NUTRITION STATUS OF CHILDREN UNDER FIVE YEARS (DURING CORONA-19 PANDEMIC) IN KIBERA INFORMAL SETTLEMENT IN NAIROBI, KENYA

BY

LUCY AKORITSA MULAMA

H57/87632/2016

A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR AWARD OF THE MASTER OF PUBLIC HEALTH DEGREE OF THE UNIVERSITY OF NAIROBI

2023

DECLARATION OF ORIGINALITY

Name of student: LUCY AKORITSA MULAMA

Registration Number: H57/87632/2016

Faculty: Health Sciences

Department: Public and Global Health

Course: Master of Public Health

Title of Research work: Nutrition status of children under five years (during Corona- 19 pandemic) in Kibera informal settlement in Nairobi, Kenya
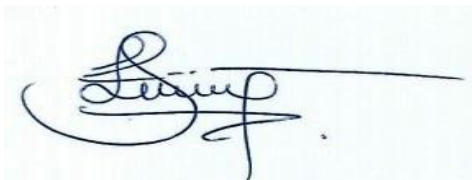
DECLARATION

I understand what Plagiarism is, and I am aware of the 'University's policy in this regard;

I declare that this thesis is my original work and has not been submitted elsewhere for examination, a degree, or publication award. Where other 'people's work or my work has been used, this has been properly acknowledged and referenced per the University of 'Nairobi's requirements;

1. I have not sought or used the services of any professional agencies to produce this work;

2. I have not allowed and shall not allow anyone to copy my work to pass it off as their work;

3. I understand that any false claim regarding this work shall result in disciplinary action, according to University Plagiarism Policy.

Signed: Date: 28 November, 2023

APPROVALS

This dissertation has been submitted for examination with my approval as university academic supervisor:

Dr Rose Opiyo BEd (Hons), MSc, PhD.,
Senior Lecturer
Department of Public and Global Health,
University of Nairobi
P.O. Box 19676-00200, Nairobi

Signature: .... Date: 30/11/2023

Approved by the Chairperson,
Department of Public and Global Health
Dr Rose Opiyo BEd (Hons), MSc, PhD.,
Chairperson, Department of Public and Global Health,
University of Nairobi
P.O. Box 19676-00200, Nairobi

Signature: .... Date: 30/11/2023

DEDICATION

I would like to dedicate this work firstly to God whose unfailing love and mercy is unmatched. Secondly, to my family especially my late mum for her belief in me.

Finally, to my friends, without your support, this achievement would not have been possible. This dissertation is a tribute to our shared journey.

ACKNOWLEDGEMENTS

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

C. I	Confidence Interval
COVID-19	Coronavirus disease of 2019
FAO	Food and Agriculture Organization
FCS	Food Consumption Score
GAM	Global Acute Malnutrition
GNR	Global Nutrition Report
HAZ	Height for Age Z score
HDDS	Household Dietary diversity score
KDHS	Kenya Demographic Health Survey
MAM	Moderate Acute Malnutrition
MUAC	Mid-Upper Arm Circumference
NCD	Non-Communicable Diseases
ODK	Open Data Kit
PPS	Probability Proportion to size
SAM	Severe Acute Malnutrition
SDGs	Sustainable Development Goals
SMART	Standardized Monitoring and Assessment of Relief & Transitions
UN	United Nations
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
WASH	Water, Sanitation, and Hygiene
WFH	Weight for height
WHZ	Weight for Height
WHO	World Health Organization

OPERATIONAL DEFINITION OF TERMS

Childhood illnesses in this study included diarrhea, fever, cough, and acute respiratory infection manifested in the past 14 days before the study.

Cluster this was defined as the simplest geographical unit in a study setting. For purposes of this study, a cluster is defined as a village or sub-division / segment of a village.

Corona Virus Disease 2019 (COVID-19) is an infectious disease caused by a recently found Corona virus strain. This disease was first reported in China but spread across the globe. It is transmitted from human to human via infected droplets spread through coughing or sneezing.

COVID-19 pandemic was defined as the spread of the Corona virus across continents. The World Health Organization (WHO) declared it a pandemic on March 11, 2020, which could not be contained

Dietary habits: in this study, referred to habitual decisions of people or groups concerning their food choices.

Ever Breastfed referred to the proportion of children born in the last 24 months who were ever breastfed

Global Acute Malnutrition (GAM) is the proportion of children with a z-score of less than -2 weight-for-heights and/or presence of bilateral edema

Malnutrition: in this study referred to wasting (low weight-for-height), underweight and stunting and overweight in children between the ages of 6-59 months

Minimum Dietary Diversity: refers to the proportion of children aged 6 to 23 months who have included items from a minimum of five out of eight specific food groups in their diet within the past day.

Minimum Meal Frequency refers to the proportion of children between the ages of 6 and 23 months who have consumed solid, semi-solid, or soft foods, including milk feeds for non-breastfeeding children, at least a specified number of times during the preceding day.

Pandemic the spread of an infectious disease from person to person across countries or continents, leading to the loss of lives of various people

Severe Acute Malnutrition (SAM) was determined by identifying children whose z-score was below -3 and/or who exhibited edema.

Under nutrition: According to this study, under nutrition referred to Z score whose value is less than or equal to -2. The study's dependent variables were wasting, underweight and stunting.

Under-five (5) years: According to this study, the under-five targeted were children between the ages of 6 to 59 months

Weight for height z-score: The weight for height z-score (WHZ) is a crucial indicator in assessing wasting, a form of acute malnutrition. Wasting serves as an indicator of acute malnutrition characterized by a weight for height z-score (WHZ) below -2. Moderate wasting falls within the range of -2 and -3 on the Z-score, while severe wasting is categorized when the WHZ is less than -3, following the WHO (2006) reference standards.

ABSTRACT

Introduction: The emergence of Coronavirus Disease 2019 pandemic in 2019 disrupted societal norms and had profound implications for various determinants of health. One significant concern was the potential exacerbation of malnutrition among vulnerable populations, including children (Committee on World Food Security, 2020).

Purpose: This study aimed to assess the prevalence of undernutrition among children in the age group of 6 to 59 months in Kibera informal settlement, Nairobi County, Kenya, during the corona virus disease pandemic in 2019.

Methodology: A cross-sectional assessment was carried out between June 28th and July 5th, 2022, involving 411 children aged 6-59 months residing in the Kibera Informal settlement. Study participants were identified through a three-stage cluster sampling method and were then administered structured questionnaires. Anthropometric measures, including weight for height, weight for age, and height for age standard scores, were calculated using the Emergency Nutrition Assessment (ENA) 2020 software. Additionally, socio-demographic, Household and child feeding practices were analyzed using STATA version 14. To assess the correlation between the predictors and the nutrition status of the children, multivariable logistic regression was utilized.

Results: The study revealed a global acute malnutrition prevalence of 3.9% (95% CI: 2.0-7.6), with no cases of severe malnutrition based on z-scores. Underweight affected 3.6% (95% CI: 2.4-5.6), including 0.2% (95% CI: 0.0-1.9) severe cases. Stunting was observed in 14.1% (95% CI: 9.9-19.8), with 2.9% (95% CI: 1.6-5.2) being severely stunted. Average age of the children in the study was 28.0 months (SD 16.2 months), about 64.2% were married and majority of the respondents, 30.4%, were earning a monthly income range of Kshs 5000–10000. Early breastfeeding practices were positive, with 71.1% initiating within the first hour, and 96.8% were ever breastfed within the first two years, 82.4% continuing for the full two years. Dietary diversity was achieved by 55.6%, minimum meal frequency by 29.0%, and the minimum acceptable diet by only 16.3%. Associations were found between caregiver marital status, occupation, household income, handwashing practices, and child nutritional status (caregiver occupation: aOR=5.14, 95% CI=1.05-25.13, p=0.0 Marital status: aOR = 0.118; 95% CI = 0.013–1.039; household income: aOR=0.08, 95% CI=0.01-0.62, p=0.015; handwashing practices: aOR=0.21, 95% CI=0.05-0.94, p=0.041).

Conclusion: While severe acute malnutrition remained low in Kibera Informal Settlement during Covid-19 pandemic, concerns arose from elevated rates of stunting in children aged 6-59 months. Despite a prevalent breastfeeding culture, challenges persist in achieving optimal dietary variety, meal frequency, and acceptable diets. To address these issues, the study recommends promotion of diverse food consumption, reducing reliance on cereals; implement targeted nutrition education for parents and caregivers to enhance infant feeding practices; emphasize the timely introduction of nutrient-dense complementary foods and sustained meal frequency to combat stunting; and establish a robust monitoring and evaluation system for community nutrition status.

.

<center>**CHAPTER ONE**</center>

<center>**INTRODUCTION**</center>

1.1 Background to the study

The worldwide coronavirus disease pandemic of 2019 (COVID-19) has disrupted many aspects of daily living, particularly important variables that impact public health. An innovative coronavirus strain is the source of the viral illness COVID-19. This disease was first reported in China but has currently spread across the globe. It is transmitted from human to human via infected droplets spread through coughing or sneezing (Ali et al., 2020). On January 30, 2020, it was determined that the virus posed a threat to public health, and on March 11, 2020, it was deemed a pandemic. Because of its uncontrollable spread across multiple continents, it is considered a pandemic.

The pandemic wreaked havoc on essential health determinants and sparked massive changes worldwide. Every population was affected directly by the disease or indirectly (Maital & Barzani, 2020). Children worldwide have mostly suffered the adverse effects of the disease compared to being infected by the disease. Even though children are less affected directly by the virus, they suffer from the indirect impact of the crisis, including mental health consequences, poor nutrition, screen addiction, social isolation, screen, and lack of schooling and health care, especially in underprivileged communities. This problem has public health repercussions for children that could last a lifetime (Zemrani et al., 2021). Disruption of the norm, lockdowns, and job loss for many contributes to inadequate food availability and medical treatment (Committee on World Food Security, 2020), thus contributing to Malnutrition.

Furthermore, the pandemic led to low-income economies and higher food prices, undermining food access by various people (Committee on World Food Security, 2020). The pandemic also affected the supply chain, further affecting food security and nutrition (Kansiime et al., 2021). Most families were forced to adjust their dietary patterns by either regulating the intake of certain foods, reducing the number of times for meal consumption, reducing the amount of food consumed for each meal and skipping meals, or going without food for a whole day. (Committee on World Food Security, 2020). This inadequate food consumption leads to under nutrition in children as they cannot acquire the necessary micro and macronutrients essential for normal physiological functioning (Tobias & Morrison, 2021).

<center>1</center>

The COVID-19 pandemic is projected to aggravate all types of malnutrition due to disruptions in various systems, including Health, the economy, and food. Children's access to nutrition services and healthcare is predicted to plummet, similar to the Ebola virus disease outbreak in Sub-Saharan Africa in 2014–16 (Barden-O'Fallon et al., 2015).

In Kenya, 4.2 percent of the children are affected by acute malnutrition while 26 percent are stunted (Global Nutrition Report | Country Nutrition Profiles - Global Nutrition Report, n.d.) In the informal settlements of Nairobi, 3.9 percent of the children are affected by acute malnutrition while 24 percent of the children are affected by chronic malnutrition (Ministry of health, 2019). In Kenya the first COVID-19 case was reported in March 2020

In light of the surge in COVID-19 cases in Kenya, the Kenyan government took proactive measures. It mandated the closure of all schools and instructed both public and private sector employees to engage in remote work, whenever feasible. Most of the slum dwellers, who relied on waged labor, lost their jobs.

At the onset of the COVID-19 pandemic, United Nations Children's Fund (UNICEF) predicted a 25% decline in critical nutrition service coverage, with coverage getting to 75–100% in lockdown situations, such as in weak nations experiencing humanitarian crises (UNICEF, 2020a).

1.2 Problem Statement

In countries with low to moderate income levels, the extraordinary worldwide economic and social catastrophe created by the COVID-19 pandemic poses significant threats to young children's survival and nutritional status (Headey et al., 2020). A rise in malnutrition in children, especially wasting, is projected due to substantial drops in household wages, shifts in the availability and cost of healthy meals, and disruptions in nutrition, health, and social welfare programs (Headey et al., 2020).

The COVID-19 outbreak caused many people living in Nairobi's informal settlements to lose all or part of their income (Quaife et al., 2020). Despite the efforts by Governments and partners to scale up cash transfers to more than 100,000 disadvantaged households in informal settlements, the funds were limited since the Government had also responded to the locust upsurge and floods simultaneously (UNICEF, 2020b). As a result, many households in informal settlements had poor access to nutritious food in most parts of 2020 (Shupler et al., 2021).

Based on the history of malnutrition due to inadequate access to safe and healthy food, the nutrition status of children is likely to depreciate as more household's face challenges in accessing quality food due to the COVID-19 pandemic. These preventive lockdown measures have impacted the informal economy. Most households' breadwinners lost their sources of income and thus could barely put a healthy meal on the table. The situation was aggravated by closing schools due to the pandemic, which increased the number of mouths feeding on the family pot due to the closure of school feeding programs (Shupler et al., 2021). The problem of Malnutrition has been present in these informal settlements even before the emergence of the COVID-19 pandemic (De Vita et al., 2019).

Since the commencement of the COVID-19 pandemic, numerous studies have been undertaken to assess the repercussions of the pandemic and government measures on various sectors. While there have been investigations into the effect of COVID-19 on the nutritional status of the populace, there is a noticeable scarcity of documented research regarding the nutrition well-being of children in the age group of less than five years residing in informal settlements, specifically focusing on the Kibera informal settlement in Nairobi County.

1.3 Justification of the study

There is scarceness of documented data on the nutritional status of children residing in the informal settlements during the COVID-19 pandemic. This investigation will deliver valuable insights into how the COVID-19 pandemic affected the nutritional well-being of children less than five years age group. The study will also inform the design of interventions to be done by Government, child-focused organizations and Non-Governmental Organizations (NGOs) in order to cushion the children of less than five years age group in informal settlements from malnutrition especially during and post pandemics. Additionally, the outcomes of this study can be used as a valuable reference point for any future baseline studies conducted in the Kibera Informal Settlement.

1.4 Study Objectives

1.4.1 Broad objective

The major objective of this research was to assess the prevalence of under nutrition among children 6-59 months during the COVID-19 pandemic in Kibera informal settlement, Nairobi County, Kenya.

