondents according to water source and responsible person for fetching water for household use

Characteristic	Number	Percentage
Water source for household use		
Shallow well	221	63.5
Deep well	3	0.9
Taps	87	25
Pond	4	1.1
Lake	19	5.5
Rivers	14	4.0
Total	348	100
Responsible person for fetching water		
Men	8	2.3
Women	313	89.9
Male children	2	0.6
Female children	26	7.5
Caregiver	2	0.6
Total	348	100

Table 11: Reported problems faced after migrated to small town

Problem	Number	Percentage
Food shortage	342	98.3
Lacking land for settling	85	24.4
Lacking shelter	348	100
Communication problems with residents	153	44
High market food prices	348	100
Lacking access to health services	330	94.8
Death of members of family	2	0.6

4.1.4 Characteristics of sampled underfive children

More than half (54.9%) of the study children were girls while 45.1% were boys (Table 12). On the other hand, 33.6% of the children were between 7 to 13 months while 15.8% were between 14 and 20 months. Very few were of the age between 34 and 53 months.

Table 12: Distribution of study children by sex and age

Characteristic	Number	Percentage
Sex of under-fives		
Boys	157	45.1
Girls	191	54.9
Total	348	100
Age of under-five children in months		
Less than 6	27	7.8
7 – 13	117	33.6
14 – 20	55	15.8
21 – 26	38	10.9
27 – 33	50	14.4
34 – 40	8	2.3
41 – 46	10	2.9
47 – 53	4	1.1
54 – 60	39	11.2
Total	348	100

4.2 Nutrition Status

4.2.1 Nutrition status of adults

The findings indicate that about three quarters (74.1%) of respondents had normal nutrition status while 5.5% were underweight, 5.2% were obese while 15.2% were overweight (Table 13). The findings also distinguish the nutrition status for men and women. Results in Table 14 show that the mean BMI of women was 22.929 and that of

men to be 22.262; however the difference was not statistically significant. In general, mean BMI for Ikola was 23.567 while that of Kasekese was 22.817 and Majalila was 21.841 (Table 14). While comparison of the mean BMI for Ikola and Kasekese showed no significant difference, the two were different from that of Majalila.

4.2.2 Nutrition status of study children

The findings show that 15.5% of the sampled under-five children were wasted (moderate and severe) while 45.1% were stunted and 38.5% were underweight (Table 15). The findings in Table 16 indicate that boys were more affected by stunting (mean Z-score of -1.9612) as compared to girls with mean Z-score of -1.4020. Also it shows that boys were more affected by underweight (mean Z-score of -1.7587) as compared to girls (mean Z-score of -1.3516). The study children in Majalila small town were more affected by underweight (mean Z-score of -1.8638) as compared to Ikola (mean Z-score of -1.3088) and Kasekese (mean Z-score of -1.4851).

Table 13: Percentage distribution of adult respondents according to their nutrition status

Nutrition status category	Men (n=93)	Women (n=255)	Total (n=348)
Normal	77.4	72.9	74.1
Underweight	6.5	5.1	5.5
Overweight	12.9	16.1	15.2
Obese	3.2	5.5	4.9
Morbidity obese	0	0.4	0.3
Total	100	100	100

Table 14: T-test results for comparison of mean BMI of respondents

Variable	Mean BMI	Mean value	T-value	P-Value
Sex	Male(n=93)	22.262	-1.476	0.141
	Female(n=255)	22.929		
Location	Ikola (n= 75)	23.567	1.445	0.150
	Kasekese (192)	22.817		
	Ikola (n=75)	23.567	2.788	0.006**
	Majalila (n=81)	21.841		
	Kasekese (n=192)	22.817		
Majalila (n=81)	21.841			

*P≤ 0.05 **P ≤ 0.01

Table 15: Percent distribution of under-five children according to their malnutrition status

Nutrition Index	Malnutrition status		
	Moderate	Severe	Total
Wasting			
Boys(n=157)	12.7	7.1	11.5
Girls(n=191)	10.5	1.6	4.0
Stunting			
Boys(n=157)	26.75	27.39	23.3
Girls(n=191)	20.42	17.28	21.8
Underweight			
Boys(n=157)	21.02	26.11	22.4
Girls(n=191)	23.56	7.85	16.1

