

CHILD CARE PRACTICES AND NUTRITION STATUS OF CHILDREN (6 - 30 MONTHS) IN HOME-BASED AND CENTRE-BASED CHILD CARE CENTRES IN EMBAKASI EAST, NAIROBI, KENYA.

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DECLARATION AND APPROVAL

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This research proposal is my original work and has not been submitted or presented at any other University.

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ABSTRACT

Introduction: Home-based childcare centres and centre-based childcare centres play a part in improving the nutritional status of children under three. Childcare centres in the informal settlement have unclear childcare practices, including poor knowledge of caregivers on feeding practices, hygiene practices, and dietary requirements for children per day, which are contributors to undernutrition and overnutrition, resulting in increased risks associated with mortality and morbidity among children under the age of three. The study objectives assessed the socio-demographic characteristics of children, parents, and caregivers, as well as their dietary patterns and practices, children's nutritional status, and hygiene practices in both home-based and centre-based childcare settings.

Methods: The study employed a descriptive cross-sectional research design to establish childcare practices and nutrition status among children (6 - 30 months) in 26 childcare centres (13 home-based and 13 centre-based) in Embakasi East, Nairobi, Kenya. Quantitative data were analyzed descriptively using proportions, and a Chi-square test was used to determine association between variables, and a p-value of ≤ 0.05 was considered significant. The ENA/Epi Info software was used to calculate z-scores based on sex, age, and anthropometric measurements. The childcare centres were selected from all home-based and centre-based childcare centres in the Uthabiti Childcare network in Embakasi East. All 325 children in the childcare centres met the inclusion criteria; 69 available parents and 26 caregivers were included in the study.

Results: Findings show most Parents (97%) and caregivers/centre owners (78%) were aged 28-47 years. More than 50.7% of parents had secondary education, while 42% of caregivers had secondary education. The children had an almost equal gender distribution (49.2% female, 50.8% male). Over half (54.8%) of the children were aged 24-30 months, while 45.2% were 6-23 months. Most parents (63.8%) packed food for their children. Carbohydrate-rich foods were predominant (36%), with daily consumption of cabbage and porridge. Most children (96%) were fed rice, beans, and other vegetables. Animal protein consumption was low: Only 39% of centers offered eggs, 35% milk, 23% beef, and 10% sardines (omena). The overall prevalence of Wasting was 11.4% (7.7% severely and 3.7% moderately wasted), stunting was 39.4% (27.4% were severely and 12% moderately stunted), and Underweight was 23.4% (12.3% severe and 11.1% moderately underweight). Children in centers that practiced handwashing had lower rates of stunting (6.1% severe, 1.8% moderate; $p < 0.000$), wasting (6.1% severe, 1.5% moderate; $p < 0.004$), and underweight (8.9% severe, 8.3% moderate; $p < 0.03$). In contrast, centres that did not practice handwashing showed higher rates of undernutrition: 21.2% severe stunting, 10.2% moderate stunting, and 8.9% severe underweight. Stunting was also higher (16.6%; $p < 0.000$) in centers that used chemicals to treat water, while potty use was linked to lower stunting (9.8% severe, 4.3% moderate; $p < 0.0005$) and wasting (4.3% severe, 1.8% moderate).

Conclusion: Children's diet was mostly carbohydrate-rich foods with little protein-rich foods and fruits. There is a need to provide a diversified diet, and caregivers need to ensure meal provision as per WHO requirements. Findings found that poor handwashing practices, hence recommends caregivers' education on hygiene practices. The stunting, wasting, and underweight rates exceeded national averages of 18%, 5%, and 10%, respectively.

TABLE OF CONTENTS

DECLARATION AND APPROVAL	i
COPYRIGHT	ii
ABSTRACT	iii
LIST OF TABLES	ix
LIST OF FIGURES	x
ABBREVIATIONS AND ACRONYMS	xi
DEFINITION OF TERMS	xii
CHAPTER 1: INTRODUCTION	1
1.1 Background Information	1
<i>1.1.1 Definition and Types of Childcare Centres</i>	<i>1</i>
<i>1.1.2 Growing Demand and Drivers</i>	<i>1</i>
<i>1.1.3 Challenges of Informal Childcare</i>	<i>2</i>
1.2 Statement of the Problem	4
1.3 Research Objectives	7
<i>1.3.1 Broad Objective</i>	<i>7</i>
<i>1.3.2 Specific Objectives</i>	<i>7</i>
1.4 Research Questions	8
1.5 Justification of the Study	9
<i>1.5.1 Significance of the Study</i>	<i>10</i>
1.6 Scope	11
CHAPTER 2: LITERATURE REVIEW	12
2.1 Introduction	12

2.2 Socio-Demographic Characteristics of Children, Parents, and Caregivers, and Demand for Childcare Options	15
2.3 Hygiene Practices in Childcare Centres	17
2.4 Nutrition Status of Children in Childcare Centres	19
2.5 Dietary Patterns and Caregiver Practices.....	21
2.6 Research Gap	24
2.7 Conceptual Framework	25
CHAPTER 3: METHODOLOGY	28
3.1 Research Design.....	28
3.2 Study Site	28
3.3 Target Population/Study Population.....	28
3.3.1 <i>Inclusion Criteria</i>	29
3.3.1 <i>Exclusion Criteria</i>	29
3.4 Sample Size and Sampling Procedures.....	30
3.4.1 <i>Sample Size</i>	30
3.4.2 <i>Sampling Procedures</i>	30
3.5 Data Collection.....	31
3.5.1 <i>Data Collection Instruments</i>	31
3.5.2 <i>Pre-Testing</i>	31
3.6 Data Collection Procedures	32
3.7 Data Management and Analysis.....	34
3.8 Ethical Considerations and Informed Consent.....	34
3.8.1 <i>Privacy and Confidentiality</i>	35

3.8.2	<i>Obtaining Consent from Parents of the Study Participants</i>	35
3.8.3	<i>Withdrawal Procedures</i>	36
3.8.4	<i>Risks/Harm and Mitigation Measures</i>	36
3.8.5	<i>Study Benefits</i>	36
3.8.6	<i>Compensation</i>	37
CHAPTER 4: RESULTS		38
4.1	Introduction	38
4.2	Socio-demographic Characteristics of Children, Centre Owners/Centre Caregivers and Parents	38
4.3	The Dietary patterns and feeding Practices of children in Homebased and centre based childcare centres in Embakasi East.	45
4.4	The Hygiene practices of Children in Homebased and Centre Based Childcare Centres	53
4.5	Nutritional Status of Children in Home-based and Centre-based Childcare Centres	54
4.6	Association between Socio-demographic characteristics of children, feeding/dietary practices and hygiene practices of children with their nutritional status of children in homebased and centre based childcare centres in Embakasi East.	58
CHAPTER 5: DISCUSSIONS		67
5.1	Introduction	67
5.2	Socio-Demographic Characteristics of Children, Parents, and Caregivers in Home-Based and Centre-Based Childcare Centres	67

5.3 Dietary Patterns and Practices of Children in Home-Based and Centre-Based Childcare Centres	70
5.4 Nutrition Status of Children in Home-Based and Centre-Based Childcare Centres	75
5.5 Hygiene Practices of Children in Home-Based and Centre-Based Childcare Centres	76
CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS	81
6.1 Conclusion	81
6.2 Recommendations.....	82
6.3. Suggestions for Future Research Considerations.....	83
REFERENCES	84
APPENDICES	99
Appendix 1: Ethical Clearance /Research License from NACOSTI	99
Appendix 2: Informed Consent	100
Appendix 3: Data collection tools: Questionnaires and Observation Checklists..	104
Appendix 4: Embakasi East Sub County-study are Map	109
Appendix 5: ESRC Amref Health Africa Approval.....	110
Appendix 6: Similarity Report	111
Appendix 7: Home-based and centre-based child care centres under the Uthabiti network in Embakasi East with children 6- 30.....	112
Appendix 8: Hygiene Practices of Children in Homebased and Centre based Childcare centres.	114

Appendix 9: Association between Nutrition Status of children and childcare

Hygiene practices120



LIST OF TABLES

Table 4.1: Age and Sex Characteristics of Children.....	39
Table 4.2: Socio-Demographic Characteristics of Parents	42
Table 4.3: Age and Education Characteristics for Centre Owners/Caregiver.	43
Table 4.4: Childcare Centre Characteristics	45
Table 4.5: Dietary Practices of Children from Home.....	46
Table 4.6: Foods Commonly Packed from home for Children to eat at the centres.....	47
Table 4.7: Feeding patterns/frequency of children at the Childcare Centres.....	49
Table 4.8: Food commonly consumed by children in childcare centres.....	51
Table 4.10: Overall Prevalence of Child Nutritional Status	55
Table 4.11: Prevalence of Child Nutrition Status by Age	57
Table 4.12: Prevalence of Child Nutrition status by Sex.....	58
Table 4.13 Association between nutrition status and age and sex characteristics of children.	60
Table 4.14: Association between nutrition status and childcare dietary patterns and practices.....	63
Table 3.1 Home-based and centre-based child care centres under the Uthabiti network in Embakasi East with children 6- 30 months.....	112
Table 4.9: Hygiene Practices of Children in Homebased and Centre based Childcare centres.....	114
Table 4.15: Association between Nutrition Status of children and childcare Hygiene practices.....	120

LIST OF FIGURES

Figure 2.1: Conceptual Framework of the Study.....	27
Figure 4.1: Types of food packed from home.....	48
Figure 4.2: Food groups commonly given to children in childcare centres.....	52



ABBREVIATIONS AND ACRONYMS



CDC:	Centers for Disease Control and Prevention.
CSO:	Civil Society Organization
ECCD:	Early Childhood Care and Development
ECE:	Early Care and Education
ENA:	Emergency Nutrition Assessment
HAZ:	Height for Age Z-score
ILO:	International Labour Organization
IYCF:	Infant Young Child Feed
KDHS:	Kenya Demographic Health Survey
MAM:	Moderate Acute Malnutrition
NACOSTI:	National Commission for Science, Technology and Innovation
NCES:	National Center for Education Statistics.
NGO:	Non-Governmental Organization
NICHD:	National Institute of Child Health and Human Development
SAM:	Severe Acute Malnutrition
SPSS:	Statistical Packages for Social Sciences
UTHABITI:	Uthabiti Africa
UNICEF:	United Nations International Children's Emergency Fund
WASH:	Water Sanitation and Hygiene
WAZ:	Weight for Age Z-score
WHO:	World Health Organization
WHZ:	Weight for Height Z-Score

DEFINITION OF TERMS

Home-based Childcare centre

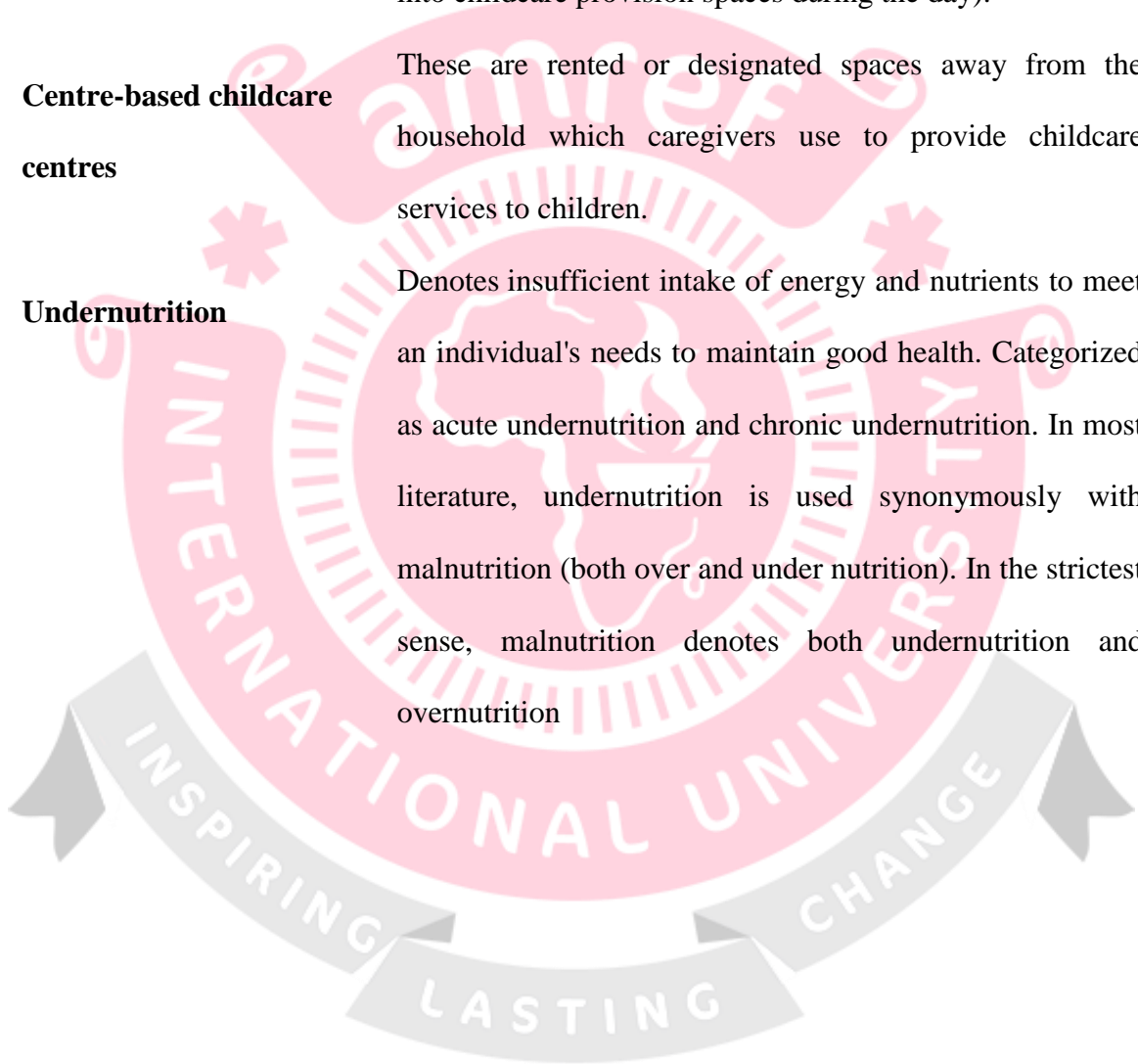
These are private home spaces used by caregivers to provide childcare services during the day while at night they are normal households for families (normal households turned into childcare provision spaces during the day).

Centre-based childcare centres

These are rented or designated spaces away from the household which caregivers use to provide childcare services to children.

Undernutrition

Denotes insufficient intake of energy and nutrients to meet an individual's needs to maintain good health. Categorized as acute undernutrition and chronic undernutrition. In most literature, undernutrition is used synonymously with malnutrition (both over and under nutrition). In the strictest sense, malnutrition denotes both undernutrition and overnutrition



CHAPTER 1: INTRODUCTION

1.1 Background Information

1.1.1 Definition and Types of Childcare Centres

Home-based childcare centres are family houses or private caregiver houses in informal settlements used as childcare centres during the day, while at night they are houses for the usually not licensed (NICHD, 2020). Center-based childcare centres are rented or designated premises or spaces that provide childcare services during the day and at night, but not in an individual household (AAP, 2021). The study will focus on the two types of informal childcare centres, which are home-based and centre-based. Most childcare centres are managed by women not trained in child caregiving practices. The parents or guardians of the children pay a small fee to childcare centre providers for their children to be cared for as they seek employment or work. Childcare centres may be considered part of the Early Childhood Care and Development (ECCD) system, where children are cared for by alternative caregivers apart from parents or guardians (Opiyo et al., 2022).

1.1.2 Growing Demand and Drivers

Urban Informal settlements have been growing rapidly in Kenya, and there appears to be a high demand for childcare services in these settlements. This has contributed to the mushrooming of these informal home-based and centre-based childcare centres. The parents bring the children to these centres as they go out to engage in various livelihood activities. This situation is similar to that in Bangladesh, based on a study done by Afzal (2021). Rural-urban migration in search of white-collar jobs increased female-oriented

labour market participation, and demand for alternative childcare services has thus led to the mushrooming of many home-based and centre-based childcare centres in the informal settlement.

In Kenya and many other African countries, women face huge challenges due to competing responsibilities on their time. They are often responsible for all activities about childbearing and care, domestic chores like preparing meals, collecting cooking fuel and water, and other non-domestic livelihood activities. This results in a heavy workload (IFAD, 2016). The informal childcare centres help relieve mothers of childcare activities so that they can engage in livelihood activities (Devercelli & Beaton-Day, 2020).

According to Hughes et al. (2021), 46% of employed and 23% of unemployed parents in the Korogocho slum of Nairobi utilized childcare services as an alternative strategy to primary childcare. This shows how widely home-based and centre-based childcare centres are being utilized in urban informal settlements as alternatives to parental caregiving for children under the age of three.

1.1.3 Challenges of Informal Childcare

Globally, informal childcare centers encounter challenges such as a lack of formal recognition and regulation, which often results in inadequate funding, poor infrastructure, and insufficient training for caregivers. In many low-income countries, enrollment rates for children aged 0–3 years in formal childcare services are below 20%, highlighting a significant gap in quality childcare provision (ILO, 2018). This gap forces many working parents, especially those in the informal economy, to rely on informal childcare arrangements that may not meet essential standards for nurturing care. Addressing these

challenges requires targeted interventions, such as supportive assessments and skills-building programs for childcare providers, to enhance the quality of care in these settings (Vazir et al., 2021).

In Kenya's informal settlements like Mukuru Kwa Njenga, there are many gaps and factors associated with quality services being provided by informal childcare centres to children under the age of three years (Hughes et al., 2021). This is mainly a result of pre-schools only admitting children between the ages of 4 and 6 years. Hence, there is a demand for childcare services for younger children less than three years old. However, many of the home-based and centre-based childcare facilities offer services that are of low quality and not well established (Muendo, 2014).

Informal childcare centers in Kenya, particularly within urban informal settlements, face numerous challenges that impact the quality of care provided to children under three years old: These centers often operate in overcrowded, unsanitary conditions, with limited resources and untrained caregivers, leading to knowledge gap in various childcare practices like hygiene and feeding of children under their care (Macharia, 2020). For instance, in Nairobi's informal settlements, some centers accommodate up to 25 children in a 10x10-foot space, leading to suboptimal health outcomes for the children (Kidogo, 2020).

Globally, childhood undernutrition continues to be a huge threat to public health, contributing to lost potential, morbidity, and mortality in children, with a 6.9% and 21.3% prevalence of wasting and stunting, respectively (UNICEF, 2020). Child undernutrition is an underlying cause for almost half of all deaths in children less than the age of 5 years (Gobena, 2022). In Kenya, informal childcare centers often struggle with limited

resources, resulting in inadequate nutrition and health care for children. A systematic review highlighted that while daycare programs can positively impact child development, the evidence on health and nutrition outcomes remains inconclusive, suggesting variability in the quality of care provided (Leroy et al., 2011). Overcrowding in these centers can hinder effective feeding practices and increase the risk of infections, further compromising children's nutritional status and overall health (Madiba et al., 2019).

In sub-Saharan Africa, undernutrition in children is of public health concern, but the challenge remains due to the complexity of this public health problem. Based on a mapping exercise done in 2017, there were 2700 informal home-based and centre-based childcare centres in Nairobi's informal settlements (Caddy, 2017). Some of these centres were observed to have poor hygienic conditions. According to a study done by Wahome and Mbatia (2017), childhood malnutrition in the Mukuru and Viwandani areas of Embakasi slums is associated with limited knowledge of child feeding practices and a knowledge gap on caregiving in childcare centres.

1.2 Statement of the Problem

In many developing countries, childhood malnutrition is still a public health challenge, contributing to nearly 35% of deaths among children less than five years old. Most of the children brought to these childcare centres are within the age range of 0-30 months. This age range includes those who require exclusive breastfeeding (0-6 months) and those who require complementary feeding (6-23 months and 24 -36 months). There are over 300,000 children in the urban informal settlements of Nairobi, approximately more than 2700

informal home-based and centre-based childcare centres with unclear situations on dietary, feeding practices, and hygiene practices (Caddy, 2017).

Most informal childcare centers lack appropriate facilities to support exclusive breastfeeding, such as refrigerators for storing breastmilk when mothers are unable to return to breastfeed their children (Kimani-Murage et al., 2022). Additionally, they lack information on how to properly store and warm breastmilk for infants aged 0–6 months under their care, increasing the likelihood of mixed feeding at an early age (Biks et al., 2021). This early introduction of complementary feeding has been associated with negative impacts on child nutrition outcomes, including an increased risk of undernutrition and infections (Ogbo et al., 2020). The majority of caregivers in informal homebased and centre-based facilities lack knowledge and skills on the required dietary diversification for children as per their age, leading to the provision of one type of food to children and below the recommended frequency (Khamis et al., 2023).

The hygiene conditions in childcare centers are uncertain, with limited information on how the lack of hygiene and sanitation facilities could lead to poor hygiene practices and later affect child nutrition outcomes (Sahiledengle et al., 2022; George et al., 2019). The lack of proper water, sanitation, and hygiene (WASH) facilities can contribute to the spread of infections, ultimately affecting child nutrition outcomes. George et al. (2019) explained that exposure to unhygienic environments can lead to enteric infections, which impair nutrient absorption and contribute to malnutrition. Similarly, Sahiledengle et al. (2022) highlight that poor WASH conditions increase the risk of diarrheal infections, which in turn heighten the likelihood of wasting and other adverse health outcomes among children.