1.4.2 Specific Objectives

1. To assess the socio-demographic characteristics of the households with children 6-59 months during the COVID-19 pandemic in Kibera informal settlement, Nairobi County;

2. To determine the prevalence of under nutrition among children 6-59 months in Kibera Informal Settlement, Nairobi County, during the COVID-19 pandemic;

3. To determine feeding practices among children below five years living in Kibera informal settlement, Nairobi County, during the COVID-19 pandemic; and

4. To determine factors associated with the nutrition status of children below five years living in Kibera informal settlement, Nairobi County, during the COVID-19 pandemic.

1.5 Research Questions

The study attempted to answer the following questions:

1. What is the prevalence of under nutrition among children under five years in Kibera informal settlement during the COVID-19 pandemic?

2. What is the relationship between socio-demographic characteristics and undernutrition in children below five years living in Kibera informal settlement, Nairobi County, during the COVID-19 pandemic?

3. What are the feeding practices among children below five years living in Kibera informal settlement, Nairobi County, during the COVID-19 pandemic?

4. What factors are associated with the nutrition status of children below five years living in Kibera informal settlement, Nairobi County, during the COVID-19 pandemic?

<center>**CHAPTER TWO**</center>

<center>**LITERATURE REVIEW**</center>

2.1 Introduction

This chapter explores the theoretical and practical literature concerning the COVID-19 pandemic, malnutrition, and the impact of the pandemic on the nutritional well-being of children. Furthermore, it incorporates an examination of the existing research gaps in these areas.

The COVID-19 epidemic upended norms in a number of global spheres of people's life. The World Health Organization (WHO) declared the virus to be a pandemic on March 11, 2020, after it was first discovered in Wuhan, China, in 2019. The virus quickly spread throughout several continents (Abrams & Szefler, 2020). According to Haleem et al. (2020), the pandemic impacted daily lives and slowed the worldwide economy. The pandemic has affected millions of individuals, some getting sick and others dying from the infection. Huang et al. (2020) states that the common symptoms of this virus include cold, fever, bone pain, cough, and difficulties in breathing which can ultimately lead to pneumonia. The emphasis is on taking preventive measures, including social distancing, washing hands, sanitizing, avoiding face-to-face interactions, and wearing masks.

Numerous nations have been compelled to implement stringent measures in an attempt to slow the virus's rapid spread. Most countries implemented mass testing of citizens to identify those infected with the Coronavirus. Furthermore, many countries have burned gatherings of people and implemented curfews. Some were compelled to implement stringent quarantines, go into total lockdown, and stop moving in order to stop the virus from spreading (Haleem et al., 2020). Some countries were also forced to restrict movement from country to country. These implemented measures, in turn, affected various sectors of individuals' daily lives.

The sectors affected include the tourism sector and the pharmaceutical sector. The health care sector has also been dealt a significant blow with the virus spread. It has caused challenges in the examination, treatment, and quarantine of presumed or verified cases, neglecting of patients suffering from other illnesses, overload on doctors and other health professionals, death of health professionals, the requirement of high protection equipment, and congestion of the health system (Haleem et al., 2020). The economy has also been affected due to the slowing of manufacturing of essential goods, losses in local international and national businesses, disruption in the products supply chain, and poor money flow. Furthermore, the

<center>5</center>

social sector has also been affected. It has caused undue stress on the population, cancellation of tournaments and sports, social distancing and separation from friends and peers, hotel closure and restaurants, and disruption of celebration of religious cultural and festive events. Children were also affected by the coronavirus pandemic.

Whereas not all the children were infected directly by the COVID-19 infection, it indirectly affected their nutritional status in many ways. Disruption of the norm, lockdowns, and job loss for many contributed to poor access to food and health care (Committee on World Food Security, 2020). Furthermore, the pandemic has also led to low-income economies and higher food prices, undermining food access by various people (Committee on World Food Security, 2020). The pandemic also affected the supply chain, further affecting food security and nutrition (Kansiime et al., 2021). These effects have led to under nutrition in children, especially in low-income areas.

2.2 Under nutrition in children

The most reliable measure of a child's overall wellbeing is their nutritional health (Dutta et al., 2009). Under nutrition is a primary form of malnutrition and is the most prevalent in developing countries. According to Maleta (2006), undernutrition is the failure to satisfy the body's requirements for growth and specific function as well as an inadequate intake of nutrients and energy, such as high-quality proteins with an appropriate mix of vital amino acids, minerals, and vitamins.

Research on how the COVID-19 scenario is affecting children's daily routines and eating habits is still scarce; the majority of these studies are carried out in middle-class and wealthy nations. An Italian study that included 41 obese kids between the ages of 6 and 18 that was conducted at home over the course of three weeks serves as an example. During the lockdown, intake of red meat, potato chips, and sugary drinks climbed dramatically, while screen time increased and athletic activity decreased, according to quarantine findings. (Pietrobelli et al., 2020).

In addition, an international survey of 820 adolescents in Spain, Italy, Colombia, Chile, and Brazil found a significant increase in sweet and fried food consumption during COVID-19 restrictions and more consumption of unwholesome food in adolescents with uneducated mothers (Ruiz-Roso et al., 2020). A web-based survey was carried out across four different geographical regions, involving 1048 families who were participants in a school-based nutrition program within the United States. The findings revealed a significant increase in

food insecurity, with 93.5 percent of respondents reporting food insecurity in April 2020, as opposed to 71.5 percent in the autumn of 2019. Additionally, 41.4 percent of the respondents attributed a reduction in consuming vegetables and fruits to the influence of COVID-19 (Sharma et al., 2020).

One out of every three children under five is malnourished globally. Around 155 million children below five year age group were stunted, and 52 million children were thin globally in 2018. Asia and Africa were responsible for 56 percent and 38 percent of stunting and 69 percent and 27.2 percent of wasting of the global under nutrition burden, respectively (Girma et al., 2019). In Kenya, 4.2 percent of the children are affected by acute malnutrition while 26 percent are stunted (Global Nutrition Report | Country Nutrition Profiles - Global Nutrition Report, n.d.) In the informal settlements of Nairobi, 3.9 percent of the children are affected by acute malnutrition while 24 percent of the children are affected by chronic malnutrition (Ministry of health, 2019). The WHO has set goals to decrease the sum of children classified as stunted by 40% and children classified as wasted to less than 5% by 2025, as an answer to the rising occurrences of Malnutrition in children (Hall et al., 2020).

Childhood malnutrition accounts for 35% of all deaths amongst children under five. Two million children die each year due to undernutrition before five years (Girma et al., 2019). According to Zemrani et al. (2021), COVID-19 has harmed the major health determinants. Zemrani et al. (2021) further argue that the significant risk caused by the pandemic in children is not the disease itself but its collateral damage. This includes both over nutrition and under nutrition in children. The COVID-19 pandemic changed the lifestyle and dietary habits of various families.

2.3 Childhood Morbidity

Childhood illnesses play a crucial part in contributing to malnutrition, as outlined in the UNICEF conceptual framework. These illnesses exacerbate malnutrition by reducing food intake through symptoms like vomiting and nausea, as well as hindering food absorption, often caused by conditions such as diarrhoea. In turn, malnutrition can also increase susceptibility to diseases due to a weakened immune system. Hence, effective prevention and management of childhood illnesses are crucial interventions in addressing malnutrition. Healthcare Seeking ways refers to the series of ways persons take to address supposed health issues, and in many developing countries, the well-being of children is closely tied to maternal healthcare behaviour.

2.4 Water and Sanitation

Water and sanitation encompass initiatives aimed at enhancing access to safe drinking water, proper sanitation & hygiene, like regular handwashing with soap at critical times. Having an ample supply of clean and safe water is essential in reduction of water-related illnesses and for various uses such as drinking, cooking, personal hygiene, and household needs. The unavailability of clean and safe water can have various adverse effects on a child's nutritional status. Diarrhoea, a number one cause of mortality in youngsters, is closely associated with inadequate WASH (Water, Sanitation, and Hygiene) services.

2.5 Food insecurity and Malnutrition

Food security, according to the United Nations committee on world food security, is the state in which people, regardless of their circumstances, have social-economic access to food that satisfies their dietary necessities and meets their choices for eating in a way that is both healthy and active. According to Siddiqui et al. (2020), there is an intertwined relationship between poverty, food security, and malnutrition. He keeps making the case that, while hunger certainly contributes to poor, poverty itself is a major cause of food insecurity and malnutrition. Poverty causes unfavorable and unstable conditions, which might exacerbate the malnutrition problem. According to Nafula et al. (2020), the COVID-19 pandemic threatens to reverse the achievements in reducing poverty at the global and domestic levels.

People living in poverty and with low financial earnings frequently face financial restrictions, which deter their ability to access safe, nutritious, and sufficient foods. Food insecurity reduces individuals' ability to obtain the required amount of food to meet the body's caloric needs (Siddiqui et al., 2020). Because of inadequate food intake, a person cannot build the energy and strength essential for daily activities hence hampering capacity and productivity. Malnutrition is further exacerbated by poverty since it lowers the quality of food consumed. People who are unemployed or have lower income as a result of the epidemic are more likely to consume diets high in carbohydrates and low in protein. French et al. (2019) stipulate that lower household income is associated with poor diet quality. Individuals with lower incomes tend to drink more sugar-sweetened beverages and eat less fruits and vegetables.

Instead of choosing wholesome meals, people in poverty and with limited resources frequently eat cheap, high-energy staple foods that are mostly made up of fats and carbohydrates. Intake of carbohydrates and lipids increases energy levels, the overall nutritional value of these choices diminishes (Charlton et al., 2016). This, in turn, causes diets

to become less nutritious and raises the possibility of dietary deficiencies. Research has demonstrated that poverty significantly influences food access and preferences, as indicated by studies indicating that individuals with limited incomes tend to prioritize tasty but less nutritious foods over more wholesome options when given the opportunity to purchase food (Charlton et al., 2016).

A report by Sharma et al. (2021) in Nepal, India indicated that the pandemic affected the food security landscape in four significant ways: stability, access, availability, and the utilization of resources.

Given the limited access to fresh produce, households are likely to turn to cheap food sources. Such foods are mainly processed foods high in sodium, sweeteners, and fat and are less nutritious, and as a result, this leads to rising incidences of non-communicable diseases. Loss of income among most households due to the surging unemployment rates limited the availability of diverse foods within households. Currently, low-income families struggle to access foodstuffs whose prices are soaring due to disrupted supply chains—disrupted supply chains due to closed borders and reduced imports, which have directly and indirectly impacted the local markets. Fears of food shortage also resulted in an unnecessary stocking of food, particularly among households with disposable income. This compromised the ability of poor households to access food items at their convenience. It is, therefore, necessary that we build resilient food systems during and even post the COVID-19 pandemic. This will require innovative context-specific demand and supply-side initiatives.

Survey investigated by Kansiime et al. (2021) in Uganda and Kenya, aimed at evaluating the effect of the COVID-19 pandemic on food sufficiency and household income, revealed that more than two-thirds of the respondents experienced a sudden decline in income due to the COVID-19 crisis. According to the food insecurity experience scale, this income shock led to a deterioration in dietary quality and food security, resulting in a reduced consumption of nutrition-rich foods. In the two countries, the sustained intake of fruits decreased by 30% during the COVID-19 pandemic. The findings also highlighted that this shock particularly affected low-income households and those relying on labor income.

Another study by Laborde et al. (2020) examined the pandemic's influence on food security using media tools and found that mobility restrictions and lockdown measures had negative consequences by causing subsequent income loss and diminishing purchasing power, thus impacting food security. Furthermore, a study conducted by O'Hara and Toussaint (2021) in

Africa on the COVID-19's effects on food security revealed that low income resulted in limited access to food. As a result, the food-insecure population had reduced food consumption and sometimes went without meals.

2.6 COVID-19 Prevention Measures

The COVID-19 prevention measures and the economic chaos have interfered with livelihood activities for individuals worldwide. In turn, these disruptions have led to food insecurity worldwide. School closures also halted programs that enabled low-income families to access free healthy meals exposing many children to food insecurity. Food programs in low-income countries were also disrupted because of the pandemic (Headey et al., 2020).

In light of the surge in COVID-19 cases in Kenya, the Kenyan government took proactive measures. It mandated the closure of all schools and instructed both public and private sector employees to engage in remote work, whenever feasible. Restrictions were implemented on all public gatherings including marketplaces. Subsequently, travel restrictions were enforced as well as restrictions of movements within the country.

The implementation of COVID-19 containment measures resulted in widespread closures of businesses, impacting various sectors significantly. This had particularly severe consequences for individuals dependent on daily wages, notably those residing in impoverished urban areas. The decline in income also had repercussions for small-scale traders within these communities, as the surge in unemployment reduced purchasing power. Consequently, households already grappling with poverty found themselves further exposed to vulnerability, facing challenges in affording both food and rent

Research by Sharma et al. (2020) in Nepal detailed that the lockdown caused a decrease in household incomes, resulting in low availability, compromised food access, and affected access to essential health care services. Nutrition services, including deworming, vitamin A supplementation, micronutrient powder supplementation, and outpatient therapeutic treatment of malnourished children and homes for nutrition rehabilitation, were impacted because of the priority change of the health sector towards COVID-19. The pandemic also forced individuals to adopt behaviors like the consumption of under nutritious foods. It also caused inadequate breastfeeding practices due to the fear of mother to child COVID-19 transmission in breast milk (Panthi et al., 2020).

2.7 Conceptual Framework

The UNICEF (United Nations Children's Fund) conceptual framework of the key contributors to the nutritional well-being of children gives a broad understanding of how under nutrition is the outcome of interrelated underlying factors, with the immediate causes being the dietary consumption and the health well-being of the individual (UNICEF, 2021).

The COVID-19 pandemic has been considered an economic and social crisis affecting societies at different levels (U.N Habitat, 2020). It has led to disruptions in the norms regarding the livelihood of individuals and families (Committee on World Food Security, 2020). Most people reported losing their jobs and sources of income due to the pandemic (Quaife et al., 2020). These disruptions in employment and business directly impacted the resources.

Studies have further shown that inadequate resources, inflated food prices, unreliable food supply, and poverty obstruct food security and a healthy environment (Hirschi, 2009). Households with limited economic resources frequently rely on staple foods that lack essential nutrients as their primary dietary source, as these are more cost-effective and readily available compared to nutrient-rich alternatives. (Hirschi, 2009).

Inability to access reliable and nutritiously well-balanced food supply causes household food insecurity that affects the amount of food and the diet quality that the individual consumes (Black et al., 2008).