Table 16: T-test results for mean Z-scores of study children

Variable	Mean Z-score	Mean Value	T- value	P-value
Sex	WHZ			
	Boys (157)	-1.0245	-1.264	0.207
	Girls (191)	-0.7740		
	HAZ			
	Boys (157)	-1.9863	-2.721	0.007**
	Girls (191)	-1.4020		.
Location	WAZ			
	Boys (157)	-1.7587	-2.440	0.015*
	Girls (191)	-1.3516		
	HAZ			
	Ikola (n=75)	-1.3119	1.906	0.058
	Majalila (n=81)	-1.8132		
	Ikola (n=75)	-1.3119	1.490	0.137
	Kasekese (n=192)	-1.7416		.
	Kasekese (n=192)	-1.7416	0.259	.0796
	Majalila (n=81)	-1.8132		
	WAZ			
	Kasekese (n=192)	-1.4851	1.812	0.071
	Majalila (n=81)	-1.8638		
	Ikola (n=75)	-	0.833	0.405
Kasekese (n=192)	-1.4851			
Ikola (n=75)	-1.3088	2.299	0.023*	
Majalila (n=81)	-1.8638			
WHZ				
Kasekese (n=192)	-0.7547	1.910	0.057	
Majalila (n=81)	-1.2296			
Ikola (n=75)	-0.8557	-0.409	0.683	
Kasekese (n=192)	-0.7547			
Ikola (n=75)	-0.8557	1.296	0.197	
Majalila (n=81)	-1.2296			

*P ≤ 0.05, **P ≤ 0.01

4.3 Breast Feeding Practices of Children of Below Five Years of Age

Four issues of breast feeding practices were considered for assessment. They included feeding of colostrum, time taken before initiation of breastfeeding after delivery, extent of doing exclusive breastfeeding in the first six months, and duration of breastfeeding.

4.3.1 Colostrum feeding and initiation of breastfeeding after delivery

The findings (Table 17) indicate that majority of mothers breastfed their infants with colostrum (85.1%) while few did not for different reasons. The findings also indicate that, three quarters (75.3%) of mothers initiated breast feeding within one hour after delivery while others took longer. It appears that among mothers who did not feed colostrum, most of them either believed that it is not safe or were having some cultural restrictions (Table 17).

Table 17: Distribution of respondents according to colostrum feeding and initiation of breastfeeding

Characteristic	Number	Percentage
Feeding colostrum		
Fed colostrum	296	85.1
Did not feed colostrum	52	14.9
Total	348	100
Reasons for not feeding colostrum		
Believes that it is not safe	28	53.8
Cultural restriction	21	40.4
The child was sick	3	5.8
Total	52	100
Time taken to initiate breastfeeding after delivery		
Within less than one hour	262	75.3
Within one to three hours	49	14.1
More than three hours	30	8.6
Don't know	7	2
Total	348	100

4.3.2 Exclusive breastfeeding and duration of breastfeeding

The findings (Table 18) show that 77% of the interviewed mothers breastfed exclusively their babies for the first six months while the remaining 23% could not. Reasons given for not breastfeeding exclusively for the first six months included child crying for what the mother felt was hunger or thirsty and therefore gave food (porridge) or water. Results also show that 73% of mothers stopped breastfeeding after two years while very few stopped after just one year; others went on for up to three years (Table 18).

Table 18: Distribution of respondents according to their breastfeeding practices

Characteristic	Number	Percentage
Exclusive breastfeeding of children for first six months		
Did exclusive breastfeeding	268	77
Did not breastfeed exclusively	80	23
Total	348	100
Reasons for not exclusively breastfeeding		
Gave porridge because a child was crying	60	75
Gave water because a child was crying	20	25
Total	80	100
Duration of breastfeeding		
One year	1	0.3
One year and six months	28	8.0
One year and eight months	52	14.9
Two years	254	73
Three years	13	3.7
Total	348	100

4.4 Most Affected Stage of Underfive Children by Malnutrition

Study children were divided into four age categories for investigation. The categories were as following: 0-6months, 7-26 months, 27-40 months and 41-60 months. T-testing was used to compare mean Z-score values of each of the four age categories and for various forms of malnutrition. Results are summarized in Table 19.

4.4.1 Height-for-Age (Stunting)

Among the tested age groups, the results show significant differences in three cases. The age category of 7-26 months was more affected by stunting than their counterparts of 27-

40 months ($P \leq 0.01$). Similarly, the 7-26 months infants were more stunted than the 41-60 months ($P \leq 0.001$). On the other hand, the 0-6 months age group was more affected than the 41-60 months age group ($P \leq 0.05$).