In Nairobi County, Kenya, the stunting prevalence among children less than five is 11.1%, underweight, 5.3%, and wasting at 2.5% (Kenya National Bureau of Statistics, 2022). The infant mortality in Kenya as of 2022 was 32 deaths per 1,000 live births, and the child mortality was 42 deaths per 1,000 live births (Kenya National Bureau of Statistics, 2022). This clearly shows that, in every 20 children, one child dies before their fifth birthday. The relatively high mortality rate is associated with the high prevalence of malnutrition. In turn, the nutrition status is affected by the child's feeding and dietary practices, and hygiene conditions of the areas where the children dwell, among other factors, including caregiver knowledge and skills around caregiving in early years. The proportion of children who had diarrhea was 17.4%, out of many other childhood-related diseases, hence increasing the childhood morbidity rate in childcare centres.

According to the UNICEF (2016) report, the quality of childcare services for children aged 0 -30 months is very crucial as it also determines the health and nutrition status from childhood through to adulthood. While nutrition and early childhood education policies exist, there is limited research on their effective implementation and the quality of care provided in Kenyan childcare centers. This includes assessing caregiver training, child-to-caregiver ratios, challenges affecting the enforcement of nutrition guidelines, and adherence to early childhood development standards. Research is needed to identify the challenges faced by these centers in enforcing nutrition guidelines and to develop strategies to bridge this implementation gap. This study will explore childcare practices in the informal home-based and centre-based childcare centres under the Uthabiti network, which will contribute to more evidence-based information to support strengthening the childcare

practices, as it will reveal gaps that exist and inform key stakeholders on the strategic direction to support improving childcare services.

Globally, there is a scarcity of studies examining how nutrition education is integrated into childcare practices, particularly for caregivers handling children aged 2–5 years, and the role of the private sector in improving childcare. This gap hinders the development of comprehensive guidelines to improve child nutrition outcomes. The study, therefore, sought to contribute information on this sector by establishing childcare practices in the home-based and centre-based childcare centres and child nutrition status in the informal settlements in Embakasi, Nairobi.

1.3 Research Objectives

1.3.1 Broad Objective

The main objective of the study was to determine the dietary patterns, hygiene practices, and nutrition status of children between 6-30 (6-23 months and 24 30 months) months in home-based and centre-based childcare centres in Embakasi East, Nairobi County.

1.3.2 Specific Objectives

- i. To determine the socio-demographic characteristics of children (6-23 months, 24-30 months), parents, and caregivers in home-based and centre-based childcare centres in Embakasi East, Nairobi County.
- ii. To determine the dietary patterns and feeding practices of children in home-based and Centre-based childcare centres in Embakasi East.

- iii. To determine the hygiene practices of children in home-based and centre-based childcare centres in Embakasi East.
- iv. To determine the nutrition status of children in home-based and centre-based childcare centres in Embakasi East.
- v. To analyze the association between socio-demographic characteristics, feeding/dietary practices, and hygiene practices with the nutritional status of children in Home-based and Centre-based centres in Embakasi East.

1.4 Research Questions

- i. What are the socio-demographic characteristics of children (6-23 months, 24-30 months), parents, and caregivers in home-based and centre-based childcare centres in Embakasi East?
- ii. What are the dietary patterns and feeding practices of children in home-based and centre-based childcare centres in Embakasi East?
- iii. What are the hygiene practices for children in home-based and centre-based childcare centres in Embakasi East?
- iv. What is the nutrition status of children in home-based and centre-based childcare centres in Embakasi East?
- v. What is the association between socio-demographic characteristics, feeding/dietary practices, and hygiene practices with the nutritional status of children in Home-based and Centre-based centres in Embakasi East.

1.5 Justification of the Study

The study is of importance to several stakeholders working in the childcare ecosystem and partners in child & social protection policy and strategy platforms, with additional information on existing practices, gaps, and evidence vital in reforms and solution designs for young children in home-based and centre-based childcare centres in urban informal settlements.

Government Relevance on policy development & regulation: Many childcare centers in Kenya operate without strict regulations, leading to poor hygiene, inadequate nutrition, and substandard caregiving practices. This study provides data to inform policy adjustments and legislation to improve standards in early childhood care. **Public Health Strategies:** Malnutrition, stunting, and poor sanitation affect child growth and development. This study provides insights into how feeding practices, water safety, and hygiene influence child health, guiding governmental intervention programs.

Resource Allocation: Understanding where and how childcare centers struggle with nutrition and hygiene enables better distribution of public funds to support programs such as feeding programs, sanitation infrastructure, and caregiver training. **Advocacy and Policy**

Influence: CSOs rely on data-driven reports to advocate for better funding, childcare policy improvements, and caregiver training. The study provides concrete evidence to push for higher standards in Childcare facilities. By identifying gaps in caregiver knowledge and feeding practices, CSOs can design training programs that educate caregivers and parents

on proper nutrition, responsive caregiving, and hygiene maintenance. **NGOs/PBOs**
Relevance: NGOs focused on child nutrition, health, and education require reliable

research to secure funding from donors and global partners. This study provides up-to-date evidence to support investment in childcare improvement programs. Findings on dietary patterns, hygiene challenges, and malnutrition prevalence help NGOs create tailored interventions, such as nutrition-focused childcare models, hygiene training, and food supplementation initiatives.

Monitoring & Evaluation: The study provides a baseline assessment that NGOs can use to measure progress and impact of early childhood development (ECD) programs over time. This study is timely and necessary as it directly informs government policies, CSO advocacy efforts, and NGO interventions. Addressing knowledge gaps in childcare feeding practices, hygiene standards, and caregiver support contributes to SDG 2 (Zero Hunger) – Ensuring adequate nutrition for children to prevent all forms of malnutrition. The study will also contribute to SDG 3 (Good Health and Well-being) – Promoting proper feeding and caregiver practices that contribute to overall child health and disease prevention. These will improve child nutrition, health outcomes and ensure sustainable, high-quality childcare services in Kenya’s informal settlements.

1.5.1 Significance of the Study

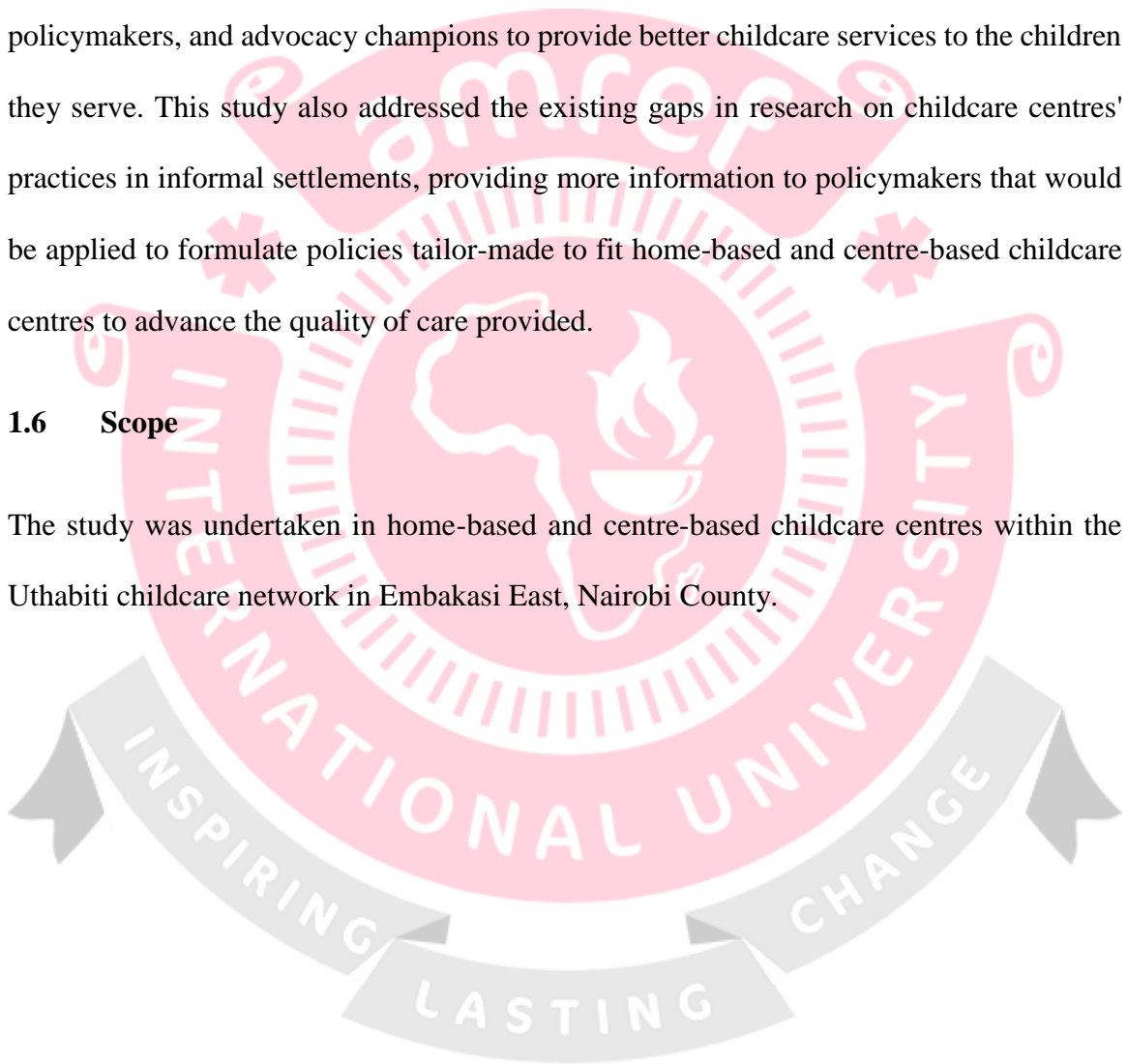
The study provided insight to parents who utilize the option of home-based and centre-based childcare centres on the nutrition and hygiene practices that childcare centres are providing to their children. Evidence-based information has been provided on the current childcare practices in the informal settlement and the nutritional status of the children. This will contribute to equipping the mothers with information to make decisions related to child nutrition and diet when taking their children to the centers. The findings of this study have

the potential to enhance the children's nutritional status and reduce childhood morbidity and mortality in the urban informal settlements.

This study also helps position the childcare providers on a better platform to voice out challenges faced and seek collaborative and inclusive support from other stakeholders, policymakers, and advocacy champions to provide better childcare services to the children they serve. This study also addressed the existing gaps in research on childcare centres' practices in informal settlements, providing more information to policymakers that would be applied to formulate policies tailor-made to fit home-based and centre-based childcare centres to advance the quality of care provided.

1.6 Scope

The study was undertaken in home-based and centre-based childcare centres within the Uthabiti childcare network in Embakasi East, Nairobi County.



CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

Chapter Two provides a review of relevant existing literature. This aims at identifying the gaps and adopting the previous studies conducted in similar fields. The first section reviews the global, regional, i.e., developing countries, country-level, and contextual informal socio-demographic status of women and the effects of home-based and centre-based childcare centres practices on the nutritional status of children 6 to 30 months. This section also contains a conceptual framework that guides the study.

2.1.1 The Global and Local Landscape of Childcare Services in Urban Informal Settlements

Early childhood plays a fundamental role and contributes to young children's development, growth, and health (CDC, 2023). The most recent data by the United States indicates that 60 percent of children between the ages 0 to 3 living in the United States were placed under non-parental care at centre based child-care centres (41%), home care by a relative (26%), and/or home-based childcare by a non-relative (5%), (NCES, 2021). These childcare centres form a part of the network of Early Care and Education programs. Early Care and Education programs include appropriate caregiving and one or more feedings, making Early Care and Education providers key players in the implementation of feeding and dietary guidelines targeting young children (Benjamin-Neelon, 2018).

Globally, according to The World Bank (2022), more than 40% of nearly 350 million children between 0 to 30 months need a quality home-based or centre-based childcare

centre but do not have access to quality childcare services. Many children spend time in an unhygienic environment with no proper nutrition care. The children - spend a better part of their day in home-based and centre-based childcare centres; therefore, their dietary intake is majorly determined by what is offered at the centres, with many centres having no feeding programs. The findings show 70% of parents aged 30 to 39 used childcare services in the preceding year, compared to 59% of parents aged 40 to 49, and 52% of parents aged 50 to 79 (Zhang et al., 2021).

The landscape of childcare services in urban informal settlements is characterized by inadequate infrastructure, unregulated facilities, and limited access to quality early childhood development programs. In many low-income urban settings, informal childcare centers emerge as a response to the growing demand for childcare among working mothers, yet these facilities often operate with minimal oversight and lack essential resources such as trained caregivers, proper sanitation, and nutritional support (UNICEF & WHO, 2021). Research indicates that in developing countries, the absence of structured childcare services significantly affects children's cognitive and physical development, leading to long-term socio-economic disparities (Black et al., 2021). Furthermore, local studies highlight that informal childcare providers in urban settlements often struggle with overcrowding, poor hygiene, and inadequate early learning materials, which contribute to suboptimal child outcomes (Abubakar et al., 2022). Addressing these gaps requires integrated policy interventions that improve service quality, enhance caregiver training, and ensure equitable access to early childhood care in marginalized urban areas (WHO, 2020).

Generally, in developing countries, many women face challenges in terms of the heavy load of household chores and other time-consuming domestic responsibilities, as well as the need to earn an income (Hallman, 2005). This has created a demand for informal home-based which are normal households for people at night while during the day, it is set to be used as childcare centre to children 0 -30 months in informal settlements and center-based childcare centres which are rented premises for the sole purpose of childcare provision during the day and at night to take up some of their childcare responsibilities.

In Kenya's informal settlements, many home-based and center-based childcare centres experience a low caregiver-to-child ratio that adversely affects the childcare practices in these centres. (Nampija et al., 2023). According to Premji (2014), poor feeding and hygiene practices, and crowded childcare facilities are not conducive to child development and growth. The article further mentions that the problem is complex and needs to be addressed holistically by multi-sectoral approaches involving both public and private sectors. Women living in Nairobi's informal settlement utilize strategies like combining work and caregiving for children, relying on next of kin and neighbors, or using home-based and centre-based care. They also highlighted several benefits of centre-based childcare for them and their young children, while acknowledging that high costs and quality of care were hindering them from accessing the services (Clark, 2021). These led to the mushrooming of home-based and centre-based care as the need was rising, despite the poor care, nutrition, hygiene, and health of the children. The study by Gelli et al. (2018) showed some improvement in the child diet at the childcare centres and the household level. However, according to the study by Leroy et al. (2012), the lack of training of the caregivers on

childcare practices hinders a potential positive impact of home-based and centre-based child care.

2.2 Socio-Demographic Characteristics of Children, Parents, and Caregivers, and Demand for Childcare Options

The demand for childcare services worldwide is largely influenced by socio-demographic factors such as parental employment, educational attainment, and household income. As more parents, especially mothers, join the workforce, the need for reliable childcare options continues to grow. The availability of childcare, its cost, and its proximity to workplaces or homes significantly shape parental decisions about childcare arrangements (Blau & Currie, 2006). Additionally, socio-demographic characteristics of children, such as age and developmental stage, impact the type of childcare services needed, with younger children often requiring specialized care and attention (NICHD, 2020)

2.2.1 Influence of Parental Education, Occupation, and Income on Child Nutrition

Parental education, occupation, and income significantly influence child nutrition outcomes, as they determine access to quality food, healthcare, and knowledge of appropriate feeding practices. Studies indicate that higher parental education levels are associated with improved dietary diversity and better nutritional status in children, as educated parents are more likely to adopt healthy feeding practices and understand the importance of balanced diets (Amah et al., 2021). Similarly, stable parental occupation and higher household income contribute to increased food security and the ability to afford nutrient-rich foods, reducing the risk of undernutrition in children (Tesfaye et al., 2022). Conversely, lower socioeconomic status is often linked to inadequate dietary intake, poor

feeding practices, and limited healthcare access, which negatively impact child growth and development (Biks et al., 2021).

In developing countries, like Colombia, for example, differences in childcare practices among primary caregivers significantly affect children's well-being, with access to structured early childhood care programs being lower in economically disadvantaged communities (Rodríguez et al., 2021). Similarly, a study in South Africa found that female caregivers in low-income households faced greater caregiving burdens, which negatively affected the quality of childcare and household nutrition (Gibbs et al., 2018). These findings highlight the disparities in childcare accessibility and quality in low-income settings.

In Kenya, socio-demographic factors such as caregiver education, household income, and location (urban vs. rural) strongly influence childcare choices and children's health outcomes. A study in Kericho County found that children whose caregivers had no formal education were significantly more likely to suffer from malnutrition, demonstrating the critical role of caregiver knowledge in child health (Kemei et al., 2022). Additionally, research in urban informal settlements, such as Nairobi's Dagoretti area, indicates that caregivers of children under two years old face unique challenges in accessing quality childcare services, which affects children's early health-seeking behaviors and nutrition (Muraya et al., 2022). Addressing these socio-demographic disparities is key to improving childcare options and overall child well-being in Kenya.

Similarly, according to a study by Nampijja (2023), most (74%) of women in Nairobi slum areas take their children to a childcare centre with 98% of the childcare providers being

women. Further findings from the article indicate that the mean age of women using childcare is 40 years, ranging from 23 to 63 years. Most (43%) of the women using childcare centres had primary education. One recent estimate suggests that 46% of employed and 23% of unemployed parents in the Korogocho slum in Nairobi use paid childcare as the primary childcare strategy.

2.3 Hygiene Practices in Childcare Centres

Childcare environments, where children interact closely and share resources, can facilitate the transmission of pathogens. Effective hygiene practices, including regular handwashing, sanitization of surfaces, and proper waste disposal, are crucial in mitigating these risks. However, as of 2023, approximately 2.3 billion people globally lacked access to handwashing facilities with water and soap at home, and 462 million children did not have access to handwashing facilities at schools (CDC, 2024). This deficiency underscores the need for improved hygiene infrastructure and education worldwide, and more research to provide insights to better strategies on how to address these gaps in childcare centres.

The immature immune systems of young children make them particularly susceptible to infections. Factors such as inadequate hygiene practices among childcare workers and inconsistent adherence to proper hygiene protocols contribute to this heightened risk (Yang et al., 2023). Implementing comprehensive infection prevention and control programs in childcare settings is essential to safeguard children's health.

In Kenya, access to safe water, sanitation, and hygiene (WASH) services remains a significant challenge, particularly in rural and underserved areas, informal settlements. Approximately 9.9 million people in Kenya rely on contaminated surface water sources,

and only 25% have handwashing facilities with soap and water at home (UNICEF Kenya, n.d.). These conditions pose substantial risks to children's health in childcare centres.

A study conducted in Londiani Sub-County, Kericho County, revealed that hygiene practices in Early Childhood centres are often inadequate. The research highlighted the need for better implementation of hygiene practices to ensure children's health and well-being (Kericho & Rebecca, 2016). Additionally, the lack of adequate WASH facilities in childcare centres has been identified as a contributing factor to preventable diseases among children in Kenya (Okwiri, 2022).

Diarrhea has been frequently reported as a huge problem in children attending home-based and centre-based childcare centres in informal settlements and one leading cause of death among children under five years (Mwapasa et al., 2022; Omona et al., 2020; Omona et al., n.d.; Thiam et al., 2017; Wahome & Mbatia, 2017).

A study by Khan et al. (2024) found that cleanliness of the children and their environment is significantly linked to child nutritional well-being and illness. In Bangladesh, an unhygienic floor or environment, a state was linked to morbidity at the developmental stages of a child who was crawling. The findings further highlight multiple sets of connections and how the effects of hygienic situations may be ascribed—to the caregiver's management and organization skills and her general attitude, as well as the direct physical effects of unsanitary surroundings on children's well-being (Nti & Lartey, 2008). Other vital hygiene-related issues in Bangladesh are linked to cultural beliefs: habits in potty training, hand washing, and hygiene of the food, and accessibility to modernized health services, which are major concern areas in home-based and centre-based childcare centres.

Good hygiene practices in childcare settings include proper handwashing with soap before meals and after using the toilet, regular cleaning and disinfection of surfaces and toys, safe food handling, and access to clean drinking water and well-maintained sanitation facilities (UNICEF & WHO, 2021). Proper waste disposal systems, well-ventilated sleeping areas, and ensuring children's hygiene, such as changing soiled clothes promptly, also contribute to a healthier environment (WHO, 2021).

Poor hygiene practices remain a challenge in many childcare centers, particularly in low-resource settings. Some common poor hygiene practices include inadequate handwashing among caregivers and children, limited access to clean water and soap, unhygienic food preparation and storage, and the use of shared bedding and play materials that are not regularly sanitized (Pickering & Boehm, 2021). Overcrowding in childcare centers also contributes to the spread of infections due to poor ventilation and close contact among children (Jones et al., 2022). Additionally, in some informal childcare settings, sanitation facilities are either absent or poorly maintained, increasing the risk of diarrhea, respiratory infections, and other hygiene-related illnesses (FAO, 2020). Addressing these gaps through training caregivers, providing adequate resources, and enforcing hygiene protocols can significantly improve child health outcomes in these settings.

2.4 Nutrition Status of Children in Childcare Centres

The provision of nutrition support is of concern with little or no support to infants during feeding and poor diets, as well as children fed on alcohol to sleep to avoid crying at some childcare centres (Hughes et al., 2021). The poor-quality childcare practices described under many circumstances reflect the wider context that children in informal home-based

and centre-based childcare centres in informal settlements face numerous adversities affecting their holistic growth and development.

In a study conducted by Kibua (2014), the overall prevalence of stunting among children under five years old was found to be 31.9%. The study further revealed that older children were more vulnerable to stunting, with prevalence rates of 46.3% among those aged 12–23 months, 38.3% among those aged 24–35 months, and 28.4% among those aged 36–47 months.

According to a study done by Kibua (2014), the nutrition status in informal home-based and centre-based care is widely poor with suboptimal diets and little support provided to infants in the centres. There is limited information on the quality of care provided in the informal home-based and Centre-based childcare in Kenyan urban centres. Yet such children may face multiple early childhood adversities including undernutrition. The paid informal home-based and Centre-based childcare centres have received very little attention to date in terms of research, policy direction, and quality services despite them being a great pillar in improving early childhood nutrition, health, and stimulation development. The study would help in shaping how we think and handle childcare issues because of this additional research information (Hughes et al., 2021).