Studies have shown that most households in the informal settlement in Kenya have limited access to piped public water supply and, therefore, heavily rely on water vendors (U.N Habitat, 2020). Reduction in resources caused an impact on the affordability of the water as well as the quantity used within the households (U.N Habitat, 2020).

Researches have shown that access to improved water and sanitation leads to reduction in childhood illnesses (Alfredo L. Fort et al., 2008). Inadequate water, sanitation and hygiene are the core risk factors for diarrhea, a prominent cause of mortality worldwide (Troeger et al., 2018).

Inadequate dietary intake in a child leads to weight loss and nutrient deficiencies, these over a period of time, translates to an undernourished child (Benson & Shekar, 2006). Consequently, the nutrient deficiency in a child causes reduced immunity where by a sick child is prone to appetite loss, mal-absorption and altered metabolism; accordingly leading to weight loss thus an undernourished child (Benson & Shekar, 2006). The loss of appetite in the sick child in turn leads to inadequate dietary intake while the inadequate dietary intake causes reduced immunity leading to diseases. This creates a vicious cycle of disease and malnutrition (Katona & Katona-Apte, 2008). All these factors interlink and have been conceptualized in figure 1.
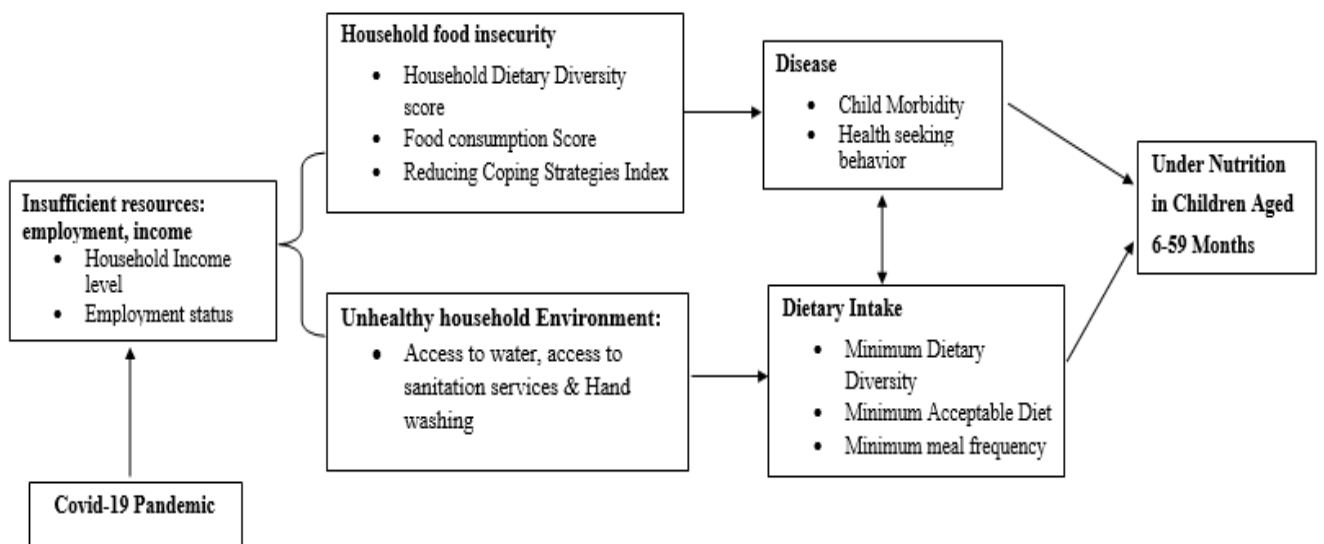
Figure 1: Conceptual framework of the key contributors to the nutritional well-being of children (source: (UNICEF, 2020c))

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Study design

The study utilized a cross-sectional research design to examine the prevalence of undernutrition in children in the age group 6-59 months living in Nairobi County's Kibera informal community.

3.2 Study Area description

The research was carried out in Kibera informal settlement in Nairobi County. Kibera informal settlements are part of the Kibera constituency, among the seventeen constituencies in Nairobi County. Resting in a land area of approximately 12.1 square Kilometers, these informal settlements host a population of 185,777 individuals (KNBS, 2019). Most of the dwellers in the Kibera Informal Settlement are faced with a myriad of issues, including poor living conditions resulting from limited access to clean water, poor hygiene, and limited access to health care and poor Nutrition (Groot et al., 2023). The population is generally impoverished.
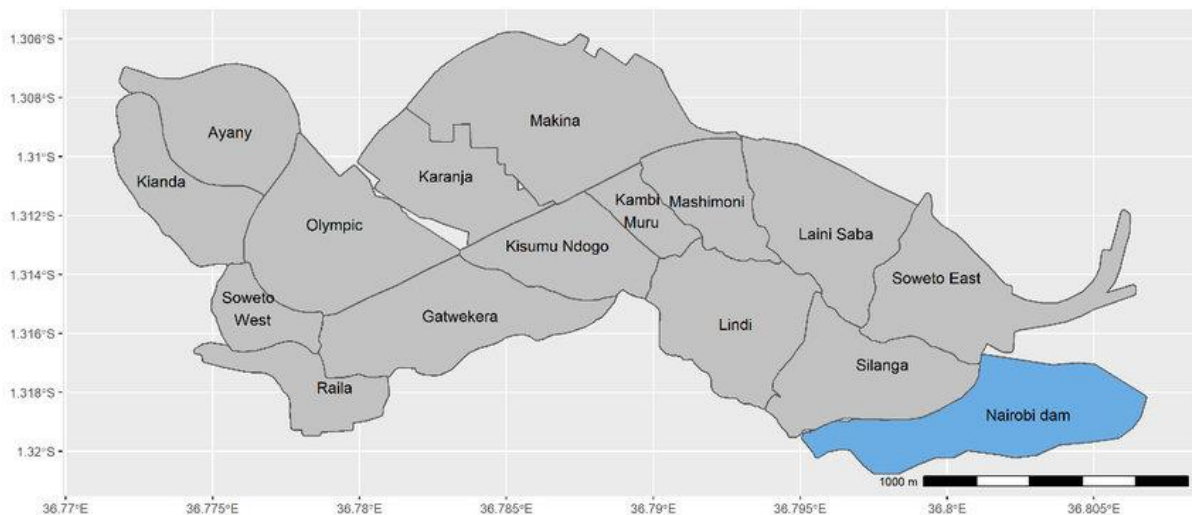
Source: (Ingasia et al., 2021)

3.3 Study population

The study population included children aged 6 – 59 months residing in Kibera Informal settlement and their caregivers. According to the Kenya Census report 2019, the population

of children less than five years in Kibera informal settlement was 20,151, which is 9.2% of the total population.

3.3.1 Inclusion Criteria

i. Households with children aged 6-59 months

3.3.2 Exclusion Criteria

Those to be exempted from the study were;

i. Critically ill children 6-59 months (who are already admitted to a health facility or those that are sick at home and cannot stand/sit on their own to have their measurements taken)

3.4 Sampling Procedure

The study targeted children 6-59 months in Kibera. However, an updated list of these children was not available, nor was it possible to derive one within a short time. Therefore, the study applied a three-stage cluster sampling approach because it was easy to acquire a list of updated clusters. The sample size determination was centered on the sample of children 6-59 months and subsequently converted to the number of households as detailed below. The initial phase involved choosing the villages; second phase was picking the needed number of clusters from an updated sampling frame of the study site, while the third stage was choosing households through simple random sampling.

3.4 1 Sample size determination

The most recent and relevant population parameters were utilized to compute the sample size for anthropometric measurements in children aged 6-59 months. The sample size for children in this age group was then determined using the Emergency Nutrition Assessment (ENA) for Standardized Monitoring and Assessment of Relief and Transitions (SMART) software, version 2020. The sample size formula for determining sample size for a two-tailed t-test using a normal distribution approximation was as described and illustrated by Prof. Najlaa Fawzi (2019) and used in this study as follows:

$$n = \frac{t^2 \times (p) \times (1-p) \times DEFF}{d^2}$$

Where:

n = sample size (children 6-59 months)

t = constant (2.045 for df =29 and p=0.05)

p = expected prevalence (fraction of 1)

d = relative desired precision (fraction of 1)

DEFF = Design Effect for Cluster Surveys

$$n = \frac{2.045^2 \text{ x } \underline{(0.039) \text{ x } (1\text{-}0.039)} \text{ x } 1.5}{0.45^2}$$

$$n = 116$$

The sample size of children was converted to household sample size employing the mean household size, percentage of children below the age five years, and percentage of lack of response using the formula:

$$n_{HH} = \frac{n_{Children}}{(\text{HH size x } \% \text{ of Under 5 x } 0.9)}$$

n_{HH}= household sample size, $n_{children}$= children sample size, H.H. size = mean of household size, % of Under5 = percentage of children below the age five years in the population (x 0.9 since sampling children 6-59 months, not 0-59)

$$\frac{116}{(3 \text{ x } 0.092 \text{ x } 0.9)} = 466.9$$

Factoring in the non-response rate at 5% = **467 x 1.05 =490.3 HH**

Table **1** below demonstrates how the sample size was arrived at.

Table 1: Sample size determination

Parameters	Value	Assumption based on context
The projected prevalence of GAM	3.9%	Nairobi SMART Survey, February 2020
Preferred Precision	4.5	Reasonable Precision for estimated prevalence
Design Effect	1.5	Recommended
Mean H.H. Size	3	Kenya Census Report, 2020
% of children below the age of five years	9.2	Kenya Census Report, 2020
% of lack of response	5	As per the previous survey
Children eligible for inclusion	116	
Sample size of households eligible for inclusion	**492**	

Factoring in logistics from one house to another and time taken to administer the structured questionnaire in one house, it was estimated that a team could conduct assessment in 15 households per day, therefore 15 households per cluster. The total households included were 492; thus, 492/15 = 32.8 rounded to 33 Clusters. For purposes of this study, a cluster was defined as a village or sub-division / segment of a village.

Kianda/Olympic, Sarang'ombe, Soweto, Gatwekera, Karanja, KisumuNdogo, Raila, Makina, Makongeni, Mashimoni, Lindi, Laini Saba, Siranga, and Kichinjio are the 14 villages that make up the informal settlement of Kibera. The 33 clusters were chosen from the 14 villages based on population proportion to size. The 14 settlements' names and populations were compiled in a list, which was then input in the ENA software. The ENA software then retrieved this updated list and randomly assigned the clusters.

3.4.2 Description of the three-stage cluster sampling approach

3.4.2.1 Selection of Villages

Villages within the Kibera Informal settlement were randomly selected.

3.4.2.2 Selection of Clusters

In this step, 33 clusters were chosen based on population proportion to size (PPS) from an updated sampling frame using the ENA for SMART 2020 software (January 11, 2020 version).

3.4.2.3 Selection of Households

Segmentation happened where two or more clusters were assigned to the same village and where a large (more than 250 households and no HH list). Subsequently, houses were picked from the chosen segments randomly. To achieve this, all households within the selected segments were listed, and then 15 houses were randomly singled out using a Random Number Generator. Local administrators assisted in developing such lists and exclude abandoned and inaccessible households.

3.5 Variables

3.5.1 Outcome Variable

The outcome variable was undernutrition specifically wasting (low weight for height)

3.5.2 Predictor Variables:

Predictor variables included the sociodemographic characteristics of the child and the caregiver, child dietary intake, Water, sanitation and hygiene, child morbidity and household food security status.

3.6 Data collection

A structured questionnaire was utilized to gather data, collecting details about children and households. The household questionnaire was administered to assess the household related indicators (Education level for the caregivers, Marital status for the Caregivers, Employment level for the Caregivers, Income Level, Household size, coping strategies, household dietary diversity score, and health care access) in Kibera Informal settlement. The data collection tool was designed based on the standard SMART methodology tool for anthropometry and mortality and the WHO 2021 IYCF indicator guide. The comprehensive questionnaire was consequently designed into an XLS form for data collection using Open Data Kit (ODK) mobile application and sent to a designated hosting server for reviews and download.

The respondent was the caregiver found at home with the child at the time of the assessment. Trained enumerators administered the pretested questionnaire to the consenting caregivers.

3.6.1 Anthropometric measurements

These measurements for children within the defined age group were taken as follows:

- **Age**: Official documents of birth, baptism and health were used to determine the child's actual age. Where there were no official documents, a local event schedule was referred.
- **Gender:** noted down individually as Female ('f') and male ('m')
- **Weight:** A standardized SECA-876 scale was used to weigh the children
- **Height:** Height measurements for children were obtained using standard height boards. Children under the age of 24 months, with a height less than 87.0 cm, were measured while lying down, while children aged 24 months or older, with a height equal to or greater than 87.0 cm, were measured while standing
- **MUAC:** measurements of the mid-upper arm circumference using calibrated MUAC tape and the readings rounded off to 0.1 cm or 1.0 mm.

17

- **Bilateral Edema:** Gentle pressure using thumb was briefly pressed to the upper part of each child's feet for approximately three seconds to assess for the presence of edema

3.6.2 Household Dietary Diversity Score (HDDS),

Food and Agriculture Organization defines this as measure of food consumption that determines household's accessibility of various foods. A household diversity score questionnaire is an inexpensive assessment instrument that can be used to gather data on particular food groups. Scores of 1 were given per group of foods that had been eaten, and 0 were given to any food group that was not consumed. In the computation, twelve dietary groups were categorized, graded, and taken into account. Next, the scores were divided into three categories: low, medium, and high. A household's score between 0 and 4 was regarded as low, and between 5 and 8 as medium, and a household score of 9-12 was considered high (Kennedy et al., 2011).

3.6.3 Food consumption score (FCS)

It serves as alternative measure of present situation for food sufficiency. It's an aggregate score that considers eating frequency, food variety, and the nutritional importance of different food categories, as explained by Coates et al. (2017).

The Food Consumption Score index provides insights into the diversity and frequency of food group consumption within a household over the previous seven days. To calculate this score, all food items were categorized into eight specific food groups based on standard 7-day food frequency data. The process involved adding up the eating frequencies of foods within each group and assigning a value to each group. These values were then multiplied by the respective weight assigned to each food group, resulting in new weighted food group scores.