4.4.2 Weight-for-Age (Underweight)

None of the test age groups was significantly different from the others in terms of underweight (weight-for-age).

4.4.3 Weight-for-Height (Wasting)

Two aspects were noted to be significantly different (Table 19), both involving the 27-40 months age group. In the two aspects, the 27-40 months age group was more affected than either 7-26 months or 0-6 months age groups.

Table 19: T-test results for mean of Z-scores of various age categories

Nutrition Index	Age category	Mean Z-score value	T-value	P-value	
Height-for-Age (HAZ)	Wasted {	7 - 26 (n=210)	-1.9612	-2.940	0.004**
		27-40 (n=58)	-1.1141		
		7 - 26 (n=210)	-1.9612	-3.571	0.000***
		41-60 (n=53)	-0.9040		
		27-40 (n=58)	-1.1141	-0.608	0.544
		41-60 (n=53)	-0.9040		
	Stunted {	0 - 6 (n=27)	-2.0467	-2.348	0.021*
		41-60 (n=53)	-0.9040		
		0 - 6 (n=27)	-2.0467	-1.907	0.060
		27-40 (n=58)	-1.1141		
		0 - 6 (n=27)	-2.0467	-0.205	0.837
		7 - 26 (n=210)	-1.9612		
Weight-for-Age(WAZ)	27-40 (n=58)	-1.6255	-1.702	0.092	
	41-60 (n=53)	-1.1987			
	7 - 26 (n=210)	-1.5850	-1.634	0.103	
	41-60 (n=53)	-1.1987			
	0 - 6 (n=27)	-1.6148	-1.167	0.247	
	41-60 (n=53)	-1.1987			
	0 - 6 (n=27)	-1.6148	0.028	0.978	
	27-40 (n=58)	-1.6255			
	7 - 26 (n=210)	-1.5850	0.173	0.863	
	27-40 (n=58)	-1.6255			
	0 - 6 (n=27)	-1.6148	-0.088	0.930	
	7 - 26 (n=210)	-1.5850			
Weight-for-Height (WHZ)	7 - 26 (n=210)	-0.7393	2.628	0.009**	
	27-40 (n=58)	-1.4871			
	0 - 6 (n=27)	-0.4663	2.717	0.008**	
	27-40 (n=58)	-1.4871			
	0 - 6 (n=27)	-0.4663	0.665	0.507	
	7 - 26 (n=210)	-0.7393			
	27-40 (n=58)	-1.4871	-1.789	0.076	
	41-60 (n=53)	-1.0300			
	7 - 26 (n=210)	-0.7393	1.002	0.317	
	41-60 (n=53)	-1.0300			
	0 - 6 (n=27)	-0.4663	1.634	0.106	
	41-60 (n=53)	-1.0300			

*P ≤ 0.05, **P ≤ 0.01 and ***P ≤ 0.001

CHAPTER FIVE

5.0 DISCUSSION

5.1 Overview

This study explored the nutritional situation of recent migrants in Mpanda district, in Katavi region Tanzania. The study involved 348 randomly selected respondents with their children of below five years of age. Four nutrition aspects were assessed, namely:

- Nutrition status of adults
- Nutrition status of children below five years of age
- Breastfeeding behavior of children below five years of age
- The most affected age category of children below five years of age

5.2 Nutrition Status of Adults

Anthropometric results showed that the nutrition transition is surely underway in the study area. This was illustrated by high prevalence of overweight and obesity among adults in the study small towns. People in towns are known to consume more animal-source foods, sugar, fats and oils, refined grains, and processed foods which contribute on weight gain Hawkes *et al.* (2017). Weight gain is not only associated with diet intakes but also low level of physical activity.

Other studies show differences in overweight and obesity between men and women in urban areas. For example, Monasta *et al.* (2010) found that overweight and obesity were influenced by genetic and other biological factors, as well as micro and macro-environmental factors.

The current study indicates that, among the respondents, 12.9% men and 16.1% women were overweight (Table 13), which were however, not statistically significant different.