Nutritional deficiencies during early childhood are linked to chronic diseases later in life, such as diabetes and cardiovascular conditions. Early intervention ensures better health trajectories and prevents stunting or obesity (UNICEF, 2022; Bhutta et al., 2020). Children under 30 months face high risks of malnutrition due to rapid growth demands. Intervening in childcare centers provides an effective mechanism to deliver essential nutrition

systematically (WHO, 2021). Childcare-based interventions teach healthy eating practices that influence not only the child but also their caregivers, helping to instill long-term dietary habits in communities (UNICEF, 2022).

2.5 Dietary Patterns and Caregiver Practices

Complementary feeding patterns in childcare centres are crucial for child survival and development. Children who are fed frequently on densely nutritious food at the childcare centers are protected against childhood malnutrition and child illnesses while inappropriate feeding of the child would contribute to undernutrition in children (Sarah, 2020; UNICEF, 2020b). The frequency of child feeding patterns has been realized to protect children against childhood malnutrition (Kimwele et al., 2017)

The home-based and centre-based childcare centers' dietary practices are frequently poor. Both home-based and center-based childcare providers encounter common barriers to implementing optimal dietary practices, including limited nutrition training, financial constraints, and inadequate food supply chains (CDC, 2015). These factors contribute to meals that fail to meet nutritional standards, increasing the risk of malnutrition and diet-related health issues among children. Addressing these issues requires targeted interventions, such as nutrition education for childcare providers and improved regulatory oversight to ensure consistent dietary quality in childcare environments (Vaughn et al., 2021).

The issue of child-to-caregiver ratio is growing in these centres which is affecting the feeding/dietary practices of younger infants/children. Caregivers in urban informal settlements receive little to no training in nutrition, hygiene, health, and caregiving. This

lack of skills affects child feeding, hygiene, and stimulation. As a result, children in these centers face higher risks of illness and mortality. Improving caregiver training is crucial to enhancing childcare quality and reducing health risks. (Gelli et al., 2018). Some of these conditions would include a lack of first aid skills which risks the health and safety of the children, unsafe and unhygienic environment placing the children at risk of diarrhea issues which is one of the top killer conditions in children less than three years old.

The provision of poor diet quality could lead to undernutrition or overnutrition, which affects more than 200 million children aged under three years (UNICEF et al., 2023). Many home-based and centre-based childcare centres do not have a feeding program as parents tend to bring packed food to the caregivers to feed the children. This practice can result in inconsistent nutritional quality, potentially contributing to malnutrition among children in these settings (Tovar et al., 2015). The pre-packed food is mainly carbohydrates with few occasions of pre-packed plant proteins and no animal protein for the children (Hurley et al., 2016).

Some studies have reported the poor state of some of the home-based and centre-based childcare centres. For instance, according to Orengo and Obegi (2020), caregivers practiced poor caregiving practices at the care centres in Naivasha, Kenya, these include; children being given alcohol or piriton syrups at the centres by caregivers to make them sleep once they get into the childcare centres. Such unethical practices hurt the social and mental well-being of the children and the nutrition, health, and milestones of these children at childcare centres (Hughes et al., 2021). The well-being and nutrition status of children in urban informal childcare centre are highly dependent and linked to childcare practices (Kibua, 2014).

Home-based and centre-based childcare has multiple sets of practices ranging from feeding practices of children, to actions promoting a healthy environment for the children. In UNICEF's conceptual framework for child nutrition, the care practices for the child and mother fall within the underlying factors of the two direct determinants of child nutrition and child growth impact (UNICEF & WHO, 2021). In addition, the beneficial effect on the physical growth and development of children through improvement in the quality of childcare practices and interactions of caregivers is also realized (WHO, 2004).

Proper nutrition during the first 30 months of life is crucial for optimal growth, development, and overall health outcomes. According to the World Health Organization (WHO), exclusive breastfeeding is recommended for the first six months, as it provides essential nutrients and strengthens the immune system. At six months, complementary foods should be introduced while continuing breastfeeding, ensuring they are nutritionally adequate, safe, and appropriately textured to meet the child's evolving needs. WHO emphasizes the importance of dietary diversity and feeding frequency during this period; however, globally, fewer than 25% of infants aged 6–23 months receive the recommended dietary diversity, contributing to malnutrition, including stunting and wasting (WHO, 2021).

The UNICEF Conceptual Framework on the Determinants of Maternal and Child Nutrition identifies immediate, underlying, and basic causes of malnutrition. Immediate causes include inadequate dietary intake and disease, while underlying factors encompass insufficient access to food, inadequate maternal and child care practices, and poor water, sanitation, and health services. Basic causes relate to broader socio-economic and political contexts that affect resource availability and control. This framework highlights the

multifaceted nature of malnutrition and underscores the need for comprehensive strategies addressing these various determinants to improve child nutrition outcomes (UNICEF, 2020).

Adhering to WHO's infant and young child feeding guidelines, alongside interventions targeting the determinants outlined in the UNICEF framework, is essential for preventing malnutrition and promoting healthy development in children under 30 months. Effective strategies must integrate adequate dietary practices with broader socio-economic and healthcare interventions to ensure long-term child health improvements (Black et al., 2021).

According to Tovar et al. (2015), the Latino Family Childcare Home (home-based childcare) providers found that caregivers had very minimal knowledge of healthy eating, despite having great positive beliefs and attitudes about healthy lifestyles, which prohibits their ability to be influential role models majority of home-based childcare centres fail to attain minimum childcare standards for nutrition, with areas drawing attention being frequent servings of fruit juice, frequent unhealthy foods prepacked by parents, with little to no nutrition capacity building or mentorship.

2.6 Research Gap

Despite the growing reliance on childcare centers in Nairobi's informal settlements, there remains limited information on the dietary and feeding practices, environmental conditions, and caregiver training and competency in nutrition, hygiene, and responsive caregiving, which directly impact children's nutrition, health, and development within these settings. The lack of data on how these factors contribute to poor anthropometric

outcomes and increased child mortality for children aged 0 to 30 months highlights a critical research gap (Kimani-Murage et al., 2021). Additionally, while home and center-based childcare centers play an essential role in early childhood development, little is known about the adequacy of their infrastructure, hygiene standards, and feeding frequency or support, particularly in informal settings (UNICEF, 2021). Limited research exists on the quality of feeding programs, with many centers lacking structured meal plans and relying on parents to provide packed food, leading to inconsistent dietary intake and potential malnutrition risks. Most existing studies focus on formal childcare settings, leaving a gap in understanding the challenges informal home-based and center-based childcare centers face in urban areas, where children are more vulnerable to poor nutrition and inadequate care. Furthermore, little research has examined the long-term effects of poor childcare practices on child health and nutrition outcomes.

Addressing these gaps through the current study will provide evidence-based insights to data that exists on the connections between the home-based and centre-based childcare dietary practices, hygiene practices, feeding frequency, socio-economic status of caregivers, and parents to children's anthropometric status is essential for developing targeted interventions that improve childcare quality, reduce malnutrition risks, and enhance child survival and development outcomes (Black et al., 2020).

2.7 Conceptual Framework

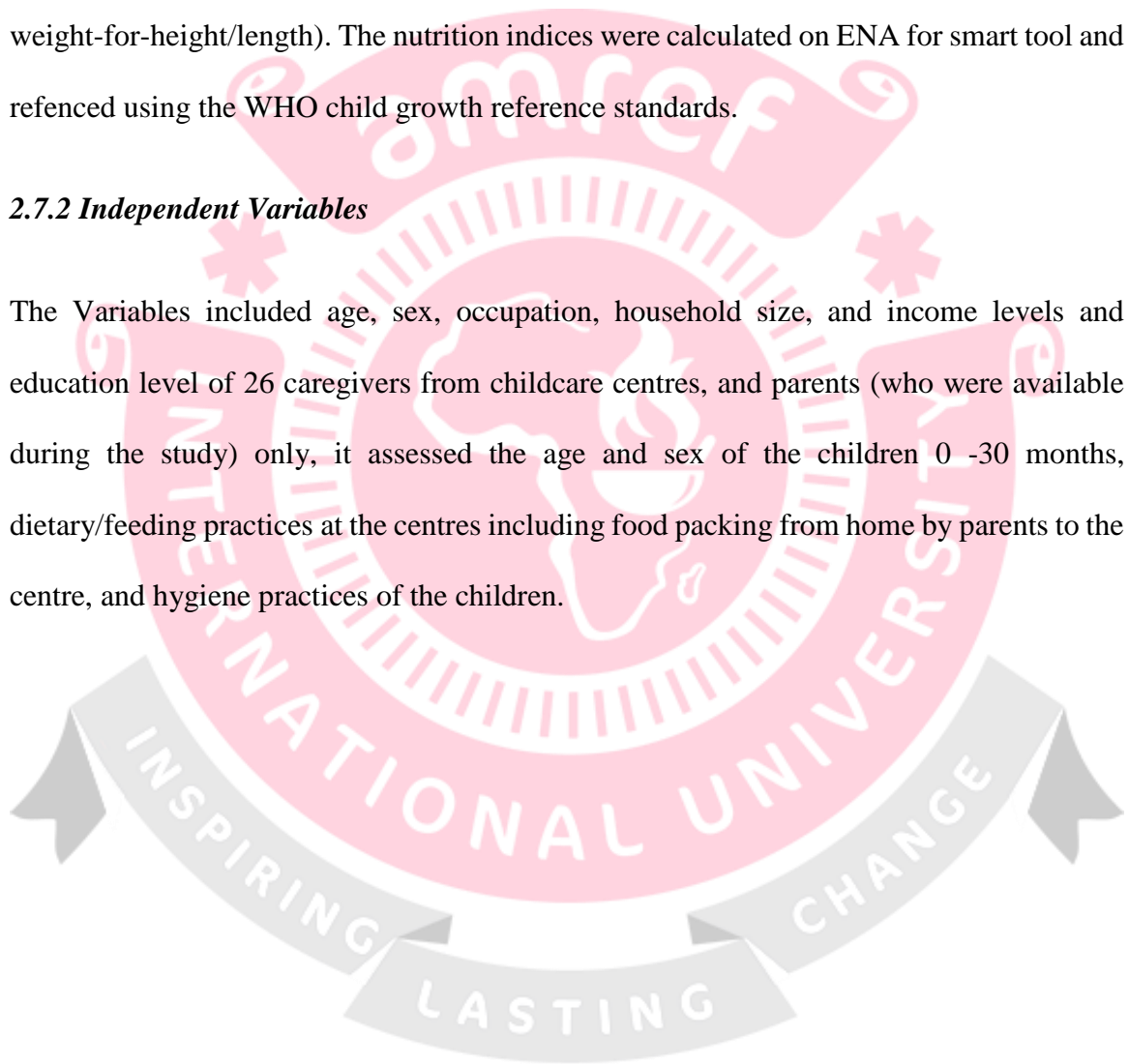
This is a hypothesized model that was used to identify concepts under the study and their relationship (Mugenda & Mugenda, 2003). This is used in conceptualizing the relationship between the independent and dependent variables.

2.7.1 Dependent Variables

Nutrition status was determined through anthropometry measurements. The three anthropometric indicators which were used for identifying undernutrition in children are: stunting (low height/length-for-age); underweight (low weight-for-age); and wasting (low weight-for-height/length). The nutrition indices were calculated on ENA for smart tool and referenced using the WHO child growth reference standards.

2.7.2 Independent Variables

The Variables included age, sex, occupation, household size, and income levels and education level of 26 caregivers from childcare centres, and parents (who were available during the study) only, it assessed the age and sex of the children 0 -30 months, dietary/feeding practices at the centres including food packing from home by parents to the centre, and hygiene practices of the children.



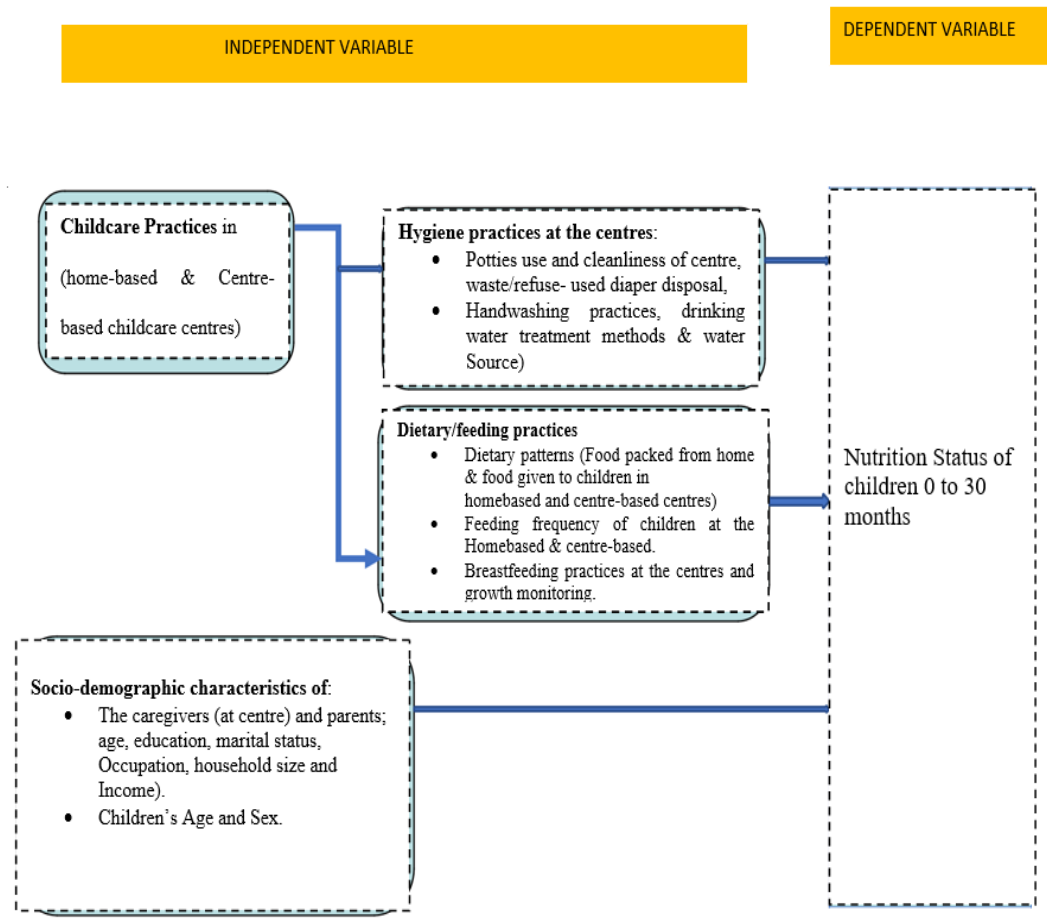


Figure 2.1: Conceptual Framework of the Study



CHAPTER 3: METHODOLOGY

3.1 Research Design

The study was a cross-sectional analytical research design and used both quantitative and qualitative methods to obtain data about the dietary patterns, nutrition status, and hygiene practices of children, in home-based and centre-based childcare centres.

3.2 Study Site

The study was in selected home-based and centre-based childcare centres within the Uthabiti network in Embakasi East, Nairobi County. Embakasi East has large informal settlements with more than five wards. The main source of income for residents of the sub-county is informal businesses and informal/casual employment. Many people, including women, seek employment at the nearby flower farms, industrial areas in Nairobi, and informal jobs within the informal settlement. This contributes to the demand for childcare options, hence leading to the mushrooming of childcare centres within the area. The majority of such centres are home-based and centre-based. The areas of Pipeline, Imara Daima, Matopeni as well as Mukuru kwa Njenga and Mukuru kwa Reuben provide opportunities for informal childcare businesses.

3.3 Target Population/Study Population

The sample study sites were 13 home-based and 13 centre-based childcare centres. The 26 Childcare centres were selected from the Uthabiti network in Embakasi East, these were all the centres under this particular network in Embakasi East at the time of the study. Therefore, the study included all the home-based and centre-based centres in the area

within the Uthabiti network in Embakasi East only. The study population was children between 0 -30 months, their parents, and the caregivers drawn from the study centres mentioned above. Uthabiti Childcare centre was a suitable network since it had both home-based and centre-based childcare centres, and the childcare centres are linked and subscribing to the network within Embakasi East sub-county, where the study was being conducted.

3.3.1 Inclusion Criteria

All children aged 0 to 30 months with a valid physical copy of their birth certificates/birth notification in the home-based and centre-based child care centres under the study and their parents and caregivers gave consent in all 26 home-based and centre-based childcare centres, **Table 14**. The parents included in the study are those who were available and had children 0-30 months in the 26 childcare centres under the study, and those who were available. The caregiver selection was done based on who was directly caring for the children in each of the 26 childcare centres (1 caregiver per the 26 centres, directly in charge of the children). These could include centre owners, caregivers, or centre managers, and they were the one interviewed (those directly caring for the children in each of the 26 childcare centres in the study).

3.3.1 Exclusion Criteria

The caregivers or parents who were not traceable, as well as the children who were sick and stayed at home (did not come to the childcare centres). However, during the study, no child was reported to be sick at the centres.

3.4 Sample Size and Sampling Procedures

3.4.1 Sample Size

Mugenda and Mugenda, (1999) formula for calculating the sample size was applied in determining the sample size of children: $N_f = n / (1+n)/N$. Where: N_f = the minimum sample size (when the population is less than 10,000). n = the minimum sample size (when the population is more than 10,000). N = the estimate of the population size. Therefore, if the minimum sample size is 312 when the population is less than 10,000, on a precision of 5% and a confidence level of 95% (Mugenda Mugenda,1999), the sample size for this study would be attained as follows; $N_f = \text{less than } 10,000 = 312 / (1+312)/312 = 313$. This gave us a minimum sample size of 313 children. The total number of children in the 13 Home-based and 13 Centre based childcare centres was 325 and they were all included in the data sample.

3.4.2 Sampling Procedures

All the 325 children aged 0 -30 months in the 26 centres, 69 available parents, and 26 caregivers/centre owners/managers were included in the study. The study conducted KII with 5 professionals (including one Assistant Chief, one Sub County Nutritionist, one Community Health Promoter, and one Public Health Officer) who were purposively selected as key informants.

The 26 Childcare centres were selected from the Uthabiti network in Embakasi East, these were all the centres under this particular network in Embakasi East at the time of the study

and met the categorization the study required, which is homebased and centre based childcare centres.

3.5 Data Collection

3.5.1 Data Collection Instruments

A semi-quantitative questionnaire was programmed into a Kobo toolbox and administered to caregivers/ center managers, and parents to collect information on dietary patterns and hygiene practices. Children's anthropometrics including weight, MUAC and height measurements were also collected using a height board (*which was also used to measure child length for those below two years of age and height for those above two years of age*), a MUAC tape and bathroom digital scale to determine their nutritional status at the childcare centres. An observational checklist was used to collect data on childcare practices and some hygiene practices at childcare centers while a key informant interview guide was used to collect data from assistant chief (providing context on major cases that arise from childcare centres regarding health service delivery like referrals), Sub County Nutritionist community health Promoter, and Public Health Officer on general information that exists on childcare practices within the Embakasi East Sub- County.

3.5.2 Pre-Testing

The questionnaire, KII guides and anthropometry instruments were pretested in a centre in Komarock, Embakasi Central. We utilized 30 respondents for the pretest. Changes were made to improve the questionnaire based on the feedback from the pretest to ensure better clarity of questions for the respondents, this included Swahili translation of the consent forms to enable participants understand the study focus area. Questionnaires were checked each day after interview sessions and again keenly checked after data collection completion

via the digital Kobo tool box. All the anthropometric instruments like weighing scales were calibrated daily and after every measurement to ensure they were on the right scale, i.e. in kilograms and at 0.00 kgs at start for each child being weighed.

3.6 Data Collection Procedures

A total of 325 children were assessed on their anthropometric measures to get their nutritional status. For those children who were less than 2 years, old and/or could not stand, they were laid on the scale ensuring that the vertex of the child's head was at the same level with the head end of the scale ensuring no space between the child's head and the head end of the scale. The child's shoulders and bottom were centrally positioned on the scale. The length was recorded to the nearest completed 0.5cm. Those above 2 years (24 to 30 months) were standing with a similar procedure taken to ensure height measurements.

Anthropometric Assessment

Nutritional status of the children was determined through Anthropometric assessment on children 0 months to 30 months. The weight was measured using an electronic digital bathroom weighing scale (Seca) in Kilograms. For height/length, children < 2 years were measured lying down (recumbent length) using a lying height board while those who are ≥ 2 years were measured standing up - measurements in centimeters. The data collectors underwent training on the data collection tools, language of engagement, research ethics, and the procedure for collecting data before they were allowed to go for data collection. The key informant provided general information on common knowledge available on childcare practices within the Embakasi East Sub-County. These were not taken by the data collectors as stated in the Key Informant interview guides. The following officers were the

key Informants (assistant chief, Sub-sub-county nutritionist community health Promoter and Public Health Officer).

For children aged 2 years or older, who were able to stand, we used the step-on scales (bathroom scale). The scales were placed on a leveled ground, caregivers supported the process as some children were scared. The scale was reading 0.0kg for every child before measurements were taken. The children stood in the middle of the scale and kept still. The measurements were then taken, but for those children below two years and could not stand, the caregivers stood on the scale and, data collectors pressed the '2 in 1' button, then the child was passed to the caregiver. The weight was then taken.

The childcare centre caregivers and parents were interviewed using questionnaires to provide information on the demographic characteristics of the children, their parents, and caregivers in the selected home-based and centre-based childcare centres. Information was also obtained on hygiene practices and dietary patterns of the children. The hygiene practices information was collected using both questionnaires and observational checklists, which highlighted parameters like; cleanliness of the center, handwashing activities, children sleeping area at the centre, potty availability and use, children feeding area, and signs of rodents at the centre.