The FCS is essentially sum of food groups assigned with weights. The score for each food category was calculated by multiplying the days the item was consumed by its corresponding weight. The household's food consumption status was evaluated using the following criteria: inadequate consumption (FCS between 1.0 and 28); borderline consumption (FCS between 28.1 and 42); and satisfactory consumption (FCS exceeding 42.0), as defined by World Food program in 2009

3.6.4 The household Income Status

The household income is the combined gross income of the household members (Scott, et.al.). According to this study, this was aggregated as richest, richer, middle, poorer and

poorest, and the income levels listed from no income to above ten thousand (10,000) Kenya shillings (Kshs). The richest was the group with an income above Kshs. 10,000, richer was those with an income level of between Kshs 5,000-Ksh 10,000, middle Kshs 1,000-Kshs 5,000, poor Kshs 100-Kshs 1,000 and poorer was a household whose income level was below Kshs 100.

3.6.5 Reduced Coping Strategy Index (RCSI)

This assessment of household food insufficiency is founded on a series of deeds. It involves an assessment of both the frequency and severity of these strategies as reported by households regarding their food consumption. It follows a standardized methodology that evaluates five food-related coping strategies employed during the week preceding the study, as outlined by Maxwell and Caldwell (2008). These scores were calculated by multiplying the number of days these strategies were used in the previous week.

Each strategy was allocated a specific weight based on its level of severity, and weighted values were then summed to calculate the total CSI score. This overall score serves as the basis for categorizing households into one of three coping levels: minimal coping (CSI= 0-3), moderate (CSI = 4-9), and extensive coping (CSI ≥10), following the framework established by Maxwell and Caldwell (2008).

3.6.6 Minimum Dietary Diversity score

The World Health Organization (WHO) recommends that children between 6 and 23 months of age should receive a diverse range of foods to ensure they meet their nutritional requirements (WHO, 2021). When a child's diet lacks diversity, it increases the risk of nutrient deficiencies that can hinder their growth. These recommended food groups include breast milk, grains, pulses, meat or fish, dairy products, eggs, vegetables, and fruits and vegetables rich in vitamin A (WHO, 2021). The Minimum Dietary Diversity Score for children aged 6-23 months serves as an indicator to assess a child's dietary diversity as part of overall feeding practices for children at the population level (Coates et al., 2017). This score reflects the proportion of children within this age range (6-23 months) who have consumed five or more of the eight classified groups of food within the day prior (WHO, 2021).

3.6.7 Selection and training of survey teams

Enumerators and team leaders were chosen from a pool of previous research and survey participants, primarily based on their past performance and experience. A comprehensive training was conducted for (8) research teams, each consisting of (2) enumerators, over a

four-day period from June 28th to July 1st, 2022. This training included a pre-test and covered modules on approaches to sampling, weight & height measurements, skills for conducting interviews, and the completion of questionnaires related to childhood illnesses, Feeding practices, and sanitation.

The training also involved standardization tests for anthropometric measurements and a pilot test. During the pilot test, each enumerator completed two questionnaires, and all pre-tested questionnaires were entered into a computer to assess the feasibility of data entry. Findings from the pre-test were reviewed and necessary adjustments in the questionnaire were made accordingly.

3.6.8 Field Data collection

Actual data collection took place immediately after the training (from 2nd to 5th July 2022) with each of the eight (8) teams assessing 15 households per day for four (4) days in 32 clusters and two (2) of the teams assessing the remaining 2 clusters on the 5th day. Information was gathered using the mobile phone platform. At the end of each day, the questionnaires underwent a thorough examination to ensure they were complete, consistent, and accurate. This quality check allowed us to provide feedback to the teams, highlighting areas where improvements in data collection were needed as the assessment continued. Subsequently, the fully completed questionnaires were synchronized with a designated hosting server, and the collected data was uploaded. A daily SMART plausibility report was generated to promptly detect any issues in data collection. This continuous monitoring aimed to enhance the quality of data collected while the assessment progressed. Feedback sessions were held every day prior to field visit.

3.6.9 Data Quality Assurance throughout the Survey Process

The units followed a sequence of activities for quality checks, including:

- Loading of the questionnaires into the mobile data collection software prior in order to manage complex time consuming coding process that can introduce mistakes;

- Digital data gathering that immediately uploads records to the server guaranteed that the data underwent regular diagnostics by the survey coordinator;

- The survey coordinator and data collection units conversed constantly via the WhatsApp promptly tackling challenges faced while in the field;

- Daily plausibility checks that guided feedback sessions with the units before undertaking next day assessments;

- Calibration of all the tools used during the survey;

- Use of age calculation and calendar of events chart for estimating children's age;

- Daily review of questionnaires to ensure they are filled in appropriately and completed;

- Frequencies of all variables were first run and the data cleaned by cross-checking any outliers observed on the respective questionnaire before analysis.

3.7 Data analysis

Information collected using mobile phones were downloaded from the server, organized, and cleaned in M.S. Excel before descriptive statistics investigation. The weight, length and height data were computed using the ENA for SMART 2020 software (January 2020 version), including plausibility checks to warrant good data.

The data was analyzed using STATA software version 14. Discrete variables, bar or pie charts and frequency tables were provided, while for the continuous variables, means with standard deviation (S.D.) were provided. For the assessment of under-nutrition status, Acute malnutrition was determined when the weight-for-height standard deviation (S.D.) is lower than -2 standard score of the median (WHZ < -2 z-score) of the WHO standards. Severe acute malnutrition was defined by a WHZ < -3 z-score, while a WHZ ≥ -3 and < -2 z-score indicated Moderate Acute Malnutrition. The MUAC < 11.5 cm for individuals' ages 6-59 months indicated severe acute malnutrition, while MUAC ≥ 11.5 cm and < 12.5 cm for the same age group indicated moderate acute Malnutrition.

Bivariate analyses were done to recognize factors that could be linked with under nutrition. According to the methodology proposed by Bursac et al. (2007), the initial step in selecting variables for a multivariate logistic regression involves conducting a univariate analysis for each variable individually. In such an analysis, any variable that demonstrates statistical significance at a certain predetermined level is considered a potential candidate for inclusion in the multivariate analysis. This significance is typically determined using the Wald test within logistic regression, and the chosen cutoff point for statistical significance is set at a p-value of 0.25.

The rationale for using a p-value cutoff of 0.25, rather than the more traditional level of 0.05, is grounded in the recognition that a stricter threshold may overlook variables that are actually important. Bursac et al. (2007) argue that a higher cutoff point helps avoid the exclusion of variables with genuine relevance. Consequently, in the context of this study, variables that exhibited statistical significance at the bivariate level having a p-value of less or equal to 0.25 were subjected to the subsequent multivariate analysis to identify the independent predictors of under nutrition among children under five. The significance level was set at a p-value of less than 0.05 and a 95% confidence interval for multivariate analysis.

3.8 Ethical considerations

Before recruiting study participants, approval and clearance from the Kenyatta National Hospital/University of Nairobi Ethics Committee (KNH/UON) was gotten to ensure compliance with ethical principles. Likewise, consent from the administrative leadership in the Kibera informal settlement and potential respondent was sought. The study included only those respondents who provided informed consent in either written form or through a thumbprint. All in-depth interviews were carried out privately to ensure privacy and confidentiality. Upon completion of the interview in a household, the caregiver was informed of the nutritional assessments and guided accordingly. Those that required prompt intervention were referred to their nearest facility.

The study instruments, once completed, were securely stored in cabinets that could be locked. All data was stored on computers protected by password restrictions, ensuring limited access. Access to study materials was granted exclusively to personnel involved in the study.

CHAPTER FOUR

RESULTS

4.1 Introduction

This chapter presents findings obtained from the study. Although the sample size of households calculated was 492, a total of 512 households with children under five years old were registered for the study. Among 512 households interviewed, 9 respondents/caregivers declined to participate in the study leading to a response rate of 98.2%. The primary reasons for non-participation were lack of interest and unwillingness to respond to the study questions. On average, each household had 3.8 members.

4.2 Socio-demographic characteristics of caregivers

The socio-demographic characteristics of the caregivers included: age, marital status, religion, education level, occupation and income level.

The average age of the caregivers was 24.3 years (SD 3.8 years) with majority 246 (57.3%) of the respondents falling within the age range of 23–29 years. Of the caregivers interviewed, 321 (64.2%), were married (living with a partner), 463 (92.6%) were Christians, 222 (51.8%) had achieved post primary education and majority 266 (53.4%) were unemployed (casual laborers). Majority of the respondents 152 (30.4%) were earning a monthly income range of 5000– 10000. The results are as displayed in Table **2** below.

Table 2: Socio-demographic characteristics of caregivers

Socio-demographic	Category	Frequency (n)	Percent (%)
Mean age of caregivers (SD) in Years	24.3 (± 3.8)		
Age category of the caregiver (years)	18-22	51	11.9
	23-29	246	57.3
	30-39	10	2.3
	40+	122	28.4
Marital status	Married (living with partner)	321	64.2
	Single (not living with partner)	179	35.8
Religion	Christians	463	92.6

	Muslims	37	7.4
Education level	Primary	121	28.2
	Secondary	222	51.8
	Post secondary	86	20.1
Occupation	Unemployed (Casual laborers)	266	53.4
	Employed (Salaried)	148	29.7
	Merchant/ Trader	84	16.9
Monthly HH Income	Less than 1000	124	24.8
	1,000 - 5,000	129	25.8
	5,000 - 10,000	152	30.4
	Above 10,000	95	19.0
Mean HH size (SD)	3.9 (± 1.7)		
HH size	1 to 6	415	92.2
	7 to 12	35	7.8

HH-Household

4.3 Distribution of study children by age and sex for anthropometric measurement

As displayed in Table **3** below, the average of the children in the study was 28.0 months (SD 16.2 months). There were 211 (53.8%) female children and 190 (46.2%) male children. Children aged 18-29 months old constituted the largest proportion, 111 (27%).

Children aged 6-17 months, were 103 children, making up 25.1%. Children aged between 30 and 41 months were 88, accounting for 21.4% of the total. Additionally, there were 73 children aged 42-53 months, representing 17.8% of the group. Lastly, children aged 54-59 months were the smallest subgroup, with 36 children, making up 8.8% of the total.

Table 3: Distribution of children by age and sex

Variable	Category	Frequency (n)	Percent (%)
Mean age of child in months (SD)	28.0 (± 16.2)		
Child age categories in months	6-17	103	25.1
	18-29	111	27.0
	30-41	88	21.4
	42-53	73	17.8
	54-59	36	8.8
Child sex	Female	221	53.8
	Male	190	46.2

4.4 Effects of COVID-19 on economic status of households

The majority of respondents, 300 (60.0%) reported that their income levels were affected by the pandemic. Among those who reported changes in income levels, (n=300), the most common reasons were "casual jobs were not available" (36.0%, n=108) and "salary cuts" (32.3%, n=97). The study also found that majority of respondents (82.8%, n=414) did not have alternative sources of income. The most common alternative sources of income were "rental income" (41.9%, n=36) and "remittances from relatives" (31.4%, n=27). The results are as displayed in Table **4** below.

Table 4: Effects of COVID-19 on economic status of households

Variable	Category	Frequency (n)	Percent (%)	p-value[2]
Covid-19 income effects	No	200	40.0	
	Yes	300	60.0	
Income change margin	Less than 1000	124	24.8	
	1000-5000	129	25.8	0.819
	5,000 - 10,000	152	30.4	

	Above 10,000	95	19.0	
Income changes reasons	Laid off	67	22.3	
	Sickness	26	3.7	
	Salary reduction	97	32.3	
	Salary increase	8	3.1	
	Closed business	64	21.3	
	Casual jobs unavailable	108	36.0	
	Not able to travel to work	14	4.7	
Availability of other income source	No	414	82.8	0.012
	Yes	86	17.2	
Other income source	Rental income	36	41.9	
	Remittances from relatives	27	31.4	0.170
	Other	23	26.7	

[2] *Pearson's Chi-square test*

There were no significant differences between income margins. However, there was a significant difference on the availability of other source of income in relation to Covid-19 effects.

4.5 Nutritional status of study children in Kibera

4.5.1 Prevalence of underweight as determined by the weight-for-age z-score

Proportion of children classified as underweight was 3.6 % (95% C.I: 2.4 - 5.6) while those classified as severe underweight was 0.2 % (95% C.I: 0.0 - 1.9.) as illustrated in Tables 5 and 6 below.

Table 5: Prevalence of underweight of the children by gender of study children in Kibera

	All n = 411	Boys n = 190	Girls n = 221
Prevalence of underweight	(15) 3.6 %	(8) 4.2 %	(7) 3.2 %

	(95% C.I: 2.4 - 5.6.)	(95% C.I: 2.4 - 7.4.)	(95% C.I: 1.5 - 6.6.)
Prevalence of mild underweight	(14) 3.4 %	(8) 4.2 %	(6) 2.7 %
	(95% C.I: 2.1 - 5.4.)	(95% C.I: 2.4 - 7.4)	(95% C.I: 1.2 - 6.1)
Prevalence of extremely underweight	(1) 0.2 %	(0) 0.0 %	(1) 0.5 %
	(95% C.I: 0.0 - 1.9.)	(95% C.I: 0.0 - 0.0.)	(95% C.I: 0.1 - 3.6.)

There was one child aged 30-41 months who was found to be extremely underweight representing 0.2%. Moderate underweight was predominantly visible in the age bracket of 18-41-months. Children aged 54-59 months were the least affected in-terms of being undernourished with 96.3% within that age group presenting as normal.

Table 6: Prevalence of underweight by age

		Extremely underweight		Mild underweight		Normal	
Age	Total	No.	%	No.	%	No.	%
6-17	104	0	0.0	3	2.9	101	97.1
18-29	116	0	0.0	5	4.3	111	95.7
30-41	87	1	1.1	5	5.7	81	93.1
42-53	71	0	0.0	0	0.0	71	100.0
54-59	31	0	0.0	1	3.2	30	96.8
Total	409	1	0.2	14	3.4	394	96.3

Age is in months

4.5.2 Prevalence of stunting based on height-for-age z-scores

The prevalence of stunting was 14.1 % (95% C.I: 9.9 – 19.8.) and the prevalence of severe stunting was 2.9 % (95% C.I: 1.6 – 5.2.). The results are as displayed in Table **7** below.