Lack of significant difference of overweight and obesity between men and women in this study can be due to men and women equal involvement in casual works where they spend a lot of energy (Wood *et al.*, 1991). There are also noted differences in nutrition status of adults between Ikola and Majalila sites. These location differences may be due to the main activities conducted in those towns. Ikola small town is located along the coastal area of lake Tanganyika where fishing is their main activity while Majalila small town is famous for tobacco production. Fish was easily accessible in Ikola small town as compared to Majalila small town which is far from lake Tanganyika. Most of migrants in Ikola are able to purchase fish for their households use because the market price is within their purchasing power as compared to Majalila small town where the market price of fish is high and only few migrants afford. Kranz *et al.* (2017) found that diet of dwellers along Islands/lake shores is heavily influenced by the maritime resources which provide important nutrients, such as long-chain omega-3 polyunsaturated fatty acids (n-3 PUFA). This is likely to help the adults in Ikola to be well nourished as compared to Majalila small town where the main activity was tobacco production, where migrants work as casual labourers.

Similarly, the nutrition status in Kasekese and Majalila small towns were significantly different. This may be due to Kasekese small town being famous in food crop production (maize and rice) and also its close proximity to Ikola small town whereby migrants can easily move to Ikola to buy fish compared to Majalila small town where it is very far. This study is in line with the study by Mayige *et al.* (2012) who found that the prevalence of overweight and obesity was 22% among males and 26% among females, and whereby overweight and obesity was associated with unhealthy diet, alcohol consumption, high blood pressure, high cholesterol levels, and lack of physical activity.

5.3 Nutrition Status of Children Below Five Years of Age

Another important aspect to consider in this study in terms of the nutrition transition is so-called double burden of malnutrition. Both undernutrition and overweight and obesity are rooted in poverty, and are increasingly coinciding in the expanding urban environment in low, middle-income countries and high-income countries (UNSCN, 2012). While the overweight and obesity were evidenced among adults, prevalence of wasting was 15.5% while stunting was 45.1% and underweight was 38.5% of children below five years of age. The stunting rate of 45.1% was higher than the national prevalence of 34% (URT, 2016). The prevalence of stunting differs from one region to another. For example, TFNC (2014) noted that a level of chronic malnutrition (stunting) considered “very high”, exceeding the 40% threshold was in 9 regions (Iringa, Njombe, Kagera, Dodoma, Ruvuma, Rukwa, Kigoma, Katavi and Geita) among which 3 regions were above 50% (Iringa, Njombe and Kagera). In the study conducted by Semali *et al.* (2015), about half (49.7 %) of the children were stunted because most of them were from households where the head of family was young (below 35 years). Stunting of children below five years of age indicates a prolonged insufficient intake of body nutrients over a period of time.

The traditional weaning foods in Tanzania depend on cereal and non-cereal based foods from maize, sorghum, millet, rice, cassava, potatoes, yams and plantains which are known for their high bulkiness and concentrations of fiber which reduce the bioavailability of some essential nutrients (Muhimbula and Issa-Zacharia, 2010). These are likely to result into insufficient intake of nutrients for the body.

Also water used for drinking and preparation of food can be a source of pathogenic agents whereby in almost all regions of Tanzania, water is often contaminated. For example, an assessment of the microbiological quality of water used for reconstitution of complementary foods in Zanzibar indicated that the water was highly contaminated with pathogens (Kung'u *et al.*, 2009) and failed to meet the standards recommended by the

World Health Organization for quality of drinking-water (WHO, 1997). Improper storage and handling of cooked food is equally responsible for food borne illnesses, as during storage especially at ambient temperature (28 to 35⁰ C) there is the risks of multiplication of pathogenic organisms. Under favourable conditions, a single bacterium can multiply to 500 million bacteria in 10 hours. This condition is a predisposing factor of diarrhea diseases and most of these pathogens have been isolated from complementary foods commonly consumed in developing countries (Muhimbula and Issa-Zacharia, 2010).

This study noted significant differences between boys and girls for mean Z-score values of HAZ and WAZ. The study done by Wamani *et al.* (2007) revealed that in 10 countries in sub-Saharan Africa, male children below five years of age are more likely to become stunted than their female counterparts due to sex differences which was more pronounced in the poorest, socio-economically households.

The study shows significant difference between Ikola and Majalila for underweight (WAZ) probably due to the occupational activities done in each of the specific small town. The children in Ikola are likely of having good access to nutritious food (fish) as compared to children from Majalila small town, where parents are predominantly casual labourers in tobacco farming.

Other indices (mean Z-score values) were not significant different. This may be due to similar characteristics observed in those small towns, but it needs more research to establish the causes.