The parents who would drop their children off early before 7:30 am and pick up late after 4:30 pm were interviewed virtually /via phone call. They signed consent to allow recording of the interview conversations.

3.7 Data Management and Analysis

Data entry, cleaning, and validation were done. Anthropometric data were analyzed using (Epi Info/ENA) 2020 / Epi info version 3.5.4 with the WHO Anthro validation tool for anthropometric analysis on the software to assess nutritional indicators. The Epi Info software was used to calculate z-scores based on sex, age in months, and the anthropometric measurements.

Stunting was defined using the Height for Age-Z-scores (HAZ score), while wasting was defined using the Weight-for-Height-Z-score (WHZ score), and Underweight was defined by Weight-for-Age-Z-score (WAZ). The classification for malnutrition was as follows: Severe Acute Malnutrition (SAM) was defined as a Weight-for-Height-Z-score (WHZ score) less than -3, Moderate Acute Malnutrition (MAM) was defined as a WHZ score greater than or equal to -3 but less than or equal to -2, Normal is defined as a WHZ score greater than -2 to +1.99, Overweight is defined as a WHZ score greater than or equal to +2 to +3, and Obesity is defined as a WHZ score greater than +3. The quantitative data - analyzed descriptively using proportions, and a Chi-square test was used to determine the association between variables and children's nutrition status. A p-value of less than or equal to 0.05 was considered significant.

3.8 Ethical Considerations and Informed Consent

The study issued an informed consent form to the parents, and childcare as a way of their voluntary agreement to participate in this research. All participants provided informed consent before taking part in the study. Caregivers provided informed consent. The study was reviewed and approved by Amref Health Africa's Ethics and Scientific Review

committee and received a NACOSTI research permit certificate. The information collected from the respondents was kept confidential and locked in secret passwords.

3.8.1 Privacy and Confidentiality

All subjects'/participants responses were coded as opposed to using participants' names and locked in a password where no public person can access. This ensured an absolute prevention of any unauthorized disclosures of personal data and fully minimized any authorized disclosure of personal data to third parties. The interviews were done in a separate room away from noise or third-party interference or engagement during the interview session.

The data from the study were stored in a secure server where only authorized individuals had access to the data. This data was backed up on a secure server with access granted only by the principal investigator in the study. The data were safeguarded against unlawful and unauthorized processing and accidental loss, destruction of, and/or damage to the data. The data were strictly private and confidential including encryption, pseudonymization, or anonymization of personal data where appropriate. The data collectors were trained on study tools and were requested to sign the data confidentiality form before being allowed to proceed to collect data at the field or in virtual interviews.

3.8.2 Obtaining Consent from Parents of the Study Participants

Some parents had an option of signing the consent electronically as well as filling in the data digitally directly to the secured study data portal. The parents also had equal sessions to understand the study subject and sign the consent on behalf of their children.

3.8.3 Withdrawal Procedures

The participants' involvement in the study was completely voluntary, and they had the sole authority to decide for or against their participation in the interview, including all information they provided during the study period. They could withdraw from the study at any time through a written statement indicating their decision to no longer be part of the study. This statement was to be signed by the principal investigator. The participants were free to withdraw from the study at any point.

In case a participant withdraws from the study, they signed consent to either accept that their data can be used even when they withdraw from the study, or have their data deleted. All these followed the due process of withdrawal from the study. I want to assure you that even when you withdraw from the study, your child will still receive great care at the centre and even at home, hence no cause for alarm.

3.8.4 Risks/Harm and Mitigation Measures

The study had no direct or indirect harm or risk to the participants. However, I ensured the confidentiality of their information by not sharing their responses with anyone outside the study. I did not record names or addresses on the questionnaire, ensuring that there were no risks of identifying any respondent in the analyzed results.

3.8.5 Study Benefits

There was no direct benefit or remuneration, neither in cash nor in kind, for this interview. There may, however, be indirect benefits, as the information obtained is intended to help improve the childcare practices situation, and help students, Amref International

University, and future urban health projects and activities in Embakasi East and similar other urban communities in or beyond Kenya.

3.8.6 Compensation

There was no pay to participants for agreeing to participate in this interview.



CHAPTER 4: RESULTS

4.1 Introduction

Data were collected from 325 children aged 6- 30 months, 69 available parents, and their caregivers (26) in 13 home-based and 13 centre-based childcare centres in Embakasi East, Nairobi County. Hence, the response rate was above the sample size of 313. All the subjects were included in the study as they met the inclusion criteria for the study. The results are organized into four sections, corresponding to the five specific objectives of the study.

4.2 Socio-demographic Characteristics of Children, Centre Owners/Centre Caregivers and Parents

4.2.1 Age and Sex Characteristics of Children

The findings presented in Error! Reference source not found. highlight the socio-demographic characteristics of the children who participated in the study. A majority of the children, 72.6%, attended center-based childcare centers, while a smaller proportion, 27.3%, attended home-based childcare centers. This distribution indicates a higher reliance on center-based childcare services among the study participants. Additionally, the results show that the sex distribution among the children was nearly equal, with 49.2% being female and 50.8% male, reflecting a balanced representation of both sexes in the study population.

The majority of the children were in the older age group, with 60.3% aged between 24 and 30 months, while the remaining 39.7% were in the younger age bracket of 6 to 23 months. This skew towards older children suggests that more families may be enrolling their

children in childcare services as they approach their second year of life, potentially due to parental work commitments and showing demand for childcare services being higher.

Table 4.1: Age and Sex Characteristics of Children

Variable	Centre based		Home Based		
Child's age in Months	frequency	%	frequency	%	Total (%)
6-23 months	73	56.6	56	43.4	129(39.7)
24-30 months	124	63.3	72	36.7	196(60.3)
Gender					
Female	113	71	47	29	160(49.2)
Male	123	75	42	25	165(50.8)
Total	236	72.6	89	27.4	

4.2.2 Socio-demographic characteristics of parents

The socio-demographic characteristics of the parents who participated in the study are summarized in **Table 4.2**. These characteristics include age, education level, marital status, occupation, household size, and household income, providing a comprehensive overview of the study respondents.

A total of 69 parents were interviewed, these consisted of those who were available at the childcare centers and willingly agreed to participate in the study. The age distribution of the parents showed that the largest proportion, 42%, fell within the 28 to 37 years age range, followed by 39% who were between 18 and 27 years old. A much smaller proportion, 2.9%, were aged 48 years and above, indicating that the majority of parents utilizing childcare services were young to middle-aged adults.

In terms of educational attainment, the findings revealed that 50.7% of the parents had completed secondary education, making it the most common level of education among the

respondents. This was followed by 28.9% who had reached tertiary education, while 15.9% had only completed primary education. A relatively small proportion, 4.4%, had attained university-level education, suggesting that higher education attainment was less common among the study participants. Regarding marital status, the majority of parents (66.7%) were married, while 26.1% were divorced and 7.2% were widowed. These statistics highlight a diverse range of family structures among the participants, with a significant proportion of single parents.

The study also examined occupational status, revealing that 36.4% of the parents were engaged in business, making it the most common source of income. This was followed by 24.6% who worked as casual laborers; these are parents who do short-term, often informal types of employment where workers are hired on a day-to-day or task basis without a long-term contract, e.g., construction helpers, farmhands, cleaners, loaders, and 21.7% who were salaried employees; these are parents who have formal jobs with some long-term contracts and are paid monthly as consolidated pay. The least common occupations were drivers and mechanics, each representing 1.5% of the respondents, suggesting that only a small number of parents were involved in skilled trade jobs.

The majority of parents (61%) lived in households with 3 to 4 members, followed by 22% who lived in households of 5 to 6 people. Only 4.4% of the respondents lived in households with 7 or more members, indicating that most families had relatively small household sizes.

The study findings showed that 39.1% of parents had a monthly income ranging between 5,001 and 10,000 Kenyan shillings, while 34.9% earned 5,000 Kenyan shillings or less. A smaller group, 11.6%, had a household income exceeding 20,000 Kenyan shillings,

suggesting that a significant portion of parents in the study lived within low-income brackets, which could impact their access to quality childcare services. These findings provide valuable insights into the socio-economic background of parents utilizing childcare services, highlighting the economic constraints, educational levels, and household dynamics that influence childcare decisions and practices.



Table 4.2: Socio-Demographic Characteristics of Parents

Variable	Frequency	Percent (%)
Age(years)		
18 – 27	27	39.1
28 -37	29	42.0
38 -47	11	15.9
48 – Above	2	2.9
Education		
University	3	4.3
Tertiary	20	28.9
Secondary	35	50.7
Primary	11	15.9
Marital Status		
Married	46	66.7
Divorced	18	26.1
Widowed	5	7.2
Occupation		
Business	25	36.2
casual laborer	17	24.6
Driver	1	1.5
Mechanic	1	1.5
Salaried	15	21.7
Unemployed/Housewife	10	14.5
Household Size		
1 - 2 people	9	13.0
3 -4 people	42	60.9
5 -6 people	15	21.7
7 and above	3	4.4
Parents Income		
<=5000	24	34.9
5001 - 10,000	27	39.1
10,001 – 20,000	10	14.5
>20,000	8	11.6
Total	69	100

4.2.3 Socio-Demographic Characteristics for Centre Owners/Caregiver

A total of 26 centre caregivers or the owners from 13 center-based childcares and 13 home-based childcare centres were interviewed as shown in **Table 4.3**. The findings in **Table 4.3** further show that the majority (34.6%) of the caregivers/centre owners had an age range between 28-37 years and 38-47 years, while caregivers/owners/centre managers aged

above 48 were 23.1%. Nearly half (42.3%) of caregivers/owners had reached the Secondary education level, followed by 26.9% of caregivers/owners who have equally reached the Tertiary and Primary levels of education.

Table 4.3: Age and Education Characteristics for Centre Owners/Caregiver.

	N	%
Age in Years		
18-27	2	8
28-37	9	34.6
38-47	9	34.6
48-Above	6	23.1
Education level		
Primary	7	26.9
Secondary	11	42.3
Tertiary	7	26.9
University	1	3.8
Totals	26	100

4.2.4 Childcare Centre Characteristics

The findings in **Table 4.4** indicate that the majority of respondents (73.07%) were childcare center owners (19), while 27% were caregivers working at the centers (7). The role of centre ownership and caregiver experience is crucial in shaping childcare practices, as owners influence policies, service quality, and resource allocation, while caregivers are responsible for daily feeding, hygiene, and overall child well-being. Well-trained and experienced caregivers/owners are more likely to adopt proper hygiene practices, ensure adequate nutrition, and provide attentive care, reducing the risk of infections and malnutrition among children.

The duration of operation of childcare centers varied significantly. A large proportion (42%) had been in operation for more than four years, indicating greater experience in

childcare management. Nineteen percent (19%) of centers (5 centers) had been operational for two to three years, while 11% (3 centers) had been functioning for one to two years. A smaller proportion (7.7%) had operated for 7 to 12 months, highlighting newer facilities that may still be developing structured feeding programs, hygiene protocols, and caregiving routines. The duration of operation plays a key role in childcare quality, as longer-established centers are likely to have more structured hygiene and nutrition policies, ensuring consistent meal provision and better sanitary conditions to prevent malnutrition and disease outbreaks.

The study examined the main activities that childcare centers prioritize. A significant 58% of centers primarily focused on playing and sleeping, with less emphasis on structured feeding schedules and hygiene routines. In contrast, 42% of centers incorporated sleeping, playing, and feeding as key activities, demonstrating a more balanced approach to childcare. Centers that fail to integrate structured mealtimes and hygiene practices may contribute to poor nutrition outcomes and increased health risks among children. Proper feeding routines, handwashing before meals, and clean food preparation areas are essential in preventing undernutrition, diarrhea, and infections, which are common in childcare settings with poor sanitation.

These findings emphasize the critical role of center ownership, duration of operation, and structured caregiver practices in ensuring proper nutrition, hygiene, and overall child health. Childcare centers with experienced caregivers, established hygiene protocols, and structured meal plans are more likely to provide consistent nutrition, reduce illness risks, and improve the overall well-being of children in their care.

Table 4.4: Childcare Centre Characteristics

Childcare type	N	%
Centre-based childcare centre	13	50
Home-based childcare Centre	13	50
Respondent's role at the Child Centre	N	%
Caregiver	7	27
Childcare owner	19	73
Duration of childcare centre operation	N	%
Between ≥ 1 to 2 years	3	12
Between ≥ 2 to 3 years	5	19
Between ≥ 3 to 4 years	2	8
More than 4 years	11	42
Within the last 6 months	3	12
Within the last 1 year	2	8
Main Activities at the childcare centres		
Playing and sleeping	15	58
Playing, sleeping, and learning	11	42
Totals	26	100

4.3 The Dietary patterns and feeding Practices of children in Homebased and centre based childcare centres in Embakasi East.

4.3.1 Feeding practices of parents from home to their children in childcare centres

Information on the feeding practices of parents to their children attending both home-based and center-based childcare centers was gathered, focusing on feeding practices, types of foods consumed, and dietary diversity. The findings are detailed in **Table 4.5** and **Table 4.6**, which specifically analyze "the dietary patterns **Table 4.6** and "feeding practices, **Table 4.5**.

Data collection involved 69 parents, primarily those who were available for interviews. However, many parents were unable to participate due to time constraints related to their work schedules. The results in **Table 4.5** indicate that the majority of parents (63.8%) reported packing food for their children to take to the childcare center, while 36.2% did not

send packed meals with their children. This highlights the varying dependence on meals provided by childcare centers and suggests potential differences in food quality, portion sizes, and dietary diversity among children in different childcare settings.

Table 4.5: Dietary Practices of Children from Home

Variable	Categories	n	%
Parents are packing food for their children to take to the childcare centre	No	25	36.2
	Yes	44	63.8

The most commonly packed meals for children attending childcare centers included rice, porridge, beans, ugali, potatoes, green vegetables, green grams, and mandazi, as shown in **Table 4.6**. These meals reflect the typical dietary patterns of families, with a heavy reliance on staple foods, as carbohydrate rich foods. Carbohydrates made up the largest proportion of packed meals, accounting for 48.6% of the total food items. This indicates a significant dependence on energy-rich foods such as rice, ugali, potatoes, and mandazi, which are easily accessible and affordable for many families. However, protein intake was notably low, with only 16.9% of the packed meals containing protein-rich foods such as beans, green grams, and occasional animal-based proteins. The limited protein intake may impact children's growth and muscle development, emphasizing the need for improved dietary planning to ensure adequate protein consumption.

Fruits and vegetables were the least included food groups, with fruits accounting for only 4.6% and vegetables at 9.5%. This low intake suggests a gap in micronutrient consumption, which is critical for boosting immunity and preventing deficiencies such as anemia and vitamin A deficiency. The minimal inclusion of fruits and vegetables highlights potential

affordability issues, lack of awareness of their nutritional benefits, or preference for more filling, energy-dense foods over nutrient-dense options.

These findings suggest imbalanced dietary patterns among children in childcare centers, with an overreliance on carbohydrates and insufficient intake of proteins, fruits, and vegetables. Addressing this imbalance through parental nutrition education, better meal planning, and increased accessibility to diverse food options could significantly improve children's overall nutritional status and health outcomes.

Table 4.6: Foods Commonly Packed from home for Children to eat at the centres

Most Common Meals Packed	Frequency/cou nts	%	Categories
Rice	41	10.7	Carbohydrate-rich food- cereals
Porridge (millet)	29	7.6	Carbohydrate-rich food – tubers/cereals
Beans	25	6.5	Protein-rich food -legumes/lentils
Ugali	24	6.3	Carbohydrate-rich food – tubers/corn
Potatoes	22	5.7	Carbohydrate-rich food -tubers
Green Vegetables	21	5.5	Vegetable
Green Grams	21	5.5	Proteins-rich food-lentils
Mandazi	19	4.9	Carbohydrate-rich food - wheat
Tea	17	4.4	Beverages
Fruits	15	3.9	Fruits
Cooked bananas	15	3.9	Carbohydrate-rich food -tubers
Cabbage	10	2.6	Vegetable
Milk	9	2.4	Proteins-rich food -animal product
Noodles	8	2.1	Carbohydrate-rich food - wheat

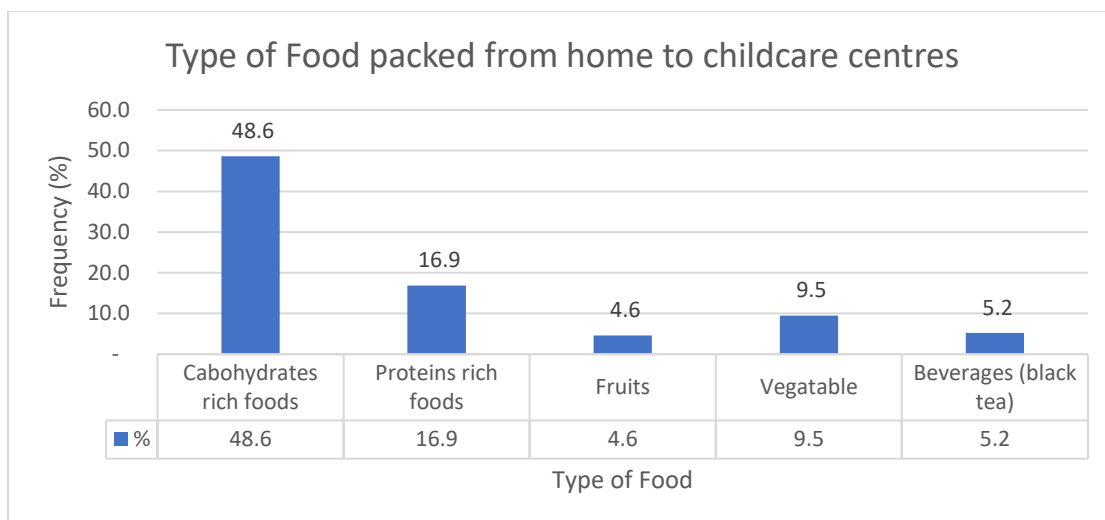


Figure 4.1: Types of food packed from home

4.3.2 Dietary and feeding Patterns of Children in Home-Based and Centre-Based Childcare Centres.

This subsection examines the dietary/feeding patterns of children in both home-based and center-based childcare centers, based on data collected from 26 childcare centers. The findings reveal that the majority of children (94.5%) were fed 2 times per day, indicating that most childcare centers provided meals or snacks less than the recommended frequency in a day. Similarly, a small proportion (5.5%) of children were fed three times in a day, suggesting potential gaps in meal provision within some childcare centers. This infrequent feeding may put children at risk of undernutrition: inadequate nutrient intake, and poor growth outcomes, particularly for 6-30 months old children who require frequent feeding to meet their nutritional needs. The differences in feeding frequencies across childcare settings highlight variations in food availability, caregiver practices, and center resources, emphasizing the need for structured feeding programs to ensure all children receive adequate nutrition while in childcare (**Table 4.7**).

Table 4.7: Feeding patterns/frequency of children at the Childcare Centres

Variable	Categories	Frequency	%
Child feeding frequency at the childcare centres	Feeding three times a day	18	5.5
	Feeding two times in a day at the centre	307	94.5

Findings on **Table 4.8**, show that childcare centres frequently provided; porridge, rice, beans or green lentils, green grams, cabbages, and green vegetables, to children followed by, mashed banana, eggs, milk, mashed potatoes, fruits, ugali, beef, ‘cooked bananas, mandazi, noodles, fish, spaghetti’, bread, tea, ‘silver cyprinid, and lablab bean’. However, some of the mentioned foods were less frequently consumed by the children, as indicated by the low percentages in Table 4.8. Children in childcare centres are mainly fed on carbohydrates with a 100% porridge consumption, followed by 100% consumption of cabbages, and a 96% consumption of Rice, Beans, green grams, and vegetables. Animal proteins are still being minimally consumed at the childcare centres as 39% of centres offer children eggs, 35% offer milk, 23% offer beef, 13% offer fish, and 10% offer sardine cyprinid (*omena*).

The qualitative data provided insights into the feeding practices in these centres. Most mothers packed food for their children to bring to the childcare cares, and on occasions when they did not pack, they liaised with the caregivers to provide food at an extra fee. As one caregiver stated, *"Yes. They either pack food or ask the caregivers to provide at an extra cost."* Another caregiver mentioned, *"Yes. At least they pack food for their children and in cases that the daycare does not have a full feeding program inclusive in the services offered, they organize with the caregivers to provide food at an extra cost."*

Qualitative data gave insights into the reason and quality of foods the 63.8% of parents packed from home to childcare centres for their children. This was common at the centres. As one participant noted (caregiver in one of the centres), "*Most of the children carry food from home, this particular food is mainly left-over, or one type like porridge or plain white rice, and some childcare centres provide food either on parents' request or they have a full feeding program.*" Another participant mentioned, "*Mixed feeding where parents begin giving their children complementary foods even before the child turns six months (packed foods), non-nutritive foodstuffs (junk foods).*" The sub-county nutritionist based at the sub-county and supports outreach programs within Embakasi East, including childcare outreach programs, noted that "*Malnutrition, anemia, scurvy, rickets, hypocalcemia, and diarrhea are common cases they handle most of the time; at least daily*". This confirms the high rate of wasting, underweight, and stunting seen among the study children.