Table 7: Prevalence of stunting by sex and age

Variable	Category	Overall Stunting/ Normal	Mild stunting	Extreme stunting
Sex	Overall	58 (14.1%)	46 (11.2%)	12 (2.9%)
		(95% C.I: 9.9 - 19.8)	(95% C.I: 7.3 - 16.8)	(95% C.I: 1.6 - 5.2)
	Boys	33 (17.4%)	25 (13.2%)	8 (4.2%)
		(95% C.I: 12.3 - 23.9)	(95% C.I: 8.8 - 19.3)	(95% C.I: 2.0 - 8.7)
	Girls	25 (11.3%)	21 (9.5%)	4 (1.8%)
		(95% C.I: 6.2 - 19.7)	(95% C.I: 4.9 - 17.6)	(95% C.I: 0.5 - 6.2)
Age	6-17	86 (82.7%)	15 (14.4%)	3 (2.9%)
	18-29	95 (81.9%)	16 (13.8%)	5 (4.3%)
	30-41	74 (85.1%)	9 (10.3%)	4 (4.6%)
	42-53	65 (91.5%)	6 (8.5%)	0 (0.0%)
	54-59	31 100.0%	0 (0.0%)	0 (0.0%)

Age is in months

4.5.3 Prevalence of overweight and malnutrition according to weight in relation to height z-scores and/without edema

As displayed in Table **8** below, the overall prevalence of overweight was 6.8%. Males registered a prevalence of 8.9% while females registered a prevalence of 5.0%. On extreme overweight, the overall prevalence was 0.7%, with males at 0.5% and females at 0.9%.

The overall prevalence of GAM for children within the age group of 6 months up to 59 months was low at 3.9 %, with boys at 3.7% and girls at 4.1%. Based on the WHZ and/or edema, there were no children in the study who had severe acute malnutrition.

Table 8: Prevalence of overweight and malnutrition by gender

	Overall	Boys	Girls
Prevalence of overweight	(28) 6.8 %	(17) 8.9 %	(11) 5.0 %
	(4.5 - 10.2 95% C.I.)	(5.7 - 13.8 95% C.I.)	(2.7 - 8.9 95% C.I.)
Prevalence of extreme overweight	(3) 0.7 %	(1) 0.5 %	(2) 0.9 %
	(0.2 - 2.2 95% C.I.)	(0.1 - 4.2 95% C.I.)	(0.2 - 3.4 95% C.I.)

Prevalence of global malnutrition	(16) 3.9 % (95% C.I: 2.0 - 7.6.)	(7) 3.7 % (95% C.I: 1.5 - 8.8.)	(9) 4.1 % (95% C.I: 2.1 - 7.7.)
Prevalence of mild malnutrition	(16) 3.9 % (95% C.I: 2.0 - 7.6.)	(7) 3.7 % (95% C.I: 1.5 - 8.8.)	(9) 4.1 % (95% C.I: 2.1 - 7.7.)
Prevalence of extreme malnutrition	(0) 0.0 % (95% C.I: 0.0 - 0.0.)	(0) 0.0 % (95% C.I:0.0 - 0.0.)	(0) 0.0 % (95% C.I: 0.0 - 0.0.)

4.5.4 The occurrence of acute malnutrition assessed using the MUAC indicator (and/or edema) and categorized by gender.

As indicated in Table **9** below, based on MUAC, the proportion of children within the age group of 6 months up to 59 months classified as acutely malnourished was 1.5 % (95% C.I: 0.7 - 3.1.) and SAM of 0.2 % (95% CI: 0.0 - 1.9)

Table 9: Prevalence of acute malnutrition based on MUAC by gender

	All **n = 411**	**Boys** **n = 190**	**Girls** **n = 221**
Prevalence of global malnutrition	(6) 1.5 % (0.7 - 3.1 95% C.I.)	(1) 0.5 % (0.1 - 3.8 95% C.I.)	(5) 2.3 % (1.0 - 5.3 95% C.I.)
Prevalence of mild malnutrition	(5) 1.2 % (0.5 - 2.8 95% C.I.)	(1) 0.5 % (0.1 - 3.8 95% C.I.)	(4) 1.8 % (0.7 - 4.8 95% C.I.)
Prevalence of extreme malnutrition	(1) 0.2 % (0.0 - 1.9 95% C.I.)	(0) 0.0 % (0.0 - 0.0 95% C.I.)	(1) 0.5 % (0.1 - 3.5 95% C.I.)

Figure **2** below displays the comparison of the different categories of malnutrition based on z-scores and MUAC.
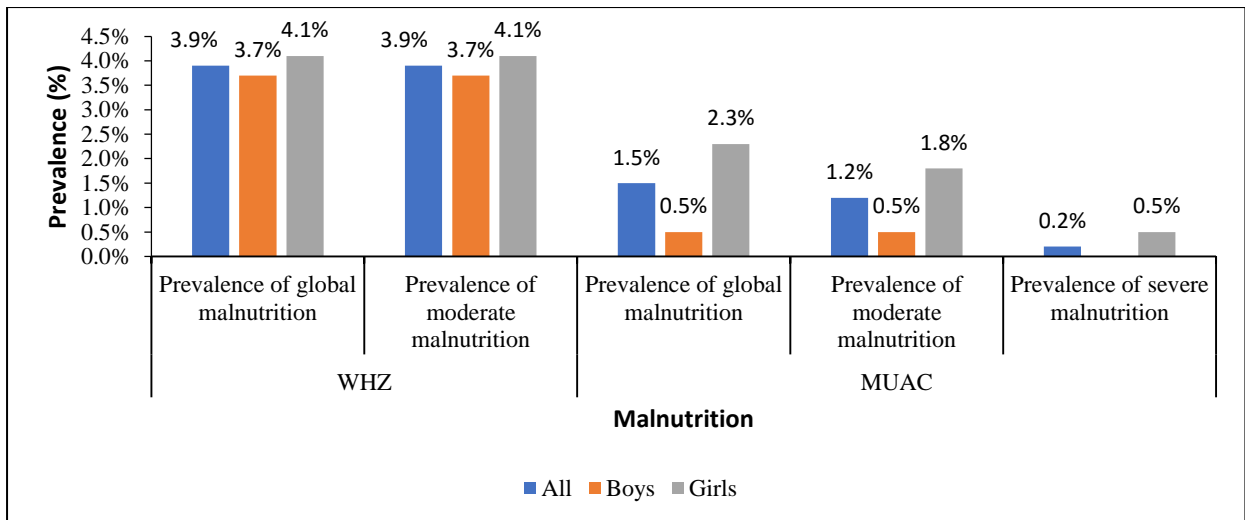
Figure 2: Comparison of malnutrition using z-scores and MUAC

4.6 Child health status and care seeking behaviors

Of the children in the study, 176 (42.8%) reported to have been ill two weeks before survey was done. The children were aged 6-59 months. As illustrated in Figure **3**, with the most prevalent illnesses during this period being cough recorded at 67.6% (119), fever recorded at 60.2% (106), watery diarrhea recorded at 14.2% (25).
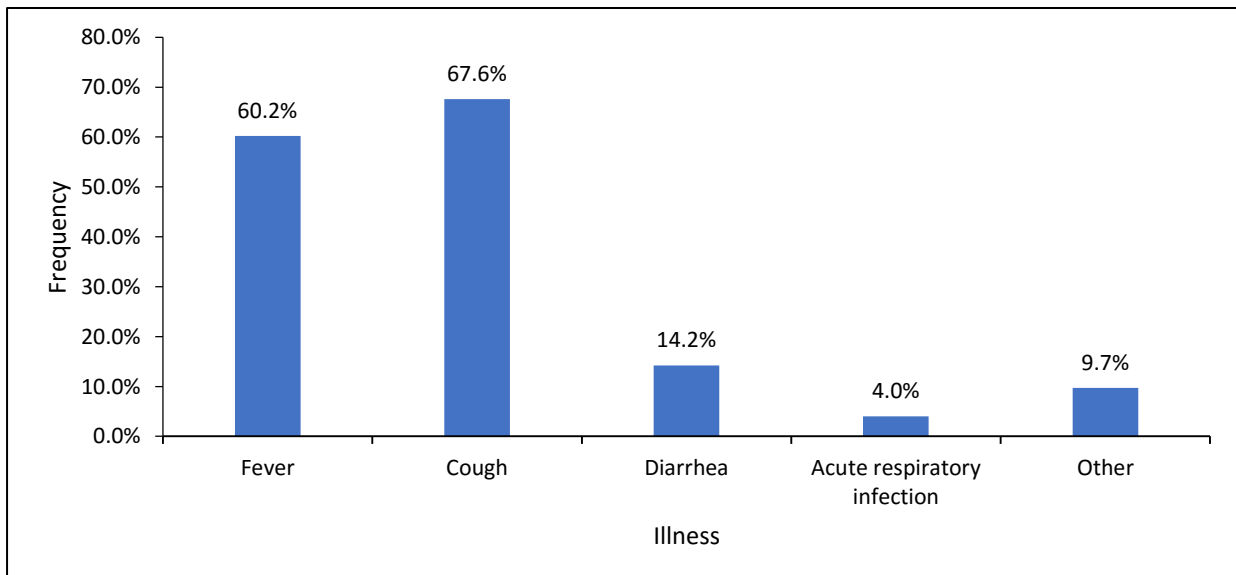
Figure 3: Distribution of study children by types of illness reported in the last two weeks

Of the children who had reported sick, 96.2% sought medical attention, with hospitals accounting for the majority of those visits (35.0%). Others sought at pharmacies and chemist 26.9%. The results are displayed in Figure **4** below.
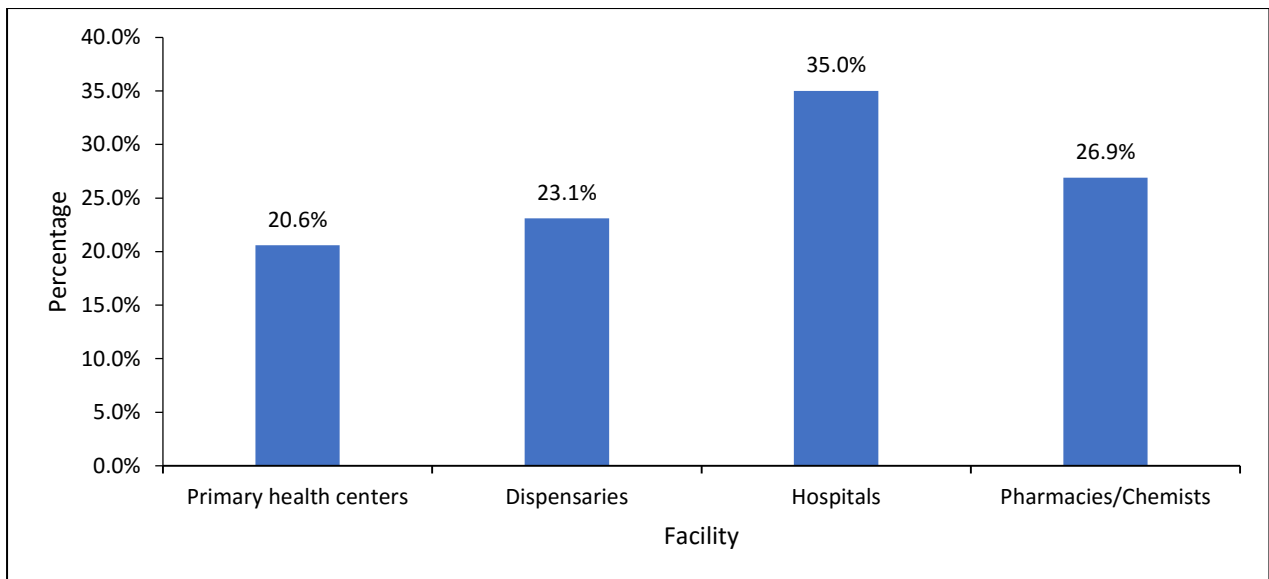
Figure 4: Distribution of facilities sought

4.7 Water, hygiene and sanitation practices among study participants

4.7.1 Primary source of water for households

Figure **5** below illustrates the sources of water in the households. Majority of households (87.8%) relied on public shared taps as their primary source of water, with a small percentage using water kiosks (4.8%) or water tanker (5.8%).
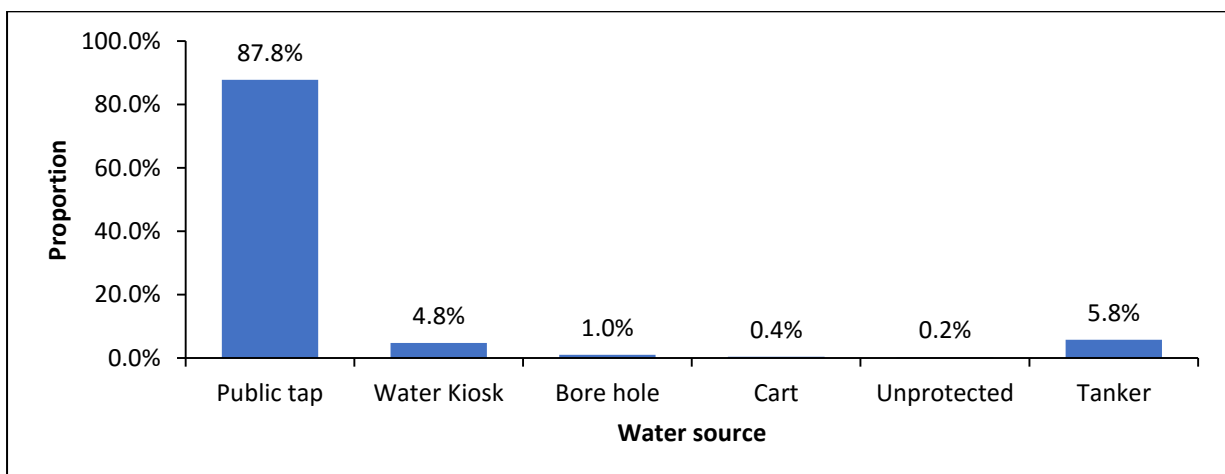
Figure 5: Distribution of sources of water in the study households

4.7.2 Access to water

Table **10** illustrates that 88.4% (440) of the homes had to walk for a distance of fewer than 500m, which took them 15 minutes or fewer to reach a water source, while 11.6% had to trek 500m to access water. Concerning waiting times at water points, the majority, constituting 86.9% (358), reported waiting fewer than 30 minutes, while 11.4% waited for more than 30 minutes but less than one hour.