5.4 Breastfeeding Practices of Children Below Five Years of Age

Four issues of breastfeeding practices were considered namely: colostrum feeding, time of initiation of breastfeeding after delivery, exclusive breastfeeding for the first six months and duration of breastfeeding.

A child who has not been fed with colostrum is prone to repetitive illnesses, which can lead to insufficient intake of nutrients leading to chronic malnutrition (stunting). Stunting can be contributed by different factors. For example, Muhimbula and Issa-Zacharia (2010) found that contaminated traditional weaning food was a major risk factor in the transmission of diseases, especially diarrhea. Infants and young children are very susceptible to food borne diseases and if they consume contaminated foods, they are likely to contract infections leading to illness and often death. Setegn *et al.* (2012) found that once the infants are older (more than two months) in Ethiopia, women feel that breast milk is not enough and therefore introduce complementary foods. Sometimes it was the need to go back to work, which has contributed to early introduction of complementary foods. URT (2016) recommended that complementary foods should be introduced when a child is six months old to reduce the risk of malnutrition.

In this study, three quarters 75.3% of mothers initiated breastfeeding within one hour after delivery which is higher as compared to the national average of 51% (URT, 2016). Timely initiation of breastfeeding with colostrum helps an infant to get antibodies which protect against diseases. Breastfeeding within the first hour of life also prevents newborn death due to sepsis, pneumonia, diarrhea and hypothermia (Ekubay *et al.*, 2018). Mgongo *et al.* (2014) found early initiation of breastfeeding within 24 hours to be associated with reduction of neonatal deaths by 22%.

In the study, 77% of mothers were exclusively breastfeeding their babies for the first six months after delivery, but 23% did not for different reasons. Some believed that breast milk is not enough for their babies, and therefore gave food (porridge) or water. However such practices are not safe to the baby, which may lead to diarrhea (Moyo *et al.*, 2011).

WHO recommends that children should receive nothing but breastmilk (exclusive breastfeeding) for the first six months of life (WHO 2003).

There were variation of duration of stopping the babies breastfeeding, whereby 73% of mothers stopped after two years and very few stopped after one year or went up to three years. This variation may be due to lack of knowledge of exactly time of stopping breastfeeding their babies. According to URT (2016), children aged below 3 years in Tanzania are exclusively breastfed for an average of 3.9 months and breastfed for a duration of 20.1 months.

According to Chirande *et al.* (2015), stunting of children aged 0-59 months in Tanzania was influenced by several factors including age of the child, sex of the child, parent's level of education and literacy, household wealth index, place of delivery and type of delivery assistance. Hashim *et al.* (2017) noted that more than seven out of ten pregnant women were knowledgeable about key issues regarding appropriate breastfeeding practices such as: importance of colostrum, time of breastfeeding initiation, exclusive breastfeeding and time of introducing complementary feeding.

5.5 The Most Affected Stage (age categories) of Children of Below Five Years of Age

5.5.1 Height-for-Age (Stunting)

According to the results, the age of children who are mostly affected was 0 to 6 months with mean Z- score value of -2.0467 as compared to the age category of 7 to 26 months with mean Z-score value of -1.9612, age of 27 to 40 months with Z-score of -1.1141 and age of 41 to 60 months with mean Z-score value of -0.9040 (Table 19).

Children at age category of 41-60 months were able to eat family solid food from their households and sometimes from the neighbour's households and therefore they were better than those of 0-6 months age group ($P \leq 0.05$). A child of 0-6 months need to be

exclusively breastfed without giving any solid foods (URT, 2016), but mothers due to lack of knowledge, often think that breast feeding alone is not enough for the babies so they give other foods. Kyra *et al.* (2011) suggested that earlier introduction to solid foods offers no benefits, and particularly prior to 4 months which may be associated with negative outcomes such as inadequate nutrient and energy intake due to the stress on immature gastrointestinal, immune, and renal systems.

The children at the age of 7-26 months were more affected by stunting than their counterparts of 27-40 months ($P \leq 0.01$). At this age, the child is being introduced to solid foods (complementary foods) because breast feeding alone is not sufficient to fulfill the child body needs for growth and development. Solid foods can be the source of diarrhea if it is prepared in unhygienic conditions. Diarrhea leads to a reduction in food intake due to anorexia. A poor food intake is aggravated by loss of nutrients from diarrhea, leading to nutritional deficiencies with serious consequences for the growth and immune system of infants and children predisposing to malnutrition (Muhimbula and Issa-Zacharia, 2010). Also Khanal *et al.* (2013) and TFNC (2014) reported that the age of 7 to 26 months is a critical age of onset of malnutrition.