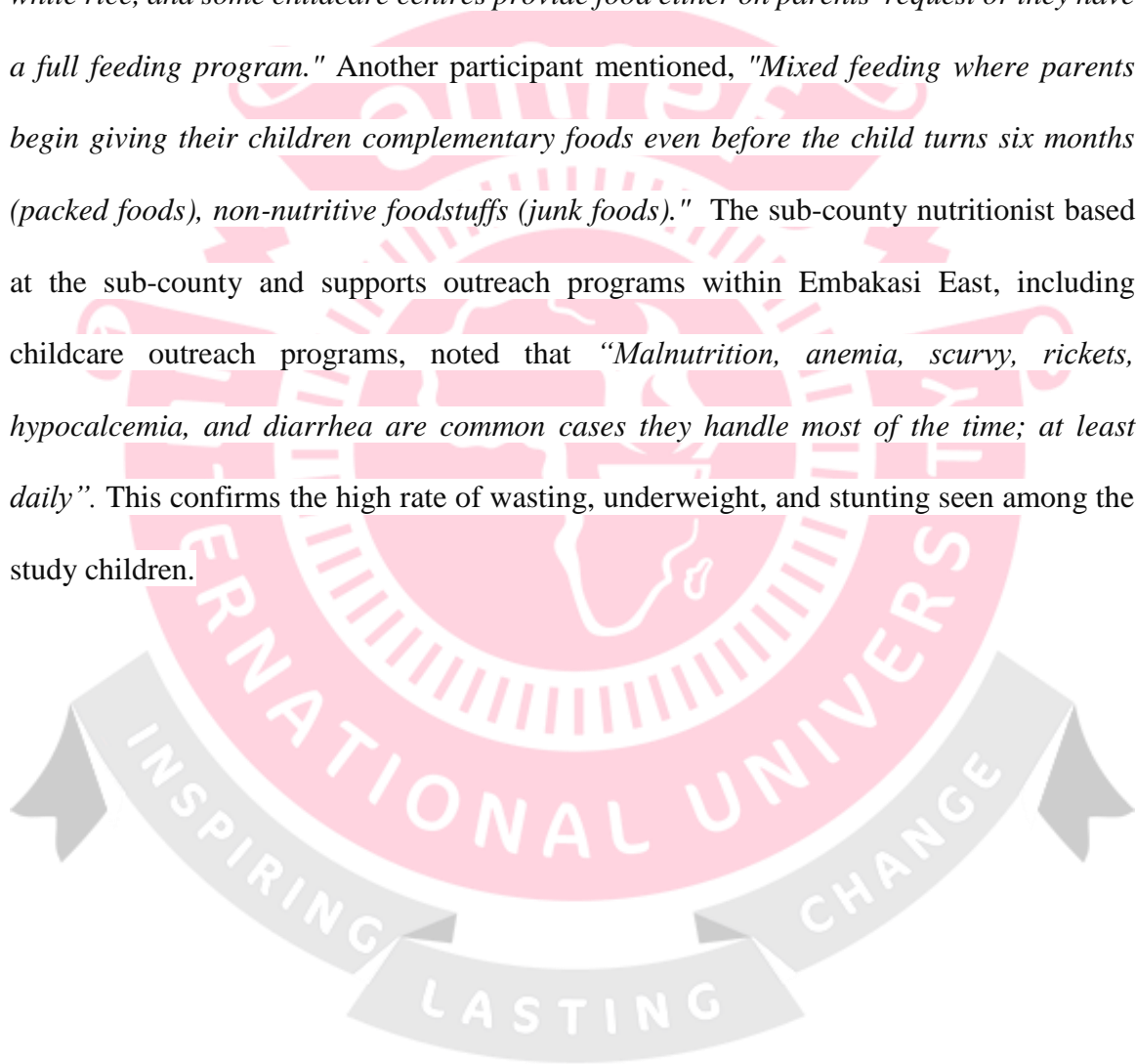


Table 4.8: Food commonly consumed by children in childcare centres

Food children ate at the childcare centres	Frequency	%	Type of food group
Porridge	26	100	Carbohydrate-rich food – tubers/cereals
Cabbage	26	100	Vegetable
Rice	25	96.2	Carbohydrate-rich food- cereals
Beans or green lentils	25	96.2	Protein-rich food -legumes/lentils
Green grams	25	96.2	Proteins-rich food-lentils
Green vegetables	24	92.3	Vegetables
Mashed potatoes	17	65.4	Carbohydrate-rich food -tubers
Fruits	16	61.5	Fruits
Mashed banana	13	50	Carbohydrate-rich food -tubers
Ugali	12	40	Carbohydrate-rich food – tubers/corn
Eggs	10	38.5	Protein-rich food -animal-rich
Milk	9	34.6	Protein-rich food -animal products
Tea	8	26.7	Beverage
Beef	7	23.3	Protein-rich food -animal source
Cooked bananas	7	23.3	Carbohydrate-rich food -tubers
Mandazi	5	16.7	Carbohydrate-rich food - wheat
Noodles	4	13.3	Carbohydrate-rich food - wheat/cereals
Fish	4	13.3	Protein-rich food -animal source
Spaghetti	4	13.3	Carbohydrate-rich food- wheat/cereals
Bread	3	10	Carbohydrate-rich food- wheat/cereals
Sardine cyprinid(omena)	3	10	Protein-rich food -fish/animal source
Chapati	2	6.7	Carbohydrate-rich food- wheat/cereals
Lablab Beans	1	3.3	Protein-rich food -legumes/lentils

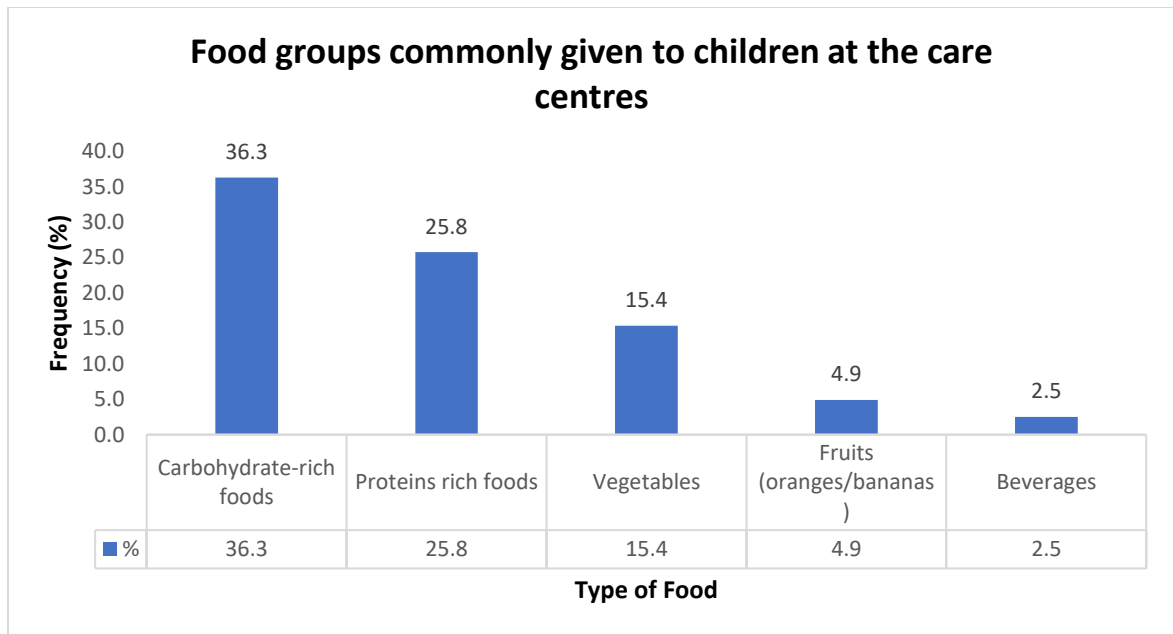


Figure 4.2: Food groups commonly given to children in childcare centres

4.3.3 Children Breastfeeding at the Childcare Centres

Interviews were conducted with 26 childcare center owners/caregivers to determine whether any children under their care were being breastfed at the center by their parents. The findings revealed that none of the children (100%) were breastfed while at the childcare centers. This indicates that breastfeeding during childcare hours is not a common practice, possibly due to parental work schedules, lack of designated breastfeeding spaces, or logistical challenges in visiting the centers for breastfeeding sessions.

The absence of breastfeeding at the centers may have nutritional and health implications, particularly for infants who still rely on breast milk as a primary source of essential nutrients and immunity support. This finding highlights the importance of alternative feeding strategies, such as expressed breast milk storage or appropriate complementary

feeding, to ensure that young children in childcare centers continue to receive adequate nutrition while away from their mothers.

4.4 The Hygiene practices of Children in Homebased and Centre Based Childcare Centres

Findings in **Table 15** shows that in centres which were not clean had 7 children (2.2%) being moderately acutely malnourished (MAM), 12 (3.7%) severely acutely malnourished (SAM), and 15 (4.6%) overweight, while only 104 (32%) had normal nutritional status. In contrast, "very clean" centres recorded no cases of MAM or obesity, only 1 child (0.3%) overweight, and a smaller number (12 children or 3.7%) with normal status. For the stunting and underweight findings, 43 children (13.2%) were severely stunted, and 20 (6.2%) were severely underweight in those centres that were not clean, while lowest stunting and underweight rates, with only 6 children (1.8%) severely stunted and 4 (1.2%) severely underweight in those that were very clean. The highest proportions of normal nutritional status were consistently recorded in "somehow clean" centres, but "very clean" centres, though fewer in number, showed the lowest levels of severe malnutrition.

Children in centres without potties or proper waste disposal had higher rates of underweight, stunting, and wasting. Severe underweight was 8.3% where potties were absent, versus 4% where they were present. Centres without waste disposal had 17.5% severely stunted children, compared to 4.6% in those with dumpsites. These findings point to the importance of maintaining hygienic environments in childcare settings as part of strategies to reduce malnutrition among young children.

4.5 Nutritional Status of Children in Home-based and Centre-based Childcare Centres

4.4.1 Overall Nutrition Status Among Study Children.

The analysis of the overall nutrition status presented in **Table 4.9** indicates notable levels of undernutrition and overnutrition among the study population. The findings show that stunting was 39.4%, wasting was 11.4% and underweight was 23.4%. However, a notable percentage of children still suffered from acute and chronic under-nutrition, 12.3% were severely underweight, more so in centre-based care (6.8%) than in home-based care (5.5%), and 11.1% moderately underweight; however, moderate underweight rates were slightly higher in centre-based centres (7.1%) compared to 4% in home-based ones. When it comes to wasting (weight-for-height), 76% of children were in the normal range, while 7.7% suffered from severe acute malnutrition (SAM), slightly more in home-based (4%) than in centre-based care (3.7%). Cases of overweight and obesity were relatively low but still notable, with 9.5% overweight and 3.1% obese across both childcare centres. These results highlight significant nutritional concerns, with a considerable proportion of children experiencing acute and chronic undernutrition.

A further comparison between center-based and home-based childcare centers reveals differences in chronic undernutrition rates. For stunting, 27.4% of all children were severely stunted, with 14.5% in centre-based and 12.9% in home-based centres. Moderate stunting was relatively balanced between the two childcare centre types, at 5.8% and 6.2% respectively. The normal height-for-age category was highest among children in centre-based care (40.3%) compared to 20.3% in home-based care, indicating a better outcome for those attending structured childcare centres. These variations suggest that children in

center-based childcare centers may face greater nutritional challenges, potentially due to differences in feeding practices, food quality, and caregiver-child ratios between the two types of childcare settings.

Table 4.9: Overall Prevalence of Child Nutritional Status

Nutritional Status	ALL		Centre-based childcare centre	Home-based childcare centre
	N (%)		N (%)	N (%)
Stunting (HAZ)				
Moderately stunted (≤ -2 SD ≥ -3 SD)	39 (12)		19 (5.8)	20 (6.2)
Normal (> -2 to $+1.99$)	197 (60.6)		131 (40.3)	66 (20.3)
Severely stunted < -3)	89 (27.4)		47 (14.5)	42 (12.9)
Underweight (WAZ)				
Moderately underweight (≤ -2 SD ≥ -3 SD)	36 (11.1)		23 (7.1)	13 (4)
Normal (> -2 to $+1.99$)	249 (76.6)		152 (46.8)	97 (29.8)
Severely underweight < -3	40 (12.3)		22 (6.8)	18 (5.5)
Wasting (WHZ)				
MAM (≤ -2 SD ≥ -3)	12 (3.7)		7 (2.1)	5 (1.5)
Normal (> -2 to $+1.99$)	247 (76)		156 (48)	91 (28)
Obesity ($> +3$)	10 (3.1)		5 (1.5)	5 (1.5)
Overweight ($> +2$ to $+3$)	31 (9.5)		17 (5.2)	14 (4.3)
SAM (< -3)	25(7.7)		12 (3.7)	13 (4)

4.4.2 Child Nutrition Status by Age

The analysis of nutritional status by child's age (**Table 4.10**) shows significant variations, majorly on underweight and stunting. Children aged 24–30 months had higher prevalence of severe stunting (20.3%) compared to 7.1% among those aged 6–23 months. Similarly, moderate stunting was slightly more common in the older age group (7.4%) than the younger (4.6%), indicating that as children age, their risk of chronic undernutrition (as reflected in the stunting rates) increases if early interventions are not initiated.

Children aged 24–30 months had higher prevalence of both underweight and wasting compared to those aged 6–23 months. Specifically, moderate underweight was slightly high in the older children (24-30 months) at (5.8%) than the younger 6-23 months (5.2%), while severe underweight was significantly higher at 10.1% versus 2.2%. In terms of wasting (WHZ scores), although more children aged 6–23 months were overweight (5.5%), the 24–30 months group showed higher levels of severe acute malnutrition (SAM) at 4.3% and moderate acute malnutrition (MAM) at 2.2%, indicating a growing nutritional risk with age.

Table 4.10: Prevalence of Child Nutrition Status by Age

Variables	Categories	Moderately stunted (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Severely stunted < -3 SD N (%)		
	Child's Age in Months	24-30	24 (7.4)	106 (32.6)	66 (20.3)	
6 - 23		15 (4.6)	91 (28)	23 (7.1)		
Underweight WAZ score						
Categories		Moderately underweight (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Severely underweight < -3 SD N (%)		
24-30		19 (5.8)	144 (44.3)	33 (10.1)		
6 - 23		17 (5.2)	105 (32.3)	7 (2.2)		
Variable	Wasting WHZ score					
	Categories	MAM (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Obesity ($> +3$) N (%)	Overweight ($> +2$ to $+3$) N (%)	SAM (< -3) N (%)
Child's age in months	24-30	7 (2.2)	155 (47.7)	7 (2.2)	13 (4)	14 (4.3)
	6' - 23	5 (1.5)	92 (28.3)	3 (0.9)	18 (5.5)	11 (3.4)

4.4.3 Child Nutrition Status by Sex

Table study findings in **Table 4.11** show a 5.2% severe wasting amongst male children, while 2.5% of wasting amongst female children. The prevalence of underweight among male children was 7.4% severely underweight and 6.8% male children moderately underweight; in contrast, 4.9% of female children were severely underweight. Stunting prevalence was lower amongst female children, with 11.4% severe stunting, 5.2% moderate stunting, while high amongst male children, with 16.0% with 6.8% male children being moderately stunted. 26.8% amongst male children and 13.8% stunting amongst female children under the study.

Table 4.11: Prevalence of Child Nutrition status by Sex

Wasting WHZ score					
Child's sex	MAM (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Obesity ($> +3$) N (%)	Overweight ($> +2$ to $+3$) N (%)	SAM (< -3) N (%)
Female	6 (1.8)	126 (38.7)	7 (2.2)	13 (4)	8 (2.5)
Male	6 (1.8)	121 (37.2)	3 (0.9)	18 (5.5)	17 (5.2)
Stunting HAZ score					
	Moderately stunted (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Severely stunted < -3 SD N (%)		
Female	17 (5.2)	106 (32.6)	37 (11.4)		
Male	22 (6.8)	91 (28.0)	52 (16)		
Underweight WAZ Score					
Child's sex	Moderately underweight (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Severely underweight < -3 SD N (%)		
Female	14 (4.3)	130 (40.0)	16 (4.9)		
Male	22 (6.8)	119 (36.6)	24 (7.4)		

4.6 Association between Socio-demographic characteristics of children, feeding/dietary practices and hygiene practices of children with their nutritional status of children in homebased and centre based childcare centres in Embakasi East

4.6.1 Association between Child Nutrition Status by Age and Sex Characteristics

Findings in **Table 12** shows that, Children aged 24–30 months were severely underweight (10.1%) than younger children aged 6 -23 months (2.2%), and also had a higher rate of moderate underweight. This highlights a crucial nutritional vulnerability during the second and third years of life, potentially due to poor complementary feeding timing, diversification, frequency and consistency of food, reduced breastfeeding as indicated in section 4.3.3 of this study.

Despite the fact that, distribution of wasting (WHZ) did not show a statistically significant association with age ($\chi^2 (5, N=325) = 6.437, p = 0.266$), the data still indicates that the older children (24 -30 months) in child care centres had slightly higher cases of SAM (4.3%) and normal weight (47.7%), while the younger children (6-23 months) showed more overweight (5.5%), possibly due to early feeding patterns. These findings emphasize the importance of sustained nutrition and care beyond infancy, especially between 24–30 months.

The male children showed slightly higher rates of severe underweight (7.4%) than females (4.9%), although this difference was not statistically significant ($p=0.150$). These findings suggest that older children aged 24 -30 months, majorly male children, may be at greater risk of undernutrition. Regarding wasting (WHZ), although the majority of children fell within the normal range, children aged 6–23 months were overweight (5.5%) than those aged 24 -30 months (4.0%). Severe acute malnutrition (SAM) was slightly more prevalent among males (5.2%) than females (2.5%), though the relationship between sex and wasting was not statistically significant ($\chi^2 (5, N=325) = 7.599, p<0.180$). Overall, age appeared to have a more consistent association with nutritional outcomes than sex, particularly in underweight prevalence.

Table 12 Association between nutrition status and age and sex characteristics of children.

Association between nutrition status and age and sex characteristics of children.							
Wasting WHZ score							
Variables	Categories	MAM (≤ -2 to ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Obesity ($> +3$) N (%)	Overweight ($> +2$ to $+3$) N (%)	SAM (< -3) N (%)	Chi-q χ^2 test
Child's Age	24-30	7 (2.2)	155 (47.7)	7 (2.2)	13 (4)	14 (4.3)	$\chi^2(5, N=325) = 6.437, p < 0.266$
	6 - 23	5 (1.5)	92 (28.3)	3 (0.9)	18 (5.5)	11 (3.4)	
Child's sex	Female	6 (1.8)	126 (38.7)	7 (2.2)	13 (4)	8 (2.5)	$\chi^2(5, N=325) = 7.599, p < 0.180$
	Male	6 (1.8)	121 (37.2)	3 (0.9)	18 (5.5)	17 (5.2)	
Stunting HAZ score							
Variables	Categories	Moderately stunted (≤ -2 to ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Severely stunted < -3 SD N (%)		Chi-q χ^2 test	
Child's Age	24-30	24 (7.4)	106 (32.6)	66 (20.3)		$\chi^2(3, N=325) = 11.268, p < 0.10$	
	6 - 23	15 (4.6)	91 (28)	23 (7.1)			
Child's sex	Female	17 (5.2)	106 (32.6)	37 (11.4)		$\chi^2(3, N=325) n=5.542, p < .136$	
	Male	22 (6.8)	91 (28.0)	52 (16)			
Underweight WAZ score							
Variables	Categories	Moderately underweight (≤ -2 to ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Severely underweight < -3 SD N (%)		Chi-q χ^2 test	
Child's Age	24-30	19 (5.8)	144 (44.3)	33 (10.1)		$\chi^2(2, N=325) = 9.720, p < 0.008$	
	6 - 23	17 (5.2)	105 (32.3)	7 (2.2)			
Child's sex	Female	14 (4.3)	130 (40.0)	16 (4.9)		$\chi^2(2, N=325) = 3.788, p < 0.150$	
	Male	22 (6.8)	119 (36.6)	24 (7.4)			

4.6.2. Nutrition Status and Childcare Dietary Patterns/Feeding Practices in Homebased and Centre-Based Childcare

The findings in **Table 13** shows a strong statistical significance between feeding frequency and child nutritional status on Wasting (WHZ). The children fed two times at the childcare centres had recorded good nutrition outcome, with 68.9% being in the normal range and no cases of Severe Acute Malnutrition (SAM), however 7.4% were overweight and 2.2% moderately wasted. Conversely, children who were three times a day had high proportion of Severe Acute Malnutrition cases (7.7%). This could be linked to poor feeding patterns and practices at the childcare centres as indicated in table 4.8. The association was highly significant ($\chi^2 (4, N=325) = 131.060, p<0.000$). Similarly, there was also a significant association with feeding frequency ($\chi^2(2, N=325) = 21.948, p<0.000$) and child underweight scores. Children fed twice a day at the centre had better weight outcomes, with more in the normal category and fewer being severely underweight compared to those fed three times daily. However, 6.8% of children who were fed three times a day recorded lower severe stunting rates compared to those who fed two times a day at 5.5% SAM outcomes. The data suggests that frequency alone may not be a sufficient measure of dietary adequacy unless complemented by nutrient-dense and age-appropriate meals.

The study finding shows that 24.9% of children who ate food packed from home had severe stunting, and 11.1% were moderately stunted. This shows a significant link between quality of food and diversity of foods packed from home to childcare centre as a huge contributor to child's nutrition outcomes. This contrary to those children who did not eat food packed

from home only having 0.9% being moderately stunted and 2.5% being severely stunted. It is important to ensure food diversity for children in childcare centres.

“I usually prepare fresh food for those children, whose parents have paid and need their children to consume fresh food, hence they do not eat food packed from home.” Said the centre caregiver. From my experience as a caregiver, I realize most parents pack starchy foods, which are mainly leftover foods or black tea, so I mainly advise those who can to pay for their children to eat freshly cooked food at the centre.” Said caregiver.