Table 10: Distribution of access to water of Households

Variable	Category	Frequency (n)	Percent (%)
Trekking distance to the water point	Less than 500m (<15mins)	440	88.4%
	>500m to <2km (>15mins)	58	11.6%
Queue for water	No	58	12.9
	Yes	392	87.1
Queuing time at the water point	Less than 30 minutes	339	86.9%
	30-60 minutes hour	46	11.4%
	More than 1 hour	7	1.7 %

4.7.3 Water Storage, treatment and hand washing at critical times

Majority of households, 83.9% (418), stored their water in closed containers. Treatment of the water prior to use was reported by 71.3% (355). Only 6.8% (30) of the respondents used pot filters, compared to the majority of 59.4% (262) who used boiling water as a treatment method and 33.8% (149) who used chemicals. Majority of households 79.7% (397) reported using soap and water, and most households reported handwashing after toilet use (90.4%), before eating (90.2%), and before cooking (69.1%) and 35.7% at all the four critical times. Regarding waste disposal, a slightly larger proportion of households (50.2%) reported using latrines compared to toilets (48.2%).

4.7.4. Payment and water consumption

As displayed in Table 12 below, most households (97.8%) reported purchasing water, with the majority (87.2%) paying between 1 to 5 Kenyan Shillings per 20 liters of water.

4.7.5 Sanitation and hygiene

Majority 226 (50.2%) of the households used toilets for human excreta disposal, 217 (48.2%) used ordinary latrines while the remaining 7 (1.6%) used other means of excreta disposal such as 'flying toilets.'

A larger proportion of the respondents 403 (88.6%) stated that they washed their hands after using the toilet, 304 (66.8%) stated that they washed their hands before cooking, 401 (88.1%) stated that they wash their hands before eating, 218 (47.9%) stated that they wash their hands after taking their children to the toilet/latrines, and 9 (2.0%) stated that they wash they hands after greeting someone, before attending to their infants, before praying and before/after attending to their customers.

A majority 351 (78.2%) stated that they used soap and water to wash their hands, 68 (15.1%) used only water, 30 (6.7%) used occasionally used soap. The results are as displayed in Table **11** below**.**

Table 11: Water, hygiene and sanitation of the study participants

Variable	Category	Frequency (n)	Percent (%)
Water source	Public taps	390	86.7
	Water kiosks	24	5.3
	Water tanker	28	6.2
	Carts	2	0.4
	Boreholes	5	1.1
	Unprotected	1	0.2
Water treatment	Yes	341	75.8
	No	109	24.2
Water storage	Closed container	373	82.9
	Open container	77	17.1
Waste disposal units	Latrine	226	50.2

	Toilet	217	48.2
	Other	7	1.6
Handwashing method	Soap and water	351	78.2
	Only water	68	15.1
	Occasionally use soap	29	6.5
Handwashing practices	After toilet	403	88.6
	Before cooking	304	66.8
	Before eating	401	88.1
	After taking children to toilet	218	47.9
	Other reasons	9	2.0
Water purchase	No	10	2.2
	Yes	440	97.8
Price per 20 litres of Jerrican	1 to 5	381	87.2
	6 to 10	40	9.2
	Over 10	16	3.7

4.8 Feeding Practices for infants and young children aged 6-23 months in Kibera Informal Settlement during the COVID-19 pandemic

4.8.1 Breastfeeding practices

It was observed that 71.1% of babies were fed breast milk within initial hour after being delivered. Furthermore, 96.8% of children born within the two years leading up to the study had experienced breastfeeding at some point. Among them, a substantial 82.4% continued to be breastfed for the entirety of their first two years of life.

4.8.2 Complementary feeding practices

About 66.7% of the infants aged 6–8 months were introduced to solid, semi-solid, or soft foods. In the wider age range of six to twenty-three months, 55.6% of children had a daily diet that incorporated at least 5 out of the 8 specified food groups, as illustrated in Figure 6 below.

It is important to note that 29.0% of infants aged between 6 and 23 months—that is, breastfed children—met the requirements for consuming soft, half -solid, or solid food at least the minimum count from the day before. This specific indicator was exclusively assessed among breastfed children, as there was an insufficient sample size among non-breastfed children. Additionally, a minimum acceptable diet was achieved by 16.3% of children between 6 and 23 months of age in their daily food consumption.
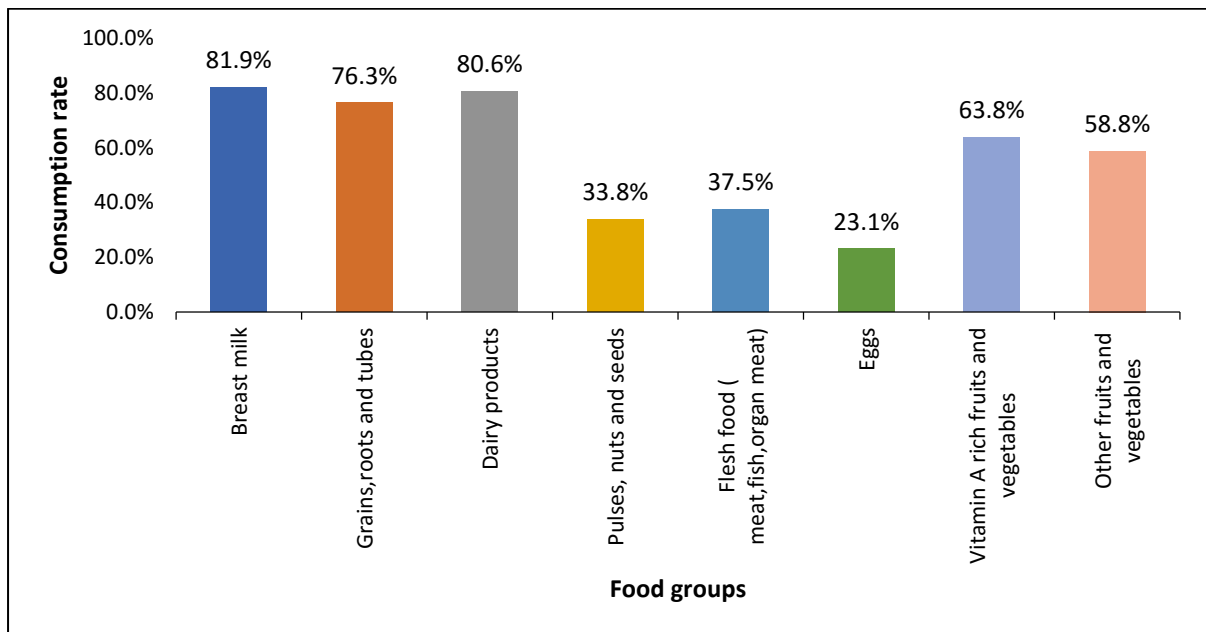
Figure 6: MDD food groups consumed by study children 6-23 months

4.9 Food security

4.9.1 Household Dietary Diversity Scores of study participants

A majority of the households, 229 (46.0%), reported consuming 5-8 food groups, 200 (40.2%) reported consuming 0-4 food groups while 69 (13.9%) reported consuming 9-12 food groups. The results are as displayed in the pie-chart (Figure 7) below.
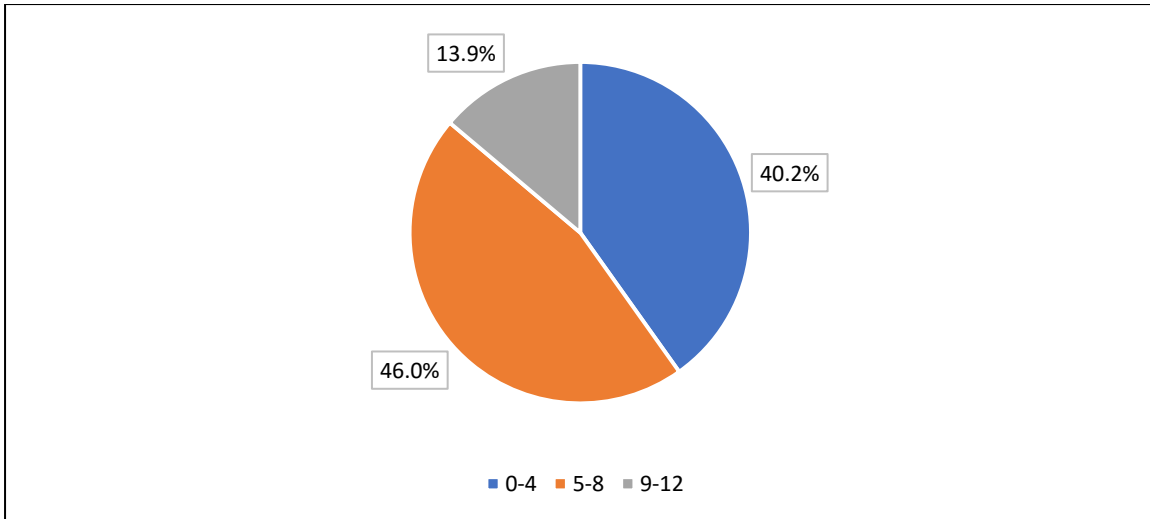
Figure 7: Household Dietary Diversity Scores of study participants

Cereals and cereal products accounted for 71% of total food consumption, with oils and fats coming in second at 66% and milk and milk products third at 52%. Eggs and roots and tubers were the least consumed food groups, at 17% and 14%, respectively. The results are as displayed in the Figure **8** below.
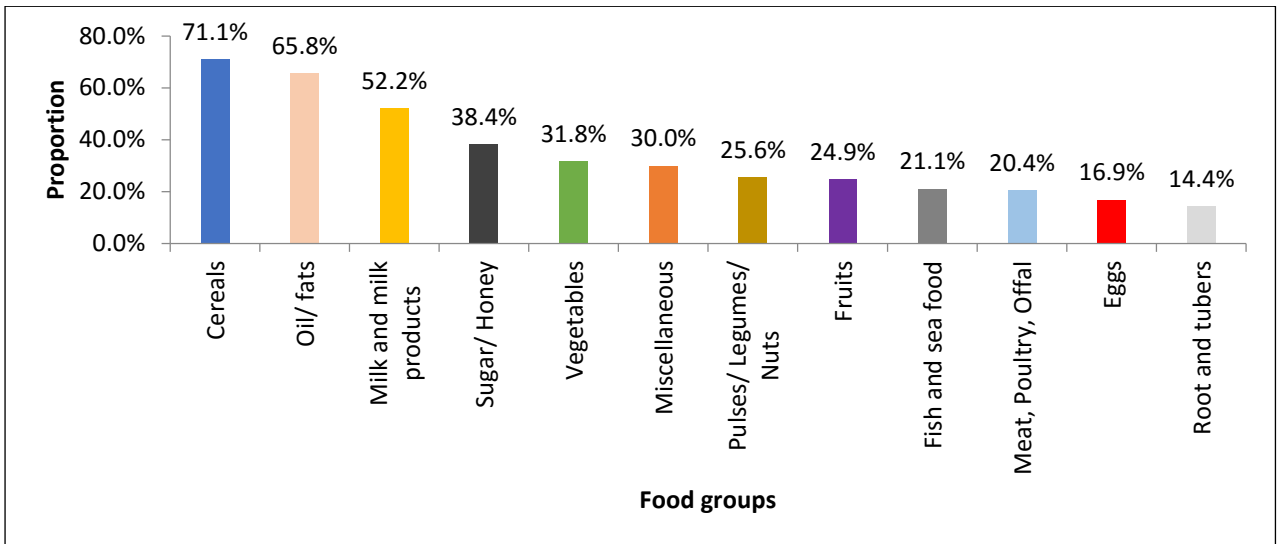
Figure 8: Food groups consumed in households

4.9.2 Food Consumption Score Indices

A higher percentage of the households, 293 (65.3%) achieved acceptable food consumption scores, 60 (13.4%) achieved borderline food consumption scores while 96 (21.4%) recorded poor food consumption scores.

Table 12: Food consumption score indices of study household

Category	Thresholds	Frequency (n)	Percentage (%)
Acceptable food consumption	>42.0	293	65.3%
Borderline food consumption	28.1 to 42.0	60	13.4%
Poor food consumption	1.0 to 28.0	96	21.4%

4.9.3 Coping Strategy Index

Data was gathered concerning the frequency of days, within the last seven days, during which households resorted to specific coping strategies as a response to income or food shortages. The study presents the results as shown in the table below. Table 14 illustrates that the total CSI score is 26.2 classifying the level of coping among the households in Kibera informal settlement as high coping.

Table 13: Coping strategy index

Coping Strategy	No. of Households	Frequency Score (0-7)	Severity Score (1-3)	Weighted Score
Rely on less preferred or less expensive foods	244	4.3	1	4.3
Borrow foods from relatives or friends	113	2.1	2	4.2
Limit Portion sizes	192	4.1	1	4.1
Restrict consumption by adults so that children can feed	144	3.2	3	9.5
Reduce the number of meals	202	4.0	1	4.0
Total Weighted CSI				**26.2**

4.10 Factors associated with the nutritional status of children aged 6 – 59 months

Bivariate analysis was conducted to examine the association between various characteristics and under- nutrition at a p-value of 0.25. Child age (in months), child morbidity, occupation of the caregiver, marital status, religion, income levels, HDDS, FCS, and handwashing practices were statistically significant factors influencing nutritional status of children aged 6-59 months at p-value 0.25. At the multivariate analysis, occupation, income levels and handwashing practices were significantly associated with the nutritional status of the children at p-value 0.05. Marital status and religion were marginally significant factors associated with the nutritional status of children aged 6-59 months in the study population. The results are as displayed in Table **14** below.