5.5.2 Weight-for-Age (Undernutrition)

In the study, none of the test age groups of study children was significantly different from the others in terms of underweight (weight-for-age). Further research is needed to investigate why underweight was not varying among the study children in these three small towns.

5.5.3 Weight-for-Height (Wasting)

The study shows that two age categories were noted to be significantly different (Table 19), both involving the 27-40 months age group. In the two aspects, the 27-40 months age

group was more affected than 7-26 and 0-6 months age groups. At that age of 27-40 months, children are likely to be fully weaned and therefore depend on family foods, whereby they are likely to be left to try to feed themselves, which they hardly manage. However, further research is required to be able to establish the actual cause for this observation.

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The overall objective of the study was to assess the nutrition situation of recent migrants in three selected small towns in Mpanda District where the focus was on nutrition status of adults and children below five years of age. The study also investigated the breastfeeding behavior and identified the most affected age group among the children below five years of age by malnutrition.

The nutrition status of adults showed that 20.4% were overweight or obese and 5.5% were underweight. There was no significant difference between men and women. Significant relationship was noted between nutrition status and location of study whereby Ikola town showed a better nutrition situation compared to Majalila town. Stunting rate of children below five years of age was higher than the national prevalence and higher than that of Katavi region.

Four breastfeeding practices were investigated namely; feeding of colostrum, time taken before initiation of breastfeeding after delivery, extent of doing exclusive breastfeeding in first six months, and duration of breastfeeding. Majority of mothers breastfed their infants with colostrum (85.1%) while few did not for different reasons. Three quarters of mothers (75.3%) initiated breastfeeding within one hour after delivering while others took longer. Beliefs and taboos were the hindrance factor to some mothers of not breastfeeding their infants with colostrums.

The study showed that majority of interviewed mothers breastfed exclusively their infants for first six months while few could not. The mentioned reasons for not breastfeeding

exclusively for first six months included child crying for what the mother felt was hunger or thirsty and therefore gave porridge or water. Also, the study showed that 73% of mothers stopped breastfeeding after two years while very few stopped after one year, others went up to three years.

The study children involved in this study were divided into four age categories for investigation as 0-6 months, 7-26 months, 27- 40 months and 41 -60 months. T-test was used to compare mean Z-scores for each of the four age categories. Results showed that younger babies were mostly affected by stunting soon after the age of receiving complementary foods than the older ones who were in most cases able to eat family meals. The most affected age category by wasting was 0-6 months followed by 7-26 months.

The study also showed that male babies were generally more prone to both stunting and underweight than baby girls. However no explanation could be deduced. Similarly, children in Majalila small town were more prone to underweight than in Ikola small town. Further research is needed to establish reasons for these differences.

6.2 Recommendations

The differences between men and women in overweight and obesity was not significant. Further research is required to be able to establish the actual cause for lacking significant difference of overweight and obesity between men and women in small towns.

While there are significant differences in stunting and wasting among different age groups, no significant difference was noted in underweight. Further research is needed to investigate why underweight was not varying among the study children in these three small towns.

The children of 27-40 months age group were more affected by wasting than 7-26 and 0-6 months age groups. At that age of 27-40 months, children are likely to be fully weaned. Further research on the feeding practices is required to be able to establish the actual cause for this observation.

Recent migrants who are likely to be struggling to find ways of living, should be identified through the Local Government and be given special attention to support their nutrition well-being.

The Government should have clear welfare policy that will consider migrants to new areas as vulnerable, and therefore provide them with special care.

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APPENDICES

Appendix 1: Questionnaire

1. The name of region..... 2. District.....

3. ID.....

4. Sex.....

5. Age of respondent.....

6. When did you migrate to small town?

i) 3- 9 months

ii) 10-18 months.

iii) 19-27 months.

iv) 28-36 months

7. Why you decided to migrate to the small town

i) Due to operation of unpublished settlement restriction

ii) Due to restriction of settlement in wild animal corridor

iii) Due to joining the family.

iv) Due to socialization.

v) Due to business establishment.

vi) Due to access to education

vii) Due to fishing activity

viii) Due to searching grasses for livestock.

ix) Due to formal employment.

x) Due to searching land for agriculture.

xi) Due to self- Employment.

xii) Due to plenty food

xiii) Due to diseases

xiv) Due to good transport.