These findings suggest that meals packed from home may lack adequate nutritional balance, possibly due to limited dietary diversity, irregular meal patterns, or economic constraints affecting food choices at the household level.

This indicates that how frequently children were fed at the centers did not have a significant impact on their nutrition status, suggesting that meal quality and composition may be more critical than feeding frequency alone in determining malnutrition outcomes.

These findings highlight the need for improving the nutritional quality of packed meals from home and ensuring that meals provided at childcare centers meet adequate dietary requirements. Interventions such as parental nutrition education, meal planning support, and dietary supplementation could help bridge the nutritional gaps and reduce malnutrition risks among children in childcare settings.

Table 13: Association between nutrition status and childcare dietary patterns and practices

Wasting (WHZ score)							
Variables	Categories	MAM (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Obesity ($> +3$) N (%)	Overweight ($> +2$ to $+3$) N (%)	SAM (< -3) N (%)	Chi-q χ^2 test
Consumption of Packed food from home at the childcare	No	0 (0)	39 (12)	2 (0.6)	1 (0.3)	5 (1.5)	$\chi^2(4, N=325) = 6.412, p < 0.170$
	Yes	12 (3.7)	208 (64.0)	8 (2.5)	30 (9.2)	20 (6.2)	
Child feeding frequency at the childcare centres-daily	Feeding three times a day	5 (1.5)	23 (7.1)	0 (0)	7 (2.2)	25 (7.7)	$\chi^2(4, N=325) = 131.060, p < 0.000$
	Feeding two times a day at the centre	7 (2.2)	224 (68.9)	10 (3.1)	24 (7.4)	0 (0)	
Stunting (HAZ)							
Variables	Categories	Moderately stunted (≤ -2 SD ≥ -3) N (%)	Normal (> -2 to $+1.99$) N (%)	Severely stunted < -3 N (%)	Chi-q χ^2 test		
Consumption of Packed food from home at the childcare	No	3 (0.90)	36 (11.1)	8 (2.5)	$\chi^2(5, N=325) = 5.914, p < 0.52$		
	Yes	36 (11.1)	161 (49.5)	81 (24.9)			
Child feeding frequency at the childcare centres-daily	Feeding three times a day	7 (2.2)	38 (11.7)	15 (4.6)	$\chi^2(2, N=325) = .249, p < 0.883$		
	Feeding two times a day at the centre	32 (9.8)	159 (48.9)	74 (22.8)			
Underweight (WAZ Score)							
Variables		Moderately underweight (≤ -2 SD to $\geq -$	Normal (> -2 to $+1.99$) N (%)	Severely underweight	Chi-q χ^2 test		

Consumption of Packed food from home at the childcare	No	3) N (%) 4 (1.2)	40 (12.3)	< -3 N (%) 3 (0.9%)	$\chi^2(2, N=325) = 2.411, p < 0.300$
	Yes	32 (9.8)	209 (64.3)	37 (11.4)	
Child feeding frequency at the childcare centres-daily	Feeding three times a day	7 (2.2)	35 (10.8)	18 (5.5)	$\chi^2(2, N=325) = 21.948, p < 0.000$
	Feeding two times a day at the centre	29 (8.9)	214 (65.8)	22 (6.8)	



4.6.3 Association between Nutrition Status of Children and Childcare Hygiene

Practices

The findings in **Table 4.1** shows an association between childcare hygiene practices of children and their nutrition status; Children in centres which are very clean have lower prevalence of stunting (1.8%), compared to children in centres which are not clean (13.2% Severe stunting) and those in childcare centres which are somehow clean (12.3%). Similarly, 6.5% of children assessed in childcare centres were severely wasted (SAM), while 8.9% were moderately wasted in centres which were reported as "not clean," suggesting that poor hygiene environments may contribute to higher susceptibility to infections, which in turn can impair nutrient absorption and overall nutritional status of children in childcare centres in the informal settlement. Although these associations were not always statistically significant ($p=0.677$ for cleanliness verses wasting and stunting), the trend highlights the importance of childcare centres improving on hygiene practices.

Handwashing practices showed a particularly strong association to preventing both undernutrition and overnutrition. In centers where handwashing was practiced, children had significantly lower rates of stunting (6.1% severely stunted and 1.8% moderately stunted), wasting (6.1% severely wasted and 1.5% of children moderately wasted), and underweight (8.9% Severe underweight and 8.3% moderately underweight), with respective p-values of <0.000 , <0.004 , and <0.03 . In contrast, centers that children did not practice handwashing showed higher prevalence of underweight (8.9% for Severe underweight, 8.3% for moderate underweight), 21.2% severe stunting rates and 10.2% moderate stunting prevalence amongst children in those centres that did not practice

handwashing. Those centres which practiced handwashing, had significant lower prevalence of overweight (2.4%) and obesity (0.4%), suggesting that improved hygiene not only protects against infection-related undernutrition but also promotes healthier routines that may reduce overnutrition risks.

Use of safe water treatment methods and sanitation facilities such as potties was also associated with better nutritional outcomes. Centers using potties had significantly fewer cases of stunting (9.8% severe stunting and 4.3% moderately stunted children and wasting rates (4.3% severe wasting and 1.8% moderate wasting); these were statistically significant with a $p < 0.0005$ for stunting amongst centres use of potties. In contrast, centers where waste was "thrown anywhere" or water was not treated showed a slight increase in overweight (2.4%) and obesity (0.4%) among children. Though less common than undernutrition, these cases of overnutrition highlight the emerging double burden of malnutrition in homebased and centre based childcare centres, where both insufficient and excessive nutrition can co-occur, influenced by hygiene and sanitation practice

CHAPTER 5: DISCUSSIONS

5.1 Introduction

The discussion of the results is grounded in the four research questions that guided the investigation. The research objectives were to investigate the socio-demographic characteristics, dietary patterns/feeding practices, nutritional status, and hygiene practices of children in home-based and centre-based childcare centres in Embakasi East. The analysis of the findings examined the similarities and differences in the outcomes between the two categories of childcare centres and established connections with the current body of research and theoretical framework. The discussion additionally emphasizes the implications of the findings for policy and implementation, along with the constraints and suggestions for future investigation.

5.2 Socio-Demographic Characteristics of Children, Parents, and Caregivers in Home-Based and Centre-Based Childcare Centres

The socio-demographic characteristics observed in the current study align with findings from previous research in similar contexts. The predominance of young, married parents with secondary education, engaged in business or casual labor, and earning low to moderate incomes is consistent with patterns identified in urban informal settlements. For instance, a study conducted in the Dagoretti informal settlement in Nairobi, Kenya, reported that caregivers of children aged 0–2 years were primarily young adults with limited formal education and engaged in informal employment (Muraya et al., 2022).

Additionally, the similarity in age and sex distribution of children between home-based and center-based childcare centers observed in this study is corroborated by other research.

A study comparing the nutrition environments of home-based and center-based childcare facilities found no significant differences in the demographic profiles of children attending these settings (Tandon et al., 2020).

Understanding these socio-demographic attributes is crucial for analyzing feeding patterns, dietary practices, nutritional status, and hygiene practices among children in different childcare types. The alignment of these findings with previous studies underscores the importance of tailoring interventions to the specific socio-economic and educational backgrounds of parents and caregivers to improve childcare practices and child health outcomes.

The caregiver's income levels indicate potential limitations in providing appropriate childcare due to resource constraints. The income levels correspond to the findings of Wahome and Mbatia (2017), which indicate that urban informal settlements have poor incomes. Consistent with the research conducted by Nampijja (2023), this study observed that most parents using childcare centres were aged between 23 years to 58 years, and a prevalence of parents with low levels of education.

The present study findings indicate distribution of wasting (WHZ) did not show a statistically significant association with age ($\chi^2 (5, N=325) = 6.437, p = 0.266$), the data still indicates that the older children (24 -30 months) in child care centres had slightly higher cases of SAM (4.3%) and normal weight (47.7%), while the younger children (6-23 months) showed more overweight (5.5%), possibly due to early feeding patterns. These findings emphasize the importance of sustained nutrition and care beyond infancy, especially between 24–30 months. These results slightly align with previous research

conducted in Nairobi's informal settlements, which reported high rates of undernutrition among children under five years old. For instance, Kimani-Murage et al. (2015) found that nearly 50% of children in these areas were stunted, highlighting the severity of malnutrition in such settings.

The higher prevalence of underweight at 12.3% as severely underweight, more so in centre-based care (6.8%) than in home-based care (5.5%), and 11.1% moderately underweight, however, moderate underweight rates were slightly higher in centre-based centres (7.1%) compared to 4% in home-based centres, this can be attributed to inadequate nutritional practices within these centers. Factors such as the absence of standardized feeding programs and limited access to nutrient-dense foods could contribute to these disparities. This is consistent with findings from Martyniuk et al. (2016), who noted that center-based facilities often lack comprehensive nutrition programs, potentially leading to suboptimal dietary intake among children.

The demographic profile of younger parents and caregivers observed in this study differs from some previous research, which may be due to variations in sampling or demographic trends within urban informal settlements. Understanding these socio-demographic factors is crucial, as they can influence childcare practices, nutritional outcomes, and the overall well-being of children in these communities. For instance, a study by Mwangi (2019) highlighted that caregivers' knowledge and practices significantly impact children's nutritional status, emphasizing the need for targeted interventions.

In summary, the current findings are consistent with existing literature on child malnutrition in informal settlements, underscoring the need for improved nutritional

practices and targeted interventions in childcare centers to address undernutrition among children.

5.3 Dietary Patterns and Practices of Children in Home-Based and Centre-Based Childcare Centres

The primary dietary practices observed in children in childcare centres would include children consuming more packed food from home, mainly comprising carbohydrate-rich foods like cereal, porridge, rice, and tubers, and limited consumption of protein-rich foods by children. This is similar to the study by Thiam et al. (2017), which found that starchy foods and legumes were often consumed by children in childcare centres, but the intake of vegetables, fruits, and animal-source foods was minimal. These insights have significant implications for policy formulation, particularly in strengthening existing nutrition policies such as the Maternal, Infant, and Young Child Nutrition (MIYCN) policy, to fit into the childcare settings in areas of capacity building for the caregivers on matters of nutrition education. The World Health Organization (WHO) emphasizes in its Comprehensive Implementation Plan on Maternal, Infant, and Young Child Nutrition that ensuring adequate nutrition from early life stages is crucial for physical and mental development (World Health Organization [WHO], 2014). Addressing the identified dietary gaps could help policymakers develop targeted interventions to improve dietary diversity in childcare centers. This may involve implementing standardized feeding programs that ensure the inclusion of various food groups, thereby enhancing nutrient intake and supporting optimal growth and development.

Furthermore, aligning childcare center feeding practices with MIYCN guidelines could contribute to reducing malnutrition rates and promoting better health outcomes. The MIYCN policy emphasizes the need for providing balanced diets rich in essential nutrients to support child growth and development (Ministry of Health, 2013). Implementing these guidelines in childcare settings can help bridge the gap between current practices and recommended nutritional standards.

The frequency of feeding children was less than 3 meals a day to a majority of children (94.5% fed two meals a day and 5.5% fed three meals a day), which is below the required minimum frequency of at least 3 meals a day. The consumption of nutrient-dense foods such as vegetables, fruits, and milk were insufficient. These findings provide insight into the actual feeding and dietary practices of children in childcare centres, as a dire need for intervention to improve the high nutrition prevalence of children in childcare centres. It is crucial to assess this aspect, as good nutrition practices like the consumption of nutrient-dense foods have a significant impact on the nutritional status of children. Lack of feeding programs in home-based and centre-based centres corresponds to the results obtained by Kimwele & Ochola (2017) in low-income households in Nairobi. Contrary to the findings of Gelli et al. (2018), the provision of on-site meals did not lead to a considerable diversification of diets.

The study finding shows that 24.9% of children who ate food packed from home had severe stunting, and 11.1% were moderately stunted. This shows a significant link between the quality of food and the diversity of foods packed from home to childcare centres as a huge contributor to children's nutrition outcomes. This observation aligns with research by

Hughes et al. (2021), which found that meals prepared on-site in childcare settings often have higher nutritional value compared to those brought from home. The lack of significant differences between the dietary patterns of children consuming packed food and those eating meals prepared at childcare centers may suggest inadequate meal diversification and preparation in these centers, limitations inherent in the cross-sectional study design, or challenges faced by centers in providing a variety of meals. Additionally, financial constraints among low-income families may limit the inclusion of nutrient-dense foods in home-packed meals, despite awareness of their benefits.

These findings underscore the importance of implementing standardized feeding programs in childcare centers, emphasizing strong parental engagement to enhance knowledge on diet diversification. Such initiatives are crucial for improving the quality of meals provided to children. Aligning these efforts with the Maternal, Infant, and Young Child Nutrition (MIYCN) policy is essential. The MIYCN policy aims to protect, promote, and support optimal feeding practices to improve child survival. Full implementation of this policy is expected to contribute to a reduction in child morbidity and mortality, supporting national health strategies and contributing to broader developmental goals.

By integrating the MIYCN guidelines into childcare settings, stakeholders can ensure that meals provided meet the nutritional needs of children, thereby addressing undernutrition and promoting better health outcomes. This approach necessitates collaboration among policymakers, childcare providers, and parents to create an environment that supports optimal nutrition for children. Nairobi County has the Childcare Facilities Act 2027, with regulations to guide the Childcare operations; however, these centres lack adequate training

on childcare practices due to low education levels amongst caregivers. This has been a big hindrance to attaining the quality standard required for either of the childcare centres in formal settlements.

The study documented the specific types of food provided to children in both home-based and centre-based childcare facilities. The majority of the foods provided consisted mostly of cereal and grain food groups, with a small number of animal-source foods. The results in Table 4.7 show a feeding frequency of two times per day. The findings address the research question by offering insights into the typical foods offered to children and the frequency of feeding in various childcare centres. This provides valuable information regarding the feeding practices of children aged 0-30 months. According to a study conducted in Kenya, cereals, roots, and tubers were found to be the primary diets supplied to children, with limited consumption of animal-source foods (Kimwele & Ochola, 2017).

A separate investigation conducted in a non-formal settlement in Nairobi similarly documented a lack of variety in the diet and the consumption of foods with low nutritional value among young children (Wahome & Mbatia, 2017). Nutrition in informal paid childcare provision is poor where it has been studied (poor diets, little support provided to even young infants (Hughes, 2021). The limited intake of animal-sourced foods that are high in nutrients is consistent with previous research and can be attributed to the prevalence of nutrition status of children in informal urban settlements.

Nevertheless, the feeding frequency of two times to children at the centres indicated that caregivers recognized the significance of the child's feeding frequency each day. However, this frequency is still below the minimum requirement by WHO, and it may be attributed

to the limited nutrient-dense foods and variety resulting from economic limitations. The results emphasize the necessity of nutrition education initiatives to enhance caregiver understanding of suitable feeding practices for infants and young children, especially the importance of diet diversification. Ensuring the availability of cost-effective protein-rich foods (animal sources) and products will also contribute to the mitigation of malnutrition. This study enhances our comprehension of prevailing infant and young child feeding practices in urban informal settings characterized by an elevated prevalence of malnutrition. This process identifies deficiencies to inform the development of impactful nutrition programs that respond and prevent malnutrition among children in childcare centres.

Children were provided with a limited variety of food in their diet, primarily consisting of cereals, with very few nutrient-rich items included. The frequency of feeding was reported to be sufficient, while the quality of the diets was low. Elevated rates of malnutrition were detected, consistent with local research. Home-based centres exhibited the most responsibilities, highlighting the necessity for focused enhancements in the provision of baby and young child feeding and hygiene assistance for caregivers who are not affiliated with formal centres.

The study analyzed the proportions of malnutrition, where a 12.3% of children were severely underweight, more so in centre-based care (6.8%) than in home-based care (5.5%), and 11.1% moderately underweight, however, moderate underweight rates were slightly higher in centre-based centres (7.1%) compared to 4% in home-based ones. When it comes to wasting (weight-for-height), 76% of children were in the normal range, while 7.7% suffered from severe acute malnutrition (SAM), slightly more in home-based (4%)

than in centre-based care (3.7%). Cases of overweight and obesity were relatively low but still notable, with 9.5% overweight and 3.1% obese across both childcare centres. The current study findings align with a previous study conducted in an informal community in Nairobi, which also observed elevated rates of undernutrition, particularly among older children (Wahome & Mbatia, 2017). The age-related rise in malnutrition may be attributed to inadequate feeding practices on energy-dense food and heightened disease susceptibility. The results suggest the necessity of enhancing feeding programs for both home-based and centre-based childcare providers, particularly regarding infant and young child feeding (IYCF). Enhancing hygienic practices and implementing illness-prevention measures are crucial to mitigating malnutrition. Providing nutrition supplements and feeding children 0-30 months. This study contributes to the existing scarcity of local data regarding the nutritional condition of young children in various childcare settings located in urban informal settlements that are confronted with significant levels of poverty and malnutrition.

5.4 Nutrition Status of Children in Home-Based and Centre-Based Childcare Centres

Children in home-based childcare centres exhibited a lower prevalence of malnutrition in comparison to those in centre-based childcare centres. The results provide a direct description of the nutritional status outcomes within the sample group and enable a comparison evaluation between home-based and centre-based care centres. The evident disparities suggest the possibility of home-based centres offering better nutrition care. According to studies conducted by Muendo and Kibua (2014), there was a correlation between home-based care and increased malnutrition. This is contrary to the findings of

this study, where the undernutrition rates were higher in centre-based childcare centres compared to home-based childcare centres.

The reduced prevalence of malnutrition in the centres is consistent with the previously documented advantages (Leroy et al., 2012). The findings emphasize the necessity of enhancing nutritional education, feeding practices/dietary patterns, and nutrition assessment in informal childcare centres in informal areas. The evident inequalities suggest that centre-based care should be given priority in policy and programming. This study provides useful evidence regarding the inequalities in nutrition status between informal home-based and centre-based childcare settings, a topic that has received little attention in low-income urban situations. The findings offer practical insights to inform targeted interventions aimed at addressing nutritional challenges and childcare practices among the urban underprivileged population.

Undernutrition in children has been linked to poor mental development and school achievement as well as behavioral abnormalities, and it is responsible for the highest mortality rate in children and has long-lasting physiologic effects (Martins, 2011).

5.5 Hygiene Practices of Children in Home-Based and Centre-Based Childcare Centres

The primary hygienic practices noted were caregivers engaging in handwashing and the presence of designated feeding places in centres. Pre-meal sanitation of feeding surfaces and utensils was a widespread practice, but with some restrictions in centres. The findings elucidate the hygienic practices and societal standards related to child feeding, enhancing comprehension of the determinants that impact health hazards and the quality of childcare.

The handwashing outcomes are promising, but the inadequate practices in centres are worrisome from a public health standpoint. According to Mwapasa et al. (2022), handwashing was commonly observed, but the hygiene practices in the centres were insufficient. In contrast to the earlier suggestion (Gelli et al., 2018), centres exhibited shortcomings in adhering to appropriate sanitation and cleaning protocols for ensuring the provision of safe food. Home hygiene adheres to the requirements on feeding space hygiene outlined by UNICEF (2020b).

Lack of handwashing and poor hygiene practices are associated with spread of common childhood diseases like diarrhea, amongst children under 30 months, while poor hand hygiene further contributes to their spread. Norovirus, a cause of viral diarrhea, spreads rapidly in areas with neglected hygiene, leading to symptoms like nausea and vomiting. Escherichia coli (E. Coli) can be contracted through contaminated food or surfaces, causing abdominal cramps and diarrhea, and certain strains may result in pneumonia or urinary infections. Similarly, Salmonella, found in animal intestines, can spread through contaminated poultry, leading to fever and cramps. Hepatitis A, which inflames the liver, spreads via food or drink contaminated with feces, causing symptoms like vomiting and joint pain.

Possible factors contributing to the issue include limited resources available to centres, flaws in the study design, or a requirement for caregivers to receive education on hygiene practices. The results emphasize the necessity for improved knowledge, of hygiene

practices, dietary and feeding practices, and assessment of children's nutrition status in childcare centres.

Home-based caregivers require capacity strengthening or sensitization on childcare practices; hygiene practices required in childcare centres, diet diversification, and feeding frequency of children, including allowing breastfeeding parents to breastfeed children whenever they can at the childcare centres. There is a need for established regulations to provide better checklists or criteria to ensure hygiene practices in informal childcare centres. The study fills a gap in knowledge by presenting new evidence on hygiene practices in informal childcare settings. This research has the potential to stimulate public health initiatives aimed at protecting children in vulnerable urban childcare centres.

The study evaluated various hygiene practices within childcare centers, including handwashing protocols, the availability and use of potties, and waste management methods. This study's findings show handwashing practices to have a strong association with preventing both undernutrition and overnutrition. In centers where handwashing was practiced, children had significantly lower rates of stunting (6.1% severely stunted and 1.8% moderately stunted), wasting (6.1% severely wasted and 1.5% of children moderately wasted), and underweight (8.9% Severe underweight and 8.3% moderately underweight), with respective p-values of <0.000, <0.004, and <0.03. In contrast, centers that children did not practice handwashing showed higher prevalence of underweight (8.9% for Severe underweight, 8.3% for moderate underweight), 21.2% severe stunting rates and 10.2% moderate stunting prevalence amongst children in those centres that did not practice handwashing.

These findings align with Muraya et al. (2022), who emphasized that poor hygiene practices in childcare settings contribute to increased health risks among children and that improving WASH (Water, Sanitation, and Hygiene) interventions can positively impact child health outcomes. Similarly, Kericho and Rebecca (2016) found that hygiene practices in early childhood education centers significantly influenced children's overall well-being, with centers that followed proper handwashing and sanitation protocols reporting lower rates of malnutrition and infections.