Table 14: Factors associated with nutritional status of children aged 6–59 months

Variable	Category	cOR (95% CI)	p-value	aOR (95% CI)	p-value
Child age (months)		1.03 (0.99, 1.06)	**0.092***	1.03 (0.99, 1.07)	0.108
Child sex	Female	Ref		*Excluded*	
	Male	0.90 (0.56, 2.99)	0.839		
Child morbidity	No	Ref		Ref	
	Yes	2.18 (0.92, 5.15)	**0.077***	0.85 (0.27, 2.71)	0.784
Ever breastfed	Yes	Ref		*Excluded*	
	No	1			
Respondent's age (years)		1.02 (0.97, 1.08)	0.437	*Excluded*	
Occupation	Unemployed (Casual laborers)	Ref		Ref	
	Employed (salaried)	2.53 (0.92, 6.99)	**0.072***	5.14 (1.05, 25.13)	**0.043****
	Merchant/trader	0.47 (0.06, 3.94)	0.492	0.67 (0.07, 6.61)	0.732
Education	Secondary	Ref		*Excluded*	
	Primary	0.54 (0.17, 1.68)	0.285		
	Post secondary	0.789 (0.22, 2.82)	0.716		

Marital status	Married	Ref		Ref	
	Single	0.16 (0.02, 1.24)	**0.079***	0.14 (0.02, 1.17)	0.069
Religion	Christian	Ref		Ref	
	Muslim	2.09 (0.61, 7.14)	**0.238***	3.98 (0.81, 19.47)	0.088
Income levels	Less than 1000	Ref		Ref	
	1,000 - 5,000	0.6 (0.16, 2.19)	0.439	0.53 (0.11, 2.59)	0.439
	5,000 - 10,000	0.42 (0.10, 1.75)	**0.237***	0.08 (0.01, 0.62)	**0.015****
	Above 10,000	0.99 (0.27, 3.62)	0.982	0.19 (0.03, 1.35)	0.097
Household size	1-6	Ref		*Excluded*	
	7-12	0.81 (0.24, 2.73)	0.731		
MDD	Yes	Ref		*Excluded*	
	No	1			
HDDS	0-4	Ref		Ref	
	5-8	0.48 (0.10, 2.30)	0.358	0.73 (0.19, 2.72)	0.638
	9-12	0.33 (0.07, 1.57)	**0.162***	0.13 (0.01, 1.53)	0.106
FCS	Acceptable	Ref		Ref	
	Borderline	2.36 (0.57, 9.69)	**0.235***	2.42 (0.39, 15.0)	0.342
	Poor	1.85 (0.51, 6.70)	0.347	3.57 (0.70, 18.17)	0.125
RCS	No or low (CSI = 0-3)	Ref		*Excluded*	
	Medium (CSI = 4-9)	1			
	High (CSI ≥ 10)	1			
Access to water (Distance)	Less than 500m (<15mins)	Ref		*Excluded*	
	>500m to <2km (>15mins)	1			
Sanitation and hygiene	Latrine	Ref		*Excluded*	

	Toilet	0.89 (0.29, 2.69)	0.836		
Handwashing practices	After taking children to toilet	Ref		Ref	
	After using toilet	1		1	
	Before cooking	2.40 (0.27, 20.95)	0.430	2.68 (0.22, 32.35)	0.438
	Before eating	0.32 (0.09, 1.12)	**0.076***	0.21 (0.05, 0.94)	**0.041****
Handwashing methods	Soap and water	Ref			
	Only water	0.94 (0.20 – 4.43)	0.933		
	Occasionally uses soap	1		*Excluded*	
	Other	1			
Healthcare seeking	Yes	Ref		*Excluded*	
	No	1			
Care seeking facilities	Hospital	1.26 (0.16, 10.09)	0.824		
	Primary health centers	1.92 (0.23, 15.75)	0.538		
	Dispensaries	1.92 (0.23, 15.75)	0.538	*Excluded*	
	Pharmacies/Chemists	2.09 (0.25, 17.10)	0.493		

*Significant at p-value 0.25

**Significant at p-value 0.05

CHAPTER FIVE

DISCUSSION

5.1 Introduction

This chapter discusses results in relation to the objectives of the investigation which included determining how much undernutrition there was in children living in Nairobi's Kibera informal settlement between the ages of 6 and 59 months during the COVID-19 pandemic. More specifically, it examined the socio-demographic features of households, appraised the feeding practices for these children, and identified the variables that are linked with the nutritional well-being of children less than five years living in Kibera informal settlement, Nairobi County, amidst the COVID-19 pandemic.

5.2 Nutrition status and feeding practices

Low prevalence was found for general acute malnutrition and its severe form. These findings indicate that the nutritional status in the research area currently falls within the acceptable range, as per the classification criteria set by the World Health Organization (WHO). These encouraging results imply that acute malnutrition is not a common issue in the Kibera informal settlement. This is similar and consistent to the findings of the Nairobi survey in the informal settlements conducted in 2019 (Ministry of Health, 2019). The results of the study on the low rate, months after COVID-19 restriction movement, indicated that most mothers took time to care for their youngsters at home during the COVID-19 pandemic, cooking wholesome meals and providing enough nutrition for them. These results build on an existing study on baby's nutrition during the imposed lockdown, (Barathea, 2021) which found that during the restriction movement, most mothers were concerned about their children's nutrition and planned family meals more frequently thereby contributing to improved nutritional status of the children. This was also reflected in the high proportion of children ever breastfed indicating that during this period when mothers were at home, they had enough time for quality childcare practices. Although there were impressive gains with breastfeeding, early initiation of breastfeeding was practiced by only three-quarters of mothers indicating that there was still room for improvement to ensure that more infants were breastfed within the first hour of life as this provides numerous health benefits and strengthens the mother-infant bond. These outcomes were alike with those reported in Kenya Demographic Health Survey (KNBS and ICF, 2023) on early initiation of breastfeeding.

In this study, WHZ did not detect severe acute malnutrition but MUAC reported one child as being severely malnourished. This is in line with, Tadesse et al. (2017) who found that there was a high likelihood of more SAM cases to be detected if MUAC is used rather than WHZ. They further explained that while WHZ was a good measure for long-term malnutrition, such as stunting, it was not as sensitive in detecting SAM, this was mostly because it was dependent on two parameters, the weight and the height of the child hence identifying different forms of malnutrition while MUAC was only dependent on the circumference of the point between shoulder and elbow and only recorded wasting. Low cases of severe malnutrition could be due to the situation not being alarming, in that as much as various indicators of the feeding practices of the child were not optimal, they were not too poor.

According to the study's findings, majority of the caregivers had completed post-primary education. Higher educated mothers are more likely to have the skills necessary to successfully meet all of their children's physical and socioemotional needs (Wulandari & Laksono, 2023). A substantial number of children in the study exhibited stunting, which indicates prolonged malnutrition. Notably, children aged 18 to 29 months old were the age group most affected by this condition, possibly as a result of inadequate supplemental feeding and the cessation of breastfeeding during this time. The discovery that slightly over half of the children had timely supplemented their meals implies a continued requirement for consistent nutrition education and health promotion. This is essential to ensure that all children in the community receive adequate nutrition during this critical developmental phase. This outcome aligns with the results of research conducted by Chepulis et al. (2020) that found caregivers give cereals and cereal products to infants for breakfast and midday snacks. Kimani-Murage et al. (2011) in their study discovered that the more mothers fed their kids cereal-based porridge as the most popular supplemental food. This helps to explain why only half of the kids met the minimum dietary diversity criteria. According to this criterion, the kids' diets were too limited in terms of variety, which resulted in dietary deficiencies that eventually led to malnutrition.

Although childhood overweight was not alarmingly high, it is still a growing concern worldwide. The results contradict the Ministry of Health's study conducted in Nairobi County's informal settlements, which found a very low prevalence (Ministry of Health, 2019). This shows a steady rise and demonstrates that some children in Kibera informal settlements are at risk of overweight- related health issues. This research emphasizes how

crucial it is to keep an eye on and deal with this problem, since overweight kids may experience short- and long-term health problems.

Households reported being food secure, as they consumed a minimum of five food groups, signifying diversity in their meals. This dietary diversity could potentially contribute to the nutritional well-being of the children within these households. On the other hand, earlier on studies conducted in the Nairobi informal settlements before the COVID-19 pandemic revealed that less households surveyed experienced food security, with nearly half facing severe food insecurity (Wanyama et al., 2019). The improved rates of food security observed during this study period could be attributed to increased food availability. Existing evidence indicates that food supplies generally remained stable in most low- and middle-income countries (Gain, 2020).

Most households in Kibera informal settlement employed high coping mechanisms to deal with income or food shortages. Coping strategies, such as reducing portion sizes and limiting adult consumption for the sake of children, were employed to mitigate food shortages. This could be indicative of economic vulnerability as much as methods for cushioning against food inadequacies to ensure the availability of food in the households.

5.3 Socio-demographic attributes of the research participants

The findings revealed the average age of caregivers participating in this study were in the youthful age, signifying a relatively youthful population responsible for childcare in Kibera. This age range aligns with a study conducted by Korir (2013) in Korogocho, where caregivers were found to be predominantly in the reproductive age bracket of around 24 years. Similarly, Kibum (2014) study on childcare practices also found that over half of the caregivers fell within the age group of 21-29 years, mirroring the findings in our study.

A significant finding in our study was that more than half of the caregivers were in a living arrangement with their partners, suggesting that a majority of the children in our sample were residing with both parents. This observation is consistent with research conducted in slums in Nairobi, specifically studies on breastfeeding behaviors and determinants conducted by Kimani-Murage et al. in 2011, which also reported a high proportion of married respondents in similar settings. This could contribute to sufficient child care, where both parents are responsible for the child and equally contribute to the availability of food in the home.

Most of the respondents had attained a level of education with the more being secondary school education holders. This indicated that the literacy levels in the Kibera Informal Settlements were good enough to understand the health promotion education messages.

The study's findings indicated that the family size was small, below both the national mean household size and the results from a previous study conducted by Korir (2013) in Korogocho, one of the Nairobi slums. Household size can carry substantial implications for factors like food availability and consumption patterns within the household, access to social and economic support, and even the availability of labor, (del Carmen Casanovas et al., 2013). The household size being small showed that the children fed well because there was no crowding hence contributing to the low malnutrition rates in the Kibera informal settlement.

The findings revealed that most were affected by the pandemic attributing this to unemployment. These findings align with research done in low-income countries in 2020, which pointed to reduction of jobs and income during the pandemic in comparison to the initial times. For instance, Egger et al. (2021) discovered in their research that Kenya had reduction in employment at the national level, with a substantial impact on small income generating groups in rural areas. Similarly, Kansiime et al. (2021) documented job losses and income reductions in Kenya and Uganda through their online survey. These trends have also been observed in other studies, including reports from the U.N. Habitat (2020) and the World Bank (2020).

Waged labor was the main occupation of the study caregivers. The rise in joblessness and a shift in employment conditions, with waged labor becoming high prevalent in the slum areas, may contribute to the reported low monthly incomes. Additionally, government-imposed pandemic-related movement restrictions and curfews may have further exacerbated the economic challenges faced by households relying on casual labor for their income.

5.4 Factors associated with the nutrition well-being of children under the age of five years living in Kibera informal settlement, Nairobi County, during the COVID-19 pandemic.

A notable association was found between marital status and the nutritional status of children, indicating that children in single-mother households face a reduced risk of malnutrition compared to those in households where mothers are married. Similar studies conducted in Burundi and Nigeria by Vandeginste (2014) showed that babies from single-mother homes

were less likely to be malnourished. This finding contrasts with prior studies, which indicated that children of single mothers typically have poorer nutritional status, with better outcomes observed among children of married or widowed women (Laksono et al., 2019; Ntoimo & Odimegwu, 2014).

Numerous studies have delved into the correlation between marital status and child nutrition, and the results generally uphold the idea that children in single-parent households may have risk of under nutrition (Griffiths, Matthews, & Hutton, 2019). One plausible explanation for this connection is the financial strain often experienced by single-parent families, leading to financial stress that can restrict the availability of diverse and nutritious foods for children, consequently affecting their overall dietary intake (Bzostek, 2008).

However, it is important to note that single parents can receive both emotional and financial support from extended family, friends, or social networks. Additionally, single parents often exhibit remarkable personal resilience and determination. They are highly motivated to provide the best for their child, which drives a strong emphasis on guaranteeing proper nutrition.

In some single-parent households, co-parenting or shared custody arrangements are put in place. In these instances, children have access to ample resources, increasing their chances of meeting their nutritional needs satisfactorily. Moreover, single parents can access community resources, such as parenting support groups, which can effectively address potential nutritional challenges.

There was significant association between the occupation of the caregiver and undernutrition with children from households whose caregivers were employed being less likely to be undernourished unlike children whose caregivers were unemployed or were merchants/traders. Occupation can influence various aspects of well-being, including income, working conditions, and access to resources. This finding is contrary to a study by Smith et al. in 2020, which reported that maternal employment, particularly in demanding occupations, was associated with an increased risk of child malnutrition. However, contradiction presented by Johnson and Patel suggested that the relationship between caregiver occupation and child nutrition was not universally applicable and could be dependent on factors such as the nature of the caregiver's work, the availability of social support, and regional differences.

There was significant association found between income levels and the nutrition status of the children. While variations in the likelihood of undernutrition were observed across different income groups, it was evident that children from households whose income levels ranged between Kshs. 5,000 – Kshs. 10,000 were less likely to be undernourished unlike households with incomes of less than Kshs. 5,000 or more than Kshs. 10,000 emphasizing the impact of economic stability on child well-being. The findings aligned with the extensive literature demonstrating the relationship between lower family incomes and a higher risk of child malnutrition, while higher incomes are protective. Studies by Fakir and Khan (2015) and Atsu et al. (2017) have consistently shown this relationship. Income-based interventions and social safety nets play an essential role in improving child nutrition.

Based on the results, there is no strong statistical evidence to suggest a significant association between any of the age groups (23-29, 30-39, or 40+) and child nutrition status when compared to the reference group of 18-22-year-old respondents. Although there was no significant association, the adjusted odds ratio for 23-29 age group was less than 1, suggesting that respondents aged 23-29 were less likely to be associated with child nutrition status when compared to the comparison group, the adjusted odds ratio for 30-39 age group was greater than 1, indicating that respondents aged 30-39 were more likely to be associated with a specific child nutrition status compared to the reference group and the adjusted odds ratio for 40+ was greater than 1, indicating that respondents aged 40 and older were more likely to be associated with a specific child nutrition status. The age of caregivers is an important factor in understanding child malnutrition in that it can influence child nutrition through various mechanisms, including knowledge, financial resources, feeding practices, stress levels, and role modeling.

There was no association with religion in this study. However, the adjusted odds ratio of 1.053 indicated that children from Muslim families had a slightly higher likelihood of undernutrition, compared to children from Christian families. Religious beliefs may influence dietary behaviors and food selections, impacting the accessibility of specific food varieties which can, in turn, impact child malnutrition (Atsu et al., 2017).

There was no statistically significant correlation found in this study between undernutrition and child morbidity. Nonetheless, the information did show that kids who had been sick during the two weeks prior to the survey were more susceptible to malnutrition than kids who hadn't been sick during that time. Nearly fifty percent of the kids had become sick in the two

weeks before the research. This finding contradicts a study carried out by the Ministry of Health in Nairobi County's informal settlements, which reported a lower proportion of children experiencing illness (Ministry of Health, 2019). It's crucial to remember that childhood illnesses can cause the body's nutritional stores to be depleted because of increased metabolism brought on by fever, appetite loss, and decreased food and nutrient intake, which raises the body's need for nutrients. (International Baby Food Action Network, 2013).A study by Rodriguez and colleagues in 2011 showed that there was an association between a child illness and malnutrition (Rodríguez et al., 2011). Factors such as the duration and seriousness of the disease, as well as the availability of healthcare, can all influence the likelihood of malnutrition in the aftermath of illness. In this study, nearly all the sick children sought for qualified medical attention.