8. The nutrition status of respondents

Anthropometric assessment for Adult

H/H No.	SEX	Weight (kg)	Height/Length (cm)	BMI

9. The location of respondent in the small town

- i. Ikola
- ii. Kasekese
- iii. Majalila

10. Marital status of the respondent

- i) Married monogamous
- ii) Married polygamous
- iii) Widowed
- iv) Married/Not married
- v) Divorced
- vi) Single
- vii) Co-habited

11. Occupation of the respondent

- i) Peasant
- ii) Farmer
- iii) Employed in a formal sector
- iv) Employed in an informal sector.
- v) Self – Employment
- vi) Housewife/Mother
- vii) Livestock keeper.
- viii) Fishing

12. How many people live in this Household?

- i) Relatives.....

ii) Children.....

13. The sex of under-fives

i) Boy

ii) Girl

14. What is the age of under-five child? Age.....

15. Breastfeeding Practices

1	Have you ever breastfed?	1= Yes 2= No	
2	Did you feed colostrum to your children?	1= Yes 2= No	
	If the response in 2 is no give reasons	1= Discarded 2= Was not safe for baby 3=Cultural restriction 4=Child was sick 5=Other (specify)	
3	When did you put your baby on the breast for the first time after delivery?	1=Within 1 hour after birth; 2= 1 to 3 hours after birth; 3= More than 3 hours after birth 6 = Doesn't know	
4	Did you breastfed your youngest child exclusively for the first six months?	1= Yes 2=No	

16 Nutrition statuses of under-five children

Anthropometric assessment for under-five

H/H No.	Sex	Age (enter DOB) (dd/mm/yy)	Age	Weight (kg)	Height/Length(cm)

17. The number of meals consumed by respondents before migrating to small town

i) One

ii) Two

iii) Three

iv) Four

v) Five

18. The number of meals consumed by respondents per 24 hours after migrating to small town

- i) One
- ii) Two
- iii) Three
- iv) Four
- v) Five

19. Do you use cooking oil during food preparation?

- i) Yes
- ii) No

20. What factors influence your consumption of different foods in a meal?

1=Availability

2=Affordability

3=Knowledge

4=Accessibility

5=Preparation time

6=Taste

21. What is your education level?

1=No formal education

2=Adult education

3=Primary school

4=Secondary school

5=Diploma/certificate

6=University

22. General Nutrition training, attitudes, perceptions and practices

1	Have you received any education and/or training about nutrition before?	1= Yes 2= No	
2	If yes where and when was the training offered	Please specify: Where..... When	
3	How often do you normally feed children 2 to 5	1=Once	

	years of age in a day? /number of meals per day per household.	2= Twice 3=Three times 4= Four times 5= Five times	
4	To whom do you seek advice and opinion about whether your baby is growing well or not?	1=Health centers 2=Relatives 3=Peers/friends 5=Others, specify 6=Do not know	

23. Water Sanitation and Hygiene

1	Where do you get your drinking water?	Mention...	
2	What time do you take from your homestead to the source of water mentioned (in question 1 about-walking time)? a) 0-5minutes b) 6-30 minutes c) 30 -60 minutes d) More than 60 minutes		
3	Who is responsible for fetching domestic water for your home use? a) Adult men b) Adult women c) Female children d) Male children e) House helpers f) Head of household g) Mother/caregiver		
4	What do you do, If drinking water comes from unclean source? a) Boiling b) Boiling and sieving c) Sedimentation method d) Drinking it.		

24. Diseases History and Conditions

1	In general, did you visit the local health facility within the last 3months for other reasons?	1= diarrhea 2= pneumonia 3= typhus 4= cholera 5=deworming 6= injury 7=other, specify.....	
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2	Could you afford the costs of the treatment(s)?	1= Yes 2= No	
3	What do you do if you couldn't afford the cost of treatment?, I went to..	i)Spiritual prayers ii) Traditional healers.	

25. Different activities done by sampled respondent

- i) Crop production, mention.....
- ii) Animal husbandry, mention.....
- iii) Fishing

26. Which problems you faced during migrating to small town?

.....

.....

27. If drinking water comes from unsafe source, what do you do?

.....

.....

28. Which problems you faced after arrival to small town?

.....

.....

29. What do you do if the food is not enough for your household?

.....

.....

THANK YOU FOR YOUR COOPERATION