On the other hand, Okwiri (2022) highlighted that despite awareness of proper hygiene practices, many childcare centers struggle with implementing effective sanitation measures due to resource constraints and lack of caregiver training, which may explain why some centers still experience high levels of stunting and underweight cases despite efforts to improve hygiene.

These findings emphasize the importance of strengthening hygiene policies within childcare settings, ensuring that caregivers receive proper training on handwashing, potty usage, and food hygiene practices. Integrating these strategies into existing childcare guidelines and WASH programs could significantly improve child nutrition and health outcomes in early childhood care environments.

An investigation conducted in childcare centers in Malawi documented unsatisfactory sanitary conditions, such as unhygienic toilets and inadequate water storage, which exposed children to disease hazards (Mwapasa et al., 2022). A study conducted in Ghana found a correlation between inadequate care, which includes inadequate hygiene practices like centre cleanliness, and a higher prevalence of undernutrition in children (Nti & Lartey,

2008). The results correlations are consistent with the notion that insufficient hygiene practices heighten the risk of illness transmission, hence adversely affecting the nutrition status of children in childcare centres. The results underscore the necessity of implementing hygiene interventions in childcare centres to guarantee the provision of safely managed water and enhanced sanitation facilities.

This is crucial for preventing diseases and promoting the good nutrition status of children. Caregivers should also be included as a target audience for sensitization on the importance of hygiene practices at childcare centres. The study offers significant local data that establishes a connection between hygiene practices and nutritional outcomes in young children residing in urban informal settlements. This emphasizes the importance of hygiene as a crucial area for integrated treatments and prevention of poor nutrition outcomes among children in childcare centres.

Further evidence suggests the presence of substandard practices such as inadequate water storage and the absence of adequate use of potties in some childcare centres, which heighten the risk of disease. Recent research has substantiated this discovery by revealing inadequate hygiene practices in childcare centres in comparable environments. The majority of homes employed unhygienic practices, such as using polythene bags for disposing of the fecal waste of children which posed significant dangers. Enhanced infrastructure is necessary to prevent the spread of diseases transmitted through the oral-fecal route.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusion

Handwashing practices were very low in childcare centers, and children primarily drank tap water. Many centres that used potties and correct waste disposal measures recorded slightly lower undernutrition prevalence. Rates of stunting, wasting, and underweight were higher in this study, surpassing the national rates of 18%, 5%, and 10% (Kenya National Bureau of Statistics, 2022), respectively. The study identified demographics using informal urban childcare and linked hygiene factors to nutritional disparities among childcare centers. The study also reveals that most children were of the same age distribution.

The study found that most children were fed starch foods as staple foods with little protein or fruits, and many children had less feeding frequency per day, with more than half recording less than 3 feeding per day in childcare centres, this is below the WHO, daily meal intake to meet the nutritional requirements of children under five years. This study provides valuable empirical evidence on the socio-demographic characteristics of children, parents, and caregivers in urban informal childcare settings.

This research is particularly significant as there is limited existing research on this topic, especially in the context of Kenya. The findings offer useful insights to guide policies and regulations focused on enhancing childcare feeding practices in informal childcare centres.

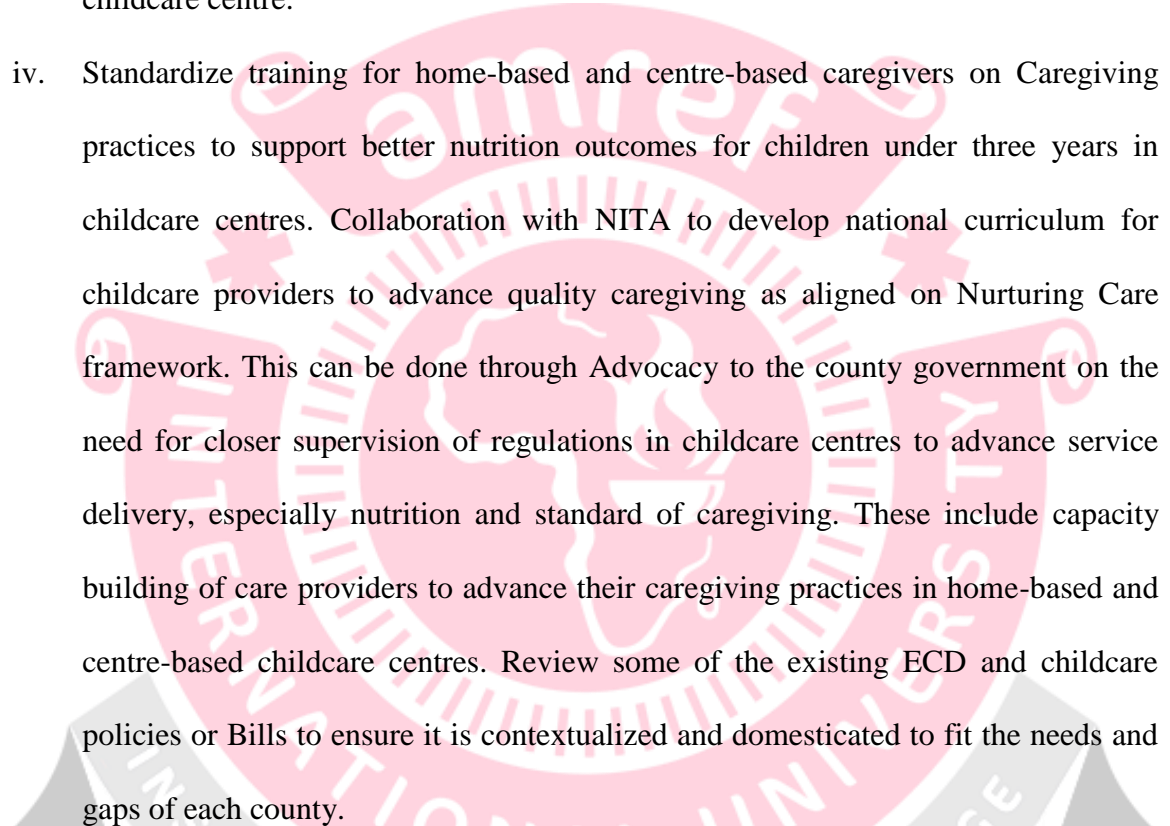
This further, offers empirical insights on the dietary sufficiency of infants and young children residing in urban informal settlements and the hygiene practices in informal childcare, making a noteworthy contribution. The evidence can provide valuable insights

for the development of policies and interventions aimed at enhancing child nutrition in impoverished urban areas that heavily rely on informal paid childcare services.

6.2 Recommendations

Findings provide data to help improve childcare practices, dietary patterns, and hygiene practices. These data suggest that targeted interventions are required to address malnutrition in both home-based and centre-based centres. The following are some of the recommendations that have been highlighted from the findings:

- i. Provision of nutrition education to parents and caregivers (those who directly care for the children in the centres) to provide/pack food that's nutrient-dense to their children/consider a diet with more diversity. This training should be advanced within the childcare networks, like Uthabiti, where these centres are aligned to, and the caregivers, to ensure parental engagement meetings for childcare to advance information to the centres, either through digital messaging to parents or physical meetings with parents on matters of child nutrition in childcare centres. The national curriculum development body -NITA to collaborate with Ministry of Health and department of Education to ensure Tots trained on Childcare Curriculum, and this assigned to networks of childcare providers to cascade the capacity building components.
- ii. Sensitization of childcare providers and parents on the importance of hygiene practices at childcare centres to child nutrition outcomes and equipping of centres with WASH/Hygiene facilities.

- 
- iii. Prioritization of the screening of acute undernutrition by use of Family MUACs at the childcare centres by caregivers, taking anthropometric measurements of the children routinely in home-based childcare centres and centre-based childcare centres. This will be issued by Ministry of health and linked health facility to childcare centre.
 - iv. Standardize training for home-based and centre-based caregivers on Caregiving practices to support better nutrition outcomes for children under three years in childcare centres. Collaboration with NITA to develop national curriculum for childcare providers to advance quality caregiving as aligned on Nurturing Care framework. This can be done through Advocacy to the county government on the need for closer supervision of regulations in childcare centres to advance service delivery, especially nutrition and standard of caregiving. These include capacity building of care providers to advance their caregiving practices in home-based and centre-based childcare centres. Review some of the existing ECD and childcare policies or Bills to ensure it is contextualized and domesticated to fit the needs and gaps of each county.

6.3. Suggestions for Future Research Considerations

1. Analyzing child development indicators across different childcare types to determine the most conducive environment for growth and development between the two childcare centres.
2. Exploring cost-effective and culturally acceptable behavior change interventions to improve recommended IYCF and WASH/hygiene practices.

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APPENDICES


Appendix 1: Ethical Clearance /Research License from NACOSTI


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NATIONAL COMMISSION FOR
SCIENCE, TECHNOLOGY & INNOVATION

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This is to Certify that Ms. Josephine Atieno Odhiambo of Amref International University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Nairobi on the topic: **CHILDCARE PRACTICES AND NUTRITION STATUS AMONG CHILDREN (0 -30 MONTHS) IN HOME-BASED AND CENTRE BASED-CHILDCARE CENTRES IN EMBAKASI EAST, NAIROBI, KENYA for the period ending : 17/June/2024.**


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See overleaf for conditions

Appendix 2: Informed Consent

Informed Consent Form (Child care owners / KII)

this ICF should only be used for those who have attained the age of majority, 18 years]

Study Title	CHILD CARE PRACTICES' AND NUTRITION STATUS AMONG CHILDREN (0 - 30 MONTHS) IN HOMEBASED AND CENTRE BASED -CHILD CARE CENTRES IN EMBAKASI EAST, NAIROBI, KENYA.
Investigator(s)	<ul style="list-style-type: none">▪ Josephine Atieno Odhiambo (Principle Investigator- (Student)▪ Dr. Peninnah Masibo - Student Supervisor (0721952175)▪ Prof. Anselimo Makhoha – Student supervisor (0713817436)
Study Sponsor(s)	Self
Collaborators	

• Informed Consent Form has two parts:

- Information Sheet (to share information about the study with you)
- Certificate of Consent (for signatures if you choose to participate)

You will be given a copy of the full Informed Consent Form

• I: Information Sheet

• Brief description of the research and organization/s involved in the research.

My name is Josephine Atieno Odhiambo public health student at Amref International University conducting research on child care practices and nutrition status among children (0 - 30 months) in homebased and centre based -child care centres in Embakasi east, Nairobi, Kenya. The purpose of your participation in this research is to help the researcher to collect data on what is affecting child care practices and nutrition status among children (0 - 30 months) in homebased and centre based -child care centres.

• Brief description of the purpose of the study.

The purpose of the study will be to determine the dietary patterns, hygiene practices and nutrition status of children between 0 -30 months in homebased and centre based childcare centres in Embakasi East, Nairobi County.

The study will give an insight to parents who utilize the option of homebased and centre based childcare centres on the nutrition and hygiene practices that childcare centres are providing to their children. The evidence-based information would help them to know what good quality childcare services should be based on the current childcare practices in the informal settlement and the nutrition status of the children. This will contribute in enhancing the children nutrition status, and to reduce childhood morbidity and mortality in the urban informal settlements, when the findings would be utilized to address any existing gaps in terms of childcare practices.

Who can participate?

The study targets childcare centre owners caring for children between 0- 36 months and are in selected childcare centres (Homebased centres and centre based childcare centres within Nakasi East sub county, Nairobi, Kenya).

Key Informant would be randomly selected to participate in the study, they will have history of working for children or expert in childcare practices.

Why voluntary participation

The purpose of your participation in this research is to help the researcher to collect data on what is affecting child care practices and nutrition status among children (0 - 30 months) in homebased and centre based -child care centres. You were selected as a possible participant in this study because you are the targeted group.

Your participation in this study is completely voluntary, and you have the sole authority to decide for or against your participation in this interview. You may also stop at any given time if you may wish to stop.

What is involved in this project?

The nutritional status of the children will be determined through Anthropometric assessment on children 0 months to 30 months. The weight to be measured using an electronic digital room weighing scale (Seca) in Kilograms. For height/length, children <2 years will be measured lying down (recumbent length) using length mat/lying height-board while those who >=2 years were measured standing up - measurements in centimeters. For MUAC, a non-stretch tape will be used which is called a MUAC tape with readings in centimeters.

These measurements shall be digitally keyed into the Growth assessment structured questionnaire in Kobo Tool and each to be given a unique code per child intended to merge the data then sent to the Epi Info/ENA) 2020 / Epi info version 3.5.4 with WHO Anthropometry tool using excel for cleaning and analysis.

Childcare owners will be interviewed as well as the parents to children aged 0 – 30 months present at the centres. A questionnaire will be sent to parents and childcare owners who consent to be able to fill them in electronically.

The recorded interview will be conducted which shall last to maximum 35 minutes.

The data collection session will include some pictures being taken during the anthropometric measurement with consideration of not showing the child's face.

The interviewers will be identified using a unique code.

How long will the project last?

Collection of data will be done within a period of one to two weeks.

What are the risks?

I do my best to keep your information safe by not sharing your answers with anyone outside of the study. I will not write down your name or address on the questionnaire there will be no risks of personality identifying any respondent in my results analyzed.

What are the benefits?

You will have no direct benefit or remuneration, neither in cash nor in kind, for this interview. There may, however, be indirect benefits, as the information obtained is intended to help improve the childcare practices situation, and help students, Amref International University and the urban health projects and activities in Embakasi East and similar other urban communities in or beyond Kenya.

How will we protect your information and maintain confidentiality?

Your subjects/participants responses would be coded or numbered as opposed to using participants names. I will ensure your personal information is numbered/coded and locked in a password where no public person can access except me for the purpose of the study alone.

What will happen with the results?

The result from the study will be disseminated at Amref International University for the purpose of finalizing my masters' studies. It will then be disseminated to Uthabiti Africa Management for the purpose of utilizing the results to strengthen the childcare space. The findings will then be published in a journal for the purpose of learning and knowledge sharing to boost the childcare sector.

What if I refuse to participate or withdraw from the study?

Your participation in this study is completely voluntary, and you have the sole authority to decide for or against your participation in this interview including all information you've provided within the study period.

Compensation

We will not pay you to help us or will not pay for agreeing to participate in this interview.

Who can I contact?

If you have any questions, you can ask anyone from our team now or later. If you have questions, you may contact **Josephine Odhiambo, 0702232197, phineodhiambo79@gmail.com**. If you have questions about your rights as a study subject, you may contact:

The Secretary ESRC
Amref Health Africa in Kenya
Wilson Airport, Lang'ata Road
Office Tel: +254 20 6994000
Mobile No: 0795746777
Fax: +254 20 606340

: II: Certificate of Consent

I have read the above information, or it has been read to me. I have had the opportunity to ask questions about it and any questions I have been asked have been answered to my satisfaction. I consent voluntarily to participate in this study.

Print name of Subject	[at least forename and surname]
Signature of Subject	
DD/MM/YYYY	

usually impaired, physically impaired, mentally impaired or illiterate

I have witnessed the accurate reading of the Consent Form to the potential study subject, and the individual has had the opportunity to ask questions. I confirm that the individual has given consent freely.

Print Name of Subject	[at least forename and surname]
Thumb/Foot print of Subject	
Signature of Witness	[A literate witness must sign and should be selected by the study subject and MUST have no connection to the research team.]
DD/MM/YYYY	

Appendix 3: Data collection tools: Questionnaires and Observation Checklists

Part 1. B. Childcare Owner's/Manager's socio-demographic characteristics and questionnaire

1. Respondents Age (Years):

- 18 – 27
- 28 – 37
- 38 – 47
- 48 -57
- 58 – Above

2. Respondent's education level

- No formal education
- Primary
- Secondary
- College
- University

3. Number of Children aged between 0 – 30 months in your childcare centre.

- 1 – 5
- 6 – 10
- 11 – 20
- 21 – 30
- 31 – above

Who is the Respondent?

- 1= Owner
- 2= Caregiver
- 3= Other (Specify)

For how long has the day care centre been operating?

- 1= Within the last 6 months
- 2= Within the past 7 to 12 months
- 3=Between 1 to 2 years
- 4= Between 2 to 3 years
- 4= Between 3 to 4 years
- 5=More than 4 years.

Total number of children at Day Care Centre:

Total number of employees at the day care centre

- 1= Only owner

- 21 – 30
- 31 – above

Who is the Respondent?

- 1= Owner
- 2= Manager
- 3= Other (Specify)

For how long has the day care centre been operating?

- 1= Within the last 6 months
- 2= Within the past 7 to 12 months
- 3=Between 1 to 2 years
- 4= Between 2 to 3 years
- 4= Between 3 to 4 years
- 5=More than 4 years.

Total number of children at Day Care Centre:

Total number of employees at the day care centre

- 1= Only owner
- 2= Only Manager
- 3= Other employees (Specify)

If there are other employees, specify category:

- 1= Teacher
- 2= Baby sitter/guardian
- 3= Security guards
- 4=Cleaner
- 5=Other (Specify)

What is normally fed to the child at the day care centres? (Multiple answers are allowed)

- | | |
|--|--|
| <input type="checkbox"/> 1=porridge | <input type="checkbox"/> 5=Rice |
| <input type="checkbox"/> 2= mashed bananas | <input type="checkbox"/> 6=mashed potatoes |
| <input type="checkbox"/> 3=eggs | <input type="checkbox"/> 7=beans/ Kamande |
| <input type="checkbox"/> 4= milk | <input type="checkbox"/> 8=rice |
| <input type="checkbox"/> 9=vegetables | <input type="checkbox"/> 11=ugali |

Part 1. C. Child demographic characteristics and anthropometric measures.

1. Child's Date of birth from birth certificate copies at the centres.....

2. Child's age in months.....

3.. Sex.

- Male
- Female

4. Child's Weight in Kgs (1st Reading)

Child's weight (2nd Reading)

Child's weight (3rd Reading)

5. Child's Height (1st Reading) in cm

Child's Height (1st Reading) in cm

Child's Height (2nd Reading) in cm

Child's Height (3rd Reading) in cm

6. MUAC in cm (1st) Reading

MUAC in cm (2nd) Reading

MUAC in cm...(3rd) Reading



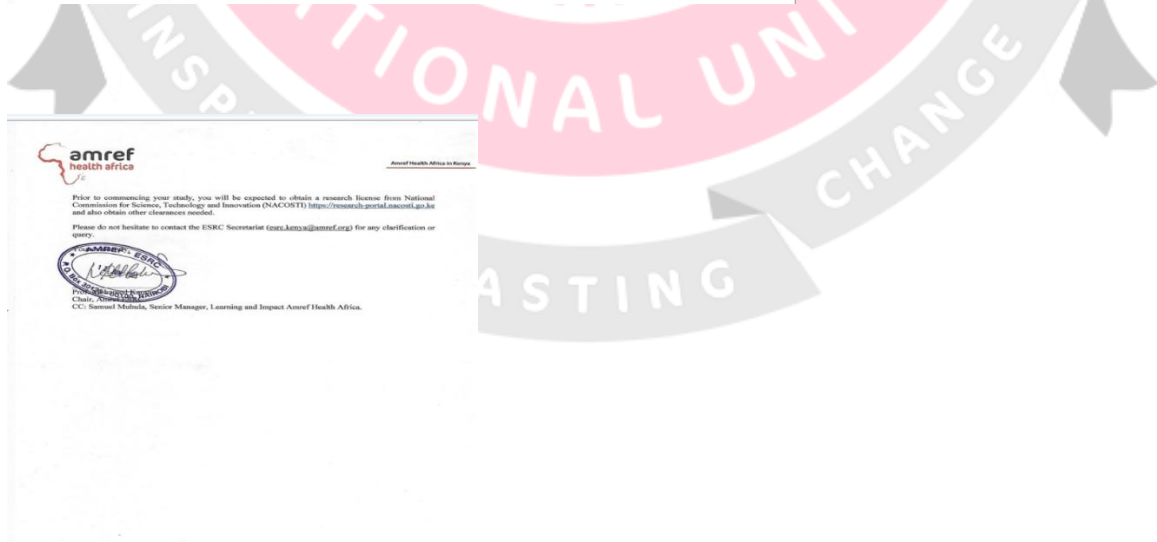
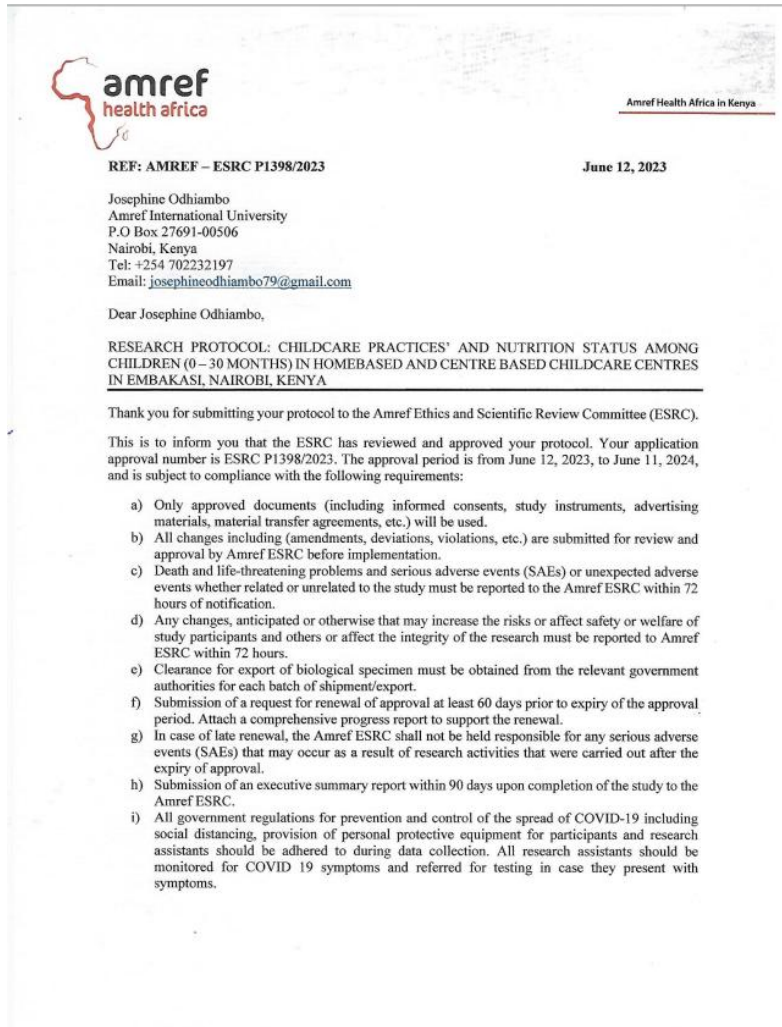
PART 2. B. OBSERVATION CHECKLIST AT DAY CARE CENTRE

The Source of water in daycare centers	<ol style="list-style-type: none"> 1. River 2. Tap 3. Borehole 4. Rain 5. Others specify 	Comments/remarks
Were there tap/handwashing containers in use at the childcare centres?	<ol style="list-style-type: none"> 1. Yes 2. No 	
What was the centre cleanliness?	<ol style="list-style-type: none"> 1. Not clean 2. Somehow clean 3. Very clean 	
Were there toilets or potties in use?	<ol style="list-style-type: none"> 1. Yes 2. No 	
Whether toilets were adequate	<ol style="list-style-type: none"> 1. Yes 2. No 	
At what frequency were children fed at the centre? (Can ask the caregiver/centre owner?)	<ol style="list-style-type: none"> 1. Feeding once a day 2. Feeding 2 times in a day 3. Feeding three times a day 4. All the above 	
Is the surrounding area of the daycares clean?	<ol style="list-style-type: none"> 1. Yes 2. No 	
Are there parents packing food for their children to childcare centres? (to parents) do you pack food for your child to the childcare centres?	<ol style="list-style-type: none"> 1. Yes 3. No 	
How many rooms does the daycare have?	<ol style="list-style-type: none"> 1 2 3 or more 	
Type of building	<ol style="list-style-type: none"> 1. Permanent 2. Semi-permanent 3. Temporary structure 	

Appendix 4: Embakasi East Sub County-study area Map



Appendix 5: ESRC Amref Health Africa Approval



Appendix 6: Similarity Report

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Page 1 of 116 21135 words 116% 2/2020

CHILD CARE PRACTICES AND NUTRITION STATUS OF CHILDREN (0 - 30 MONTHS) IN HOME-BASED AND CENTRE-BASED - CHILD CARE CENTRES IN EMBAKASI EAST, NAIROBI, KENYA.

JOSEPHINE ATIENO ODHIAMBO



Appendix 7: Home-based and centre-based child care centres under the Uthabiti network in Embakasi East with children 6- 30

Table 14 Home-based and centre-based child care centres under the Uthabiti network in Embakasi East with children 6- 30 months

Home-based and centre-based child care centres under the Uthabiti network in Embakasi East with children 6- 30 months				
No	Name of Centres	Type of Centres	Total children<30 months	Centre Location
1	Jey Wicks Daycare	Home-based	7	Nairobi - Embakasi East
2	Little Angels Daycare	Centre-based	23	Nairobi - Embakasi East
3	Caro`s Daycare	Centre-based	14	Nairobi - Embakasi East
4	Full Gospel Daycare	Centre-based	11	Nairobi - Embakasi East
5	Ebenezer Learning Centre	Centre-based	11	Nairobi - Embakasi East
6	JG Daycare	Centre-based	12	Nairobi - Embakasi East
7	Kipawa Daycare	Centre-based	9	Nairobi - Embakasi East
8	Makochini Daycare	Home-based	5	Nairobi - Embakasi East
9	Life of Hope Daycare	Home-based	5	Nairobi - Embakasi East
10	Dynamite Daycare	Home-based	9	Nairobi - Embakasi East
11	Jan Bruce Community	Centre-based	7	Nairobi - Embakasi East
12	Hope Child Care	Centre-based	33	Nairobi - Embakasi East
13	Ess Excellent Daycare	Centre-based	23	Nairobi - Embakasi East
14	Washiru Daycare	Home-based	11	Nairobi - Embakasi East
15	Shinners Daycare	Home-based	2	Nairobi - Embakasi East
16	Mama Mwangi Daycare	Home-based	8	Nairobi - Embakasi East
17	Superstars Academy	Centre-based	6	Nairobi - Embakasi East

18	The New Hope Daycare	Home-based	5	Nairobi - Embakasi East
20	Nashville Academy	Centre-based	14	Nairobi - Embakasi East
21	Pendo Daycare	Home-based	26	Nairobi - Embakasi East
22	Tsavo Ten Centre	Centre-based	22	Nairobi - Embakasi East
23	Mama Bahati Upendo Daycare	Home-based	14	Nairobi - Embakasi East
24	Mount Olive Daycare	Centre-based	20	Nairobi - Embakasi East
25	Neema Daycare	Home-based	7	Nairobi - Embakasi East
26	Jacaranda Embrace Daycare	Centre-based	15	Nairobi - Embakasi East
		TOTAL	325	



Appendix 8: Hygiene Practices of Children in Homebased and Centre based Childcare centres.

Table 15: Hygiene Practices of Children in Homebased and Centre based Childcare centres.

Wasting (WHZ)						
Variables	Categories	MAM (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Obesity ($> +3$) N (%)	Overweight ($> +2$ to $+3$) N (%)	SAM (< -3) N (%)
How clean is the centre?	Not clean	7 (2.2)	104 (32)	5 (1.5)	15 (4.6)	12 (3.7)
	Somehow clean	5 (1.5)	131 (40.3)	5 (1.5)	15 (4.6)	10 (3.1)
	Very clean	0 (0)	12 (3.7)	0 (0)	1 (0.3)	3 (0.9)
Stunting (HAZ)						
Variables	Categories	Moderately stunted (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Severely stunted < -3 SD N (%)		
How clean is the centre?	Not clean	22 (6.8)	78 (24)	43 (13.2)		
	Somehow clean	16 (4.9)	110 (33.8)	40 (12.3)		
	Very clean	1 (0.3)	9 (2.8)	6 (1.8)		
Underweight (WAZ)						

Variables	Categories	Moderately underweight (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Severely underweight < -3 SD N (%)		
How clean is the centre?	Not clean	18 (5.5)	105 (32.3)	20 (6.2)		
	Somehow clean	18 (5.5)	132 (40.6)	16 (4.9)		
	Very clean	0 (0)	12 (3.7)	4 (1.2)		
Hygiene Practices of Children in Homebased and Centre based Childcare centres.						
Wasting (WHZ)						
Variables	Categories	MAM (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Obesity ($> +3$) N (%)	Overweight ($> +2$ to $? +3$) N (%)	SAM (< -3) N (%)
Handwashing Practices of children	No	5 (1.5)	129 (39.7)	10 (3.1)	20 (6.2)	20 (6.1)
	Yes	7 (2.1)	118 (36.3)	0 (0)	11 (3.4)	5 (1.5)
Stunting (HAZ)						
Variables	Categories	Moderately stunted (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Severely stunted < -3 SD N (%)		
Handwashing Practices of children	No	33 (10.2)	82 (25.2)	69 (21.2)		
	Yes	6 (1.8)	115 (35.4)	20 (6.1)		
Underweight (WAZ)						

Variables	Categories	Moderately underweight (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Severely underweight < -3 SD N (%)		
Handwashing Practices of children	No	27 (8.3)	128 (39.4)	29 (8.9)		
	Yes	9 (2.8)	121 (37.2)	11 (3.4)		
Wasting (WHZ)						
Variables	Categories	MAM (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Obesity ($> +3$)	Overweight ($> +2$ to $? +3$) N (%)	SAM (< -3) N (%)
Water_treatment	Boil	1 (0.3)	69 (21.2)	5 (1.5)	11 (3.4)	6 (1.8)
	Chemicals	5 (1.5)	98 (30.1)	5 (1.5)	15 (4.6)	15 (4.6)
	Do nothing	6 (1.8)	71 (21.8)	0 (0)	5 (1.5)	4 (1.2)
	Filter	0 (0)	9 (2.8)	0 (0)	0 (0)	0 (0)
Hygiene Practices of Children in Homebased and Centre based Childcare centres.						
Stunting (HAZ)						
Variables	Categories	Moderately stunted (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Severely stunted < -3 SD N (%)		
Water_treatment	Boil	19 (5.8)	45 (13.8)	28 (8.6)		
	Chemicals	13 (4.0)	71 (21.8)	54 (16.6)		
	Do nothing	6 (1.8)	74 (22.8)	6 (1.8)		
	Filter	1 (0.3)	7 (2.2)	1 (0.3)		
Underweight (WAZ)						

Variables	Categories	Moderately underweight (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Severely underweight < -3 SD N (%)		
Water_treatment	Boil	10 (3.1)	73 (22.5)	9 (2.8)		
	Chemicals	20 (6.2)	88 (27.1)	30 (9.2)		
	Do nothing	6 (1.8)	79 (24.3)	1 (0.3)		
	Filter	0 (0)	9 (2.8)	0 (0)		
Wasting (WHZ)						
Variables	Categories	MAM (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Obesity ($> +3$) N (%)	Overweight ($> +2$ to $+3$) N (%)	SAM (< -3) N (%)
Potties_availability_ and _in use	No	6 (1.8)	117 (36)	8 (2.5)	15 (4.6)	14 (4.3)
	Yes	6 (1.8)	130 (40)	2 (0.6)	16 (4.9)	11 (3.4)
Stunting (HAZ)						
Variables	Categories	Moderately stunted (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Severely stunted < -3 SD N (%)		
Potties_availability_ and _in use	No	25 (7.7)	78 (24)	57 (17.5)		
	Yes	14 (4.3)	119 (36.6)	32 (9.8)		
Hygiene Practices of Children in Homebased and Centre based Childcare centres.						
Underweight (WAZ)						
Variables	Categories	Moderately underweight (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Severely underweight < -3 SD N (%)		
	No	22 (6.8)	111 (34.2)	27 (8.3)		

Potties_availability_ and _in use	Yes	14 (4.3)	138 (42.5)	13 (4)		
Wasting (WHZ)						
Variables	Categories	MAM (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Obesity ($> +3$) N (%)	Overweight ($> +2$ to $+3$) N (%)	SAM (< -3) N (%)
Waste/Refuse_disposal at the centre	Designated dumpsite	1 (0.3)	37 (11.4)	2 (0.6)	6 (1.8)	6 (1.8)
	Dustbin	3 (0.9)	72 (22.2)	2 (0.8)	5 (1.5)	2 (0.8)
	No designated area	8 (2.5)	138 (42.5)	6 (1.8)	20 (6.2)	17 (5.2)
Stunting (HAZ)						
Variables	Categories	Moderately stunted (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Severely stunted < -3 SD N (%)		
Waste/Refuse_disposal at the centre	Designated dumpsite	2 (0.6)	35 (10.8)	15 (4.6)		
	Dustbin	11 (3.4)	56 (17.2)	17 (5.2)		
	No designated area	26 (8)	106 (32.6)	57 (17.5)		
Underweight (WAZ)						
Variables	Categories	Moderately underweight (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Severely underweight < -3 SD N (%)		
Waste/Refuse_disposal at the centre	Designated dumpsite	4 (1.2)	38 (11.7)	10 (3.1)		
	Dustbin	7 (2.2)	74 (22.8)	3 (0.9)		

	No designated area	25 (7.7)	137 (42.1)	27 (8.3)		
Hygiene Practices of Children in Homebased and Centre based Childcare centres.						
Wasting (WHZ)						
Variables	Categories	MAM (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Obesity ($> +3$) N (%)	Overweight ($> +2$ to $+3$) N (%)	SAM (< -3) N (%)
water_source	Piped water	1 (0.3)	13 (4)	0 (0)	2 (0.6)	4 (1.2)
	Tap	11 (3.4)	234 (72.0)	10 (3.1)	29 (8.9)	22 (6.8)
Stunting (HAZ)						
Variables	Categories	Moderately stunted (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Severely stunted < -3 SD N (%)		
water_source	Piped water	2 (0.6)	12 (3.7)	6 (1.8%)		
	Tap	37 (11.4)	185 (56.9)	83 (25.5%)		
Underweight (WAZ)						
Variables	Categories	Moderately underweight (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Severely underweight < -3 SD N (%)		
water_source	Piped water	4 (1.2)	13 (4)	3 (0.9)		
	Tap	32 (9.8)	236 (72.6)	37 (11.4)		

Appendix 9: Association between Nutrition Status of children and childcare Hygiene practices

Table 16: Association between Nutrition Status of children and childcare Hygiene practices

Wasting (WHZ)							
Variables	Categories	MAM (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Obesity ($> +3$) N (%)	Overweight ($> +2$ to $+3$) N (%)	SAM (< -3) N (%)	Chi-q χ^2 test
How clean is the centre?	Not clean	7 (2.2)	104 (32)	5 (1.5)	15 (4.6)	12 (3.7)	$\chi^2(10, N=325)$ =7.505, p<0.677
	Somehow clean	5 (1.5)	131 (40.3)	5 (1.5)	15 (4.6)	10 (3.1)	
	Very clean	0 (0)	12 (3.7)	0 (0)	1 (0.3)	3 (0.9)	
Stunting (HAZ)							
Variables	Categories	Moderately stunted (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Severely stunted < -3 SD N (%)		Chi-q χ^2 test	
How clean is the centre?	Not clean	22 (6.8)	78 (24)	43 (13.2)		$\chi^2(6, N=325)$ =7.456, p<0.281	
	Somehow clean	16 (4.9)	110 (33.8)	40 (12.3)			
	Very clean	1 (0.3)	9 (2.8)	6 (1.8)			
Underweight (WAZ)							
Variables	Categories	Moderately underweight (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Severely underweight < -3 SD N (%)		Chi-q χ^2 test	
How clean is the centre?	Not clean	18 (5.5)	105 (32.3)	20 (6.2)		$\chi^2(4, N=325)$ =5.835, p<0.212	

	Somehow clean	18 (5.5)	132 (40.6)	16 (4.9)			
	Very clean	0 (0)	12 (3.7)	4 (1.2)			
Wasting (WHZ)							
Variables	Categories	MAM (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Obesity ($> +3$) N (%)	Overweight ($> +2$ to $+3$) N (%)	SAM (< -3) N (%)	Chi-q χ^2 test
Handwashing Practices of children	No	5 (1.5)	129 (39.7)	10 (3.1)	20 (6.2)	20 (6.1)	$\chi^2(5, N=325) = 17.215, p < 0.004$
	Yes	7 (2.1)	118 (36.3)	0 (0)	11 (3.4)	5 (1.5)	
Association between Nutrition Status of children and childcare Hygiene practices							
Stunting (HAZ)							
Variables	Categories	Moderately stunted (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Severely stunted < -3 SD N (%)			Chi-q χ^2 test
Handwashing Practices of children	No	33 (10.2)	82 (25.2)	69 (21.2)			$\chi^2(2, N=325) = 46.428, p < 0.0005$
	Yes	6 (1.8)	115 (35.4)	20 (6.1)			
Underweight (WAZ)							
Variables	Categories	Moderately underweight (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Severely underweight < -3 SD N (%)			Chi-q χ^2 test
Handwashing Practices of children	No	27 (8.3)	128 (39.4)	29 (8.9)			$\chi^2(2, N=325) = 11.814, p < 0.03$
	Yes	9 (2.8)	121 (37.2)	11 (3.4)			
Wasting (WHZ)							

Variables	Categories	MAM (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Obesity ($> +3$)	Overweight ($> +2$ to $+3$) N (%)	SAM (< -3) N (%)	Chi-q χ^2 test
Water_treatment	Boil	1 (0.3)	69 (21.2)	5 (1.5)	11 (3.4)	6 (1.8)	$\chi^2(15, N=325)$ =18.225, p<0.251
	Chemicals	5 (1.5)	98 (30.1)	5 (1.5)	15 (4.6)	15 (4.6)	
	Do nothing	6 (1.8)	71 (21.8)	0 (0)	5 (1.5)	4 (1.2)	
	Filter	0 (0)	9 (2.8)	0 (0)	0 (0)	0 (0)	
Stunting (HAZ)							
Variables	Categories	Moderately stunted (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Severely stunted < -3 SD N (%)		Chi-q χ^2 test	
Water_treatment	Boil	19 (5.8)	45 (13.8)	28 (8.6)		$\chi^2(9, N=325)$ =45.189, p<0.000	
	Chemicals	13 (4.0)	71 (21.8)	54 (16.6)			
	Do nothing	6 (1.8)	74 (22.8)	6 (1.8)			
	Filter	1 (0.3)	7 (2.2)	1 (0.3)			
Association between Nutrition Status of children and childcare Hygiene practices							
Underweight (WAZ)							
Variables	Categories	Moderately underweight (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Severely underweight < -3 SD N (%)		Chi-q χ^2 test	
Water_treatment	Boil	10 (3.1)	73 (22.5)	9 (2.8)		$\chi^2(6, N=325)$ =30.310, p<0.000	
	Chemicals	20 (6.2)	88 (27.1)	30 (9.2)			
	Do nothing	6 (1.8)	79 (24.3)	1 (0.3)			
	Filter	0 (0)	9 (2.8)	0 (0)			

Wasting (WHZ)							
Variables	Categories	MAM (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Obesity ($> +3$) N (%)	Overweight ($> +2$ to $+3$) N (%)	SAM (< -3) N (%)	Chi-q χ^2 test
Potties_availability_ and _in use	No	6 (1.8)	117 (36)	8 (2.5)	15 (4.6)	14 (4.3)	$\chi^2(5, N=325)$ =5.407, p<0.368
	Yes	6 (1.8)	130 (40)	2 (0.6)	16 (4.9)	11 (3.4)	
Stunting (HAZ)							
Variables	Categories	Moderately stunted (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Severely stunted < -3 SD N (%)		Chi-q χ^2 test	
Potties_availability_ and _in use	No	25 (7.7)	78 (24)	57 (17.5)		$\chi^2(3, N=325)$ =19.115, p<0.000	
	Yes	14 (4.3)	119 (36.6)	32 (9.8)			
Underweight (WAZ)							
Variables	Categories	Moderately underweight (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Severely underweight < -3 SD N (%)		Chi-q χ^2 test	
Potties_availability_ and _in use	No	22 (6.8)	111 (34.2)	27 (8.3)		$\chi^2(2, N=325)$ =9.531, p<0.009	
	Yes	14 (4.3)	138 (42.5)	13 (4)			
Association between Nutrition Status of children and childcare Hygiene practices							
Wasting (WHZ)							
Variables	Categories	MAM (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Obesity ($> +3$) N (%)	Overweight ($> +2$ to $+3$) N (%)	SAM (< -3) N (%)	Chi-q χ^2 test

			+1.99 N (%)			N (%)	
Waste/Refuse_disposal at the centre	Designated dumpsite outside centre	1 (0.3)	37 (11.4)	2 (0.6)	6 (1.8)	6 (1.8)	$\chi^2(10, N=325)$ =12.935, p<0.227
	Dustbin	3 (0.9)	72 (22.2)	2 (0.8)	5 (1.5)	2 (0.8)	
	Throws anywhere	8 (2.5)	138 (42.5)	6 (1.8)	20 (6.2)	17 (5.2)	
Stunting (HAZ)							
Variables	Categories	Moderately stunted (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to +1.99) N (%)	Severely stunted < -3 SD N (%)		Chi-q χ^2 test	
Waste/Refuse_disposal at the centre	Designated dumpsite outside centre	2 (0.6)	35 (10.8)	15 (4.6)		$\chi^2(6, N=325)$ =9.969, p<0.126	
	Dustbin	11 (3.4)	56 (17.2)	17 (5.2)			
	Throws anywhere	26 (8)	106 (32.6)	57 (17.5)			
Underweight (WAZ)							
Variables	Categories	Moderately underweight (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to +1.99) N (%)	Severely underweight < -3 SD N (%)		Chi-q χ^2 test	
Waste/Refuse_disposal at the centre	Designated dumpsite outside centre	4 (1.2)	38 (11.7)	10 (3.1)		$\chi^2(4, N=325)$ =11.683, p<0.20	
	Dustbin	7 (2.2)	74 (22.8)	3 (0.9)			

	Throws anywhere	25 (7.7)	137 (42.1)	27 (8.3)			
Association between Nutrition Status of children and childcare Hygiene practices							
Wasting (WHZ)							
Variables	Categories	MAM (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Obesity ($> +3$) N (%)	Overweight ($> +2$ to $+3$) N (%)	SAM (< -3) N (%)	Chi-q χ^2 test
water_source	Piped water	1 (0.3)	13 (4)	0 (0)	2 (0.6)	4 (1.2)	$\chi^2(10, N=325)$ =8.915, p<0.540
	Tap	11 (3.4)	234 (72.0)	10 (3.1)	29 (8.9)	22 (6.8)	
Stunting (HAZ)							
Variables	Categories	Moderately stunted (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Severely stunted < -3 SD N (%)			Chi-q χ^2 test
water source	Piped water	2 (0.6)	12 (3.7)	6 (1.8%)			$\chi^2(6, N=325)$ =0.724, p<0.994
	Tap	37 (11.4)	185 (56.9)	83 (25.5%)			
Underweight (WAZ)							
Variables	Categories	Moderately underweight (≤ -2 SD ≥ -3 SD) N (%)	Normal (> -2 to $+1.99$) N (%)	Severely underweight < -3 SD N (%)			Chi-q χ^2 test
water source	Piped water	4 (1.2)	13 (4)	3 (0.9)			$\chi^2(4, N=325)$ =5.112, p<0.276
	Tap	32 (9.8)	236 (72.6)	37 (11.4)			