In this study, handwashing practices before meals also played a significant role. Children in households practicing regular handwashing exhibited a decreased likelihood of undernourishment, emphasizing the importance of hygiene in child nutrition. Proper hand hygiene, both for caregivers and children, is a highly effective preventive measure against infectious diseases, particularly gastrointestinal and respiratory infections (van Beeck et al., 2016). However, there was no association between access to clean water, proper sanitation facilities and nutrition status. This could be because the majority of the households relied on public taps as their primary water source, with a relatively short trekking distance and queuing time. Nearly all the households either boiled or treated their water and stored it in closed containers. This is similar to a study by the World Bank in Nairobi slums which showed that three-quarters of the population depended on public taps for their water supply (World Bank, 2016). Ensuring access to safe drinking water, adequate sanitation, and the adoption of effective hygiene practices can lower the susceptibility to infections, improve the assimilation of nutrients, and support robust growth and development.

In this investigation, a little more than half of the children achieved Minimum Dietary Diversity (MDD). These findings deviate from those reported in the Kenya Demographic Health Survey (KNBS and ICF, 2023), where less than half of the children had attained MDD.

Most of the children were fed cereals & grains and dairy products. This was attributed to the accessibility and availability of the food items. The least consumed foods were eggs and flesh foods since these were regarded as expensive food items. The consumption of eggs and

various types of meats among infants aged 6 to 23 months, whether breastfed or not, can enhance their intake of energy, protein, and essential nutrients. These food items have a crucial role in supplying the essential elements for promoting the development of children, a point emphasized by both the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) in 2021. A study by Rah et al. (2010) found that children who meet MDD criteria tend to have better nutritional outcomes, a decreased prevalence of stunting, and enhanced cognitive development. A study done by Iannotti et al. (2014) emphasized that meeting the suggested minimal meal frequency was linked to a decreased risk of undernutrition and improved growth outcomes in young children. According to this study, nearly fifty percent of the children achieved the minimal meal frequency. This finding indicated that at least half of the children received meals 2-3 times a day suggesting that when the caregivers were present, they ensured feeding of their children was frequent and adequate ultimately contributing to the low prevalence of malnutrition. Only a quarter of the children in this assessment had minimum acceptable diet. This showed that only a fraction of the caregivers could provide a diverse diet as well as regularly feed their children. These findings were similar to those reported in the Kenya Demographic Health Survey (KNBS and ICF, 2023). Research by Ruel et al., (2013) found that children who receive basic acceptable diets were more likely to be well-nourished. These low percentages of children who achieved MDD and MMF indicated poor variety in their diets and inadequate frequency of meals among the children, which could have contributed to the malnutrition cases. The percentage of children meeting MAD was even lower, suggesting a more comprehensive challenge among households in providing an acceptable diet to these children in the informal settlement.

.

5.5 Weakness of the study

This research employed a cross-sectional approach, offering a momentary perspective of the population at a specific time. Consequently, it may not encompass prolonged trends or causal connections, limiting the ability to draw causal inferences. Longitudinal data collection over a more extended period would provide a better understanding of trends and the pandemic's long-term effects on child nutrition.

The study also employed a three-stage cluster sampling approach due to the absence of an updated list of children aged 6-59 months. These possibly introduced selection bias. Further,

the study relied on caregivers' reports for key variables, such as household income, dietary diversity, and coping strategies and this possibly introduced recall bias, as caregivers may not accurately recall or may misreport this information.

Findings from a specific informal settlement, such as Kibera, may not be directly applicable to other informal settlements or regions with different sociodemographic characteristics and challenges. Therefore, caution should be exercised when comparing results to a broader context.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The prevalence of undernutrition among children aged 6-59 months in Kibera Informal Settlement, Nairobi County, during the COVID-19 pandemic was relatively low, indicating an acceptable nutrition situation in the study area. There was only one instance of severe acute malnutrition reported, which is an encouraging indicator that acute malnutrition did not reach alarming levels, even in the face of numerous household challenges. However, it's important to note that, despite the low prevalence of undernutrition, concerns about child malnutrition persist, as both stunting and overweight prevalence rates remain significant.

The proportion of children who met the criteria for minimal dietary variety, minimal meal frequency, and basic acceptable diets were noted to be relatively limited. This suggests a lack of dietary variety, inadequate meal frequency, and difficulties in offering an acceptable diet to these children. Despite a prevalent breastfeeding culture, there is still a concern regarding the timely commencement of breastfeeding during the initial hour after a child's birth.

The marital status, occupation of caregivers, household income levels and household hand washing practices were significant predictors of undernutrition in the study population.

6.2 Recommendations and future research

6.2.1 Recommendations

Based on the study outcomes, I recommend the following:

1. Encouraging the promotion of diverse food consumption among the children to reduce overreliance on cereals and cereal products. Facilitate community forums to foster discussions on the importance of incorporating a variety of nutrient-rich foods in daily diets. Local leaders and community influencers should spearhead these efforts, fostering engagement and understanding among community members.

2. Promotion of targeted nutrition education programs to parents on proper feeding practices for infants with emphasis on the timely introduction of a diverse, nutrient-dense range of complementary foods and the maintenance of adequate meal frequency. Local healthcare providers, including nurses and community health workers, should actively participate in the execution of these programs.

3. Promotion of hand washing practices at the designated critical times to reduce the risk of diseases within the community. The Ministry of Health to enhance public health campaigns promoting hand washing with soap.

4. Establishment of a regular monitoring and evaluation system for the community's nutrition status, WASH practices, and socioeconomic conditions. Advocate for ongoing assessments to track changes over time and assess the effectiveness of implemented interventions and policies.

6.2.2 Future research

1. Conducting follow-up studies to assess the effect of interventions and track shifts in the community's health and well-being is crucial. This will help refine strategies and ensure that efforts are yielding the desired outcomes.

REFERENCES

Abinya, C. A. (2012). *Prevalence of malnutrition and related factors among children aged 6-60 months admitted at Siaya District Hospital Paediatric wards* University of Nairobi, Kenya].

Abrams, E. M., & Szefler, S. J. (2020). COVID-19 and the impact of social determinants of health. *The Lancet Respiratory Medicine*, *8*(7), 659-661.

Alfredo L. Fort, Monica T. Kothari, & Noureddine Abderrahim. (2008). *Association between Maternal, Birth, and Newborn Characteristics and Neonatal Mortality in Five Asian Countries. DHS Working Papers 2008.* https://www.path.org/files/MCHN_dhs_nnm_asian.pdf

Ali, S., Sahu, A., Sahu, P., Sharma, H., Gulati, M., Menon, S. A., . . . Sahu, G. K. (2020). A Global Public Health Emergency: COVID-19. *EAS J Pharma Pharmacol*, *2*(4), 110-128.

Barden-O'Fallon, J., Barry, M. A., Brodish, P., & Hazerjian, J. (2015). Rapid assessment of Ebola-related implications for reproductive, maternal, newborn and child health service delivery and utilization in Guinea. *PLoS currents*, *7*.

Benson, T., & Shekar, M. (2006). Trends and issues in child undernutrition. *Disease and Mortality in Sub-Saharan Africa. 2nd edition*.

Black, R. E., Allen, L. H., Bhutta, Z. A., Caulfield, L. E., De Onis, M., Ezzati, M., . . . Rivera, J. (2008). Maternal and child undernutrition: global and regional exposures and health consequences. *The Lancet*, *371*(9608), 243-260.

Bursac, Z., Gauss, C. H., Williams, D. K., & Hosmer, D. (2007). A purposeful selection of variables macro for logistic regression. Proceedings of the SAS Global Forum 2007 Conference,

Committee on World Food Security. (2020). *Impacts of COVID-19 on food security and nutrition: developing effective policy responses to address the hunger and malnutrition pandemic. HLPE issues paper*.

De Vita, M. V., Scolfaro, C., Santini, B., Lezo, A., Gobbi, F., Buonfrate, D., . . . Rovarini, J. M. (2019). Malnutrition, morbidity and infection in the informal settlements of Nairobi, Kenya: an epidemiological study. *Italian journal of pediatrics*, *45*(1), 1-11.

Dutta, A., Pant, K., Puthia, R., & Sah, A. (2009). Prevalence of undernutrition among children in the Garhwal Himalayas. *Food and nutrition bulletin*, *30*(1), 77-81.

French, S. A., Tangney, C. C., Crane, M. M., Wang, Y., & Appelhans, B. M. (2019). Nutrition quality of food purchases varies by household income: the SHoPPER study. *BMC public health*, *19*, 1-7.

Girma, A., Woldie, H., Mekonnen, F. A., Gonete, K. A., & Sisay, M. (2019). Undernutrition and associated factors among urban children aged 24–59 months in Northwest Ethiopia: a community based cross sectional study. *BMC pediatrics*, *19*, 1-11.

Groot, J., Broeze, J., & Castelein, R. (2023). *Food and nutrition security in Kibera (Nairobi, Kenya) with a focus on protein and amino acids*.

Haleem, A., Javaid, M., & Vaishya, R. (2020). Effects of COVID-19 pandemic in daily life. *Current medicine research and practice*, *10*(2), 78.

Hall, J., Walton, M., Van Ogtrop, F., Guest, D., Black, K., & Beardsley, J. (2020). Factors influencing undernutrition among children under 5 years from cocoa-growing communities in Bougainville. *BMJ global health*, *5*(8), e002478.

Headey, D., Heidkamp, R., Osendarp, S., Ruel, M., Scott, N., Black, R., . . . Haddad, L. (2020). Impacts of COVID-19 on childhood malnutrition and nutrition-related mortality. *The Lancet*, *396*(10250), 519-521.

Hirschi, K. D. (2009). Nutrient biofortification of food crops. *Annual review of nutrition*, *29*, 401-421.

Huang, C., Wang, Y., Li, X., Ren, L., Zhao, J., Hu, Y., . . . Gu, X. (2020). Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *The Lancet*, *395*(10223), 497-506.

Ingasia, O., Soma, K., & Obwanga, B. (2021). Socio-Economic Drivers of Fish Species Consumption Preferences in Kenya's Urban Informal Food System. *Sustainability*, *13*, 5278. https://doi.org/10.3390/su13095278

Kansiime, M. K., Tambo, J. A., Mugambi, I., Bundi, M., Kara, A., & Owuor, C. (2021). COVID-19 implications on household income and food security in Kenya and Uganda: Findings from a rapid assessment. *World development*, *137*, 105199.

Katona, P., & Katona-Apte, J. (2008). The interaction between nutrition and infection. *Clinical Infectious Diseases*, *46*(10), 1582-1588.

Kennedy, G., Ballard, T., & Dop, M. C. (2011). *Guidelines for measuring household and individual dietary diversity*. Food and Agriculture Organization of the United Nations.

KNBS. (2019). Census Report.

Maital, S., & Barzani, E. (2020). The global economic impact of COVID-19: A summary of research. *Samuel Neaman Institute for National Policy Research*, *2020*, 1-12.

Ministry of health. (2019). *Nairobi County, Smart Survey Report 2019*. http://www.nutritionhealth.or.ke/wp-content/uploads/SMART%20Survey%20Reports/Nairobi%20SMART%20survey%20Final%20-%20Feb%202020.pdf

Nafula, N., Kyalo, D., Munga, B., & Ngugi, R. (2020). Poverty and distributional effects of COVID-19 on households in Kenya.

Panthi, B., Khanal, P., Dahal, M., Maharjan, S., & Nepal, S. (2020). An urgent call to address the nutritional status of women and children in Nepal during COVID-19 crises. *International Journal for Equity in Health*, *19*, 1-3.

Pietrobelli, A., Pecoraro, L., Ferruzzi, A., Heo, M., Faith, M., Zoller, T., . . . Heymsfield, S. B. (2020). Effects of COVID- 19 lockdown on lifestyle behaviors in children with obesity living in Verona, Italy: a longitudinal study. *Obesity*, *28*(8), 1382-1385.

Prof. Najlaa Fawzi. (2019). *Sample Size*. https://uomustansiriyah.edu.iq/media/lectures/2/2_2019_11_18!08_08_27_PM.pdf

Quaife, M., Van Zandvoort, K., Gimma, A., Shah, K., McCreesh, N., Prem, K., . . . Pinchoff, J. (2020). The impact of COVID-19 control measures on social contacts and transmission in Kenyan informal settlements. *BMC medicine*, *18*, 1-11.

Ruiz-Roso, M. B., de Carvalho Padilha, P., Mantilla-Escalante, D. C., Ulloa, N., Brun, P., Acevedo-Correa, D., . . . de Oliveira Cardoso, L. (2020). Covid-19 confinement and changes of adolescent's dietary trends in Italy, Spain, Chile, Colombia and Brazil. *Nutrients*, *12*(6), 1807.

Sharma, K., Banstola, A., & Parajuli, R. R. (2021). Assessment of COVID-19 pandemic in Nepal: A lockdown scenario analysis. *Frontiers in Public Health*, *9*, 599280.

Sharma, S. V., Chuang, R.-J., Rushing, M., Naylor, B., Ranjit, N., Pomeroy, M., & Markham, C. (2020). Peer reviewed: Social determinants of health–related needs during COVID-19 among low-income households with children. *Preventing chronic disease*, *17*.

Shupler, M., Mwitari, J., Gohole, A., de Cuevas, R. A., Puzzolo, E., Čukić, I., . . . Pope, D. (2021). COVID-19 impacts on household energy & food security in a Kenyan informal settlement: The need for integrated approaches to the SDGs. *Renewable and Sustainable Energy Reviews*, *144*, 111018.

Siddiqui, F., Salam, R. A., Lassi, Z. S., & Das, J. K. (2020). The intertwined relationship between malnutrition and poverty. *Frontiers in Public Health*, *8*, 453.

Tobias, M. C., & Morrison, J. G. (2021). Famine in Bangladesh. In *On the Nature of Ecological Paradox* (pp. 415-426). Springer.

Troeger, C., Blacker, B. F., Khalil, I. A., Rao, P. C., Cao, S., Zimsen, S. R., . . . Abebe, Z. (2018). Estimates of the global, regional, and national morbidity, mortality, and aetiologies of diarrhoea in 195 countries: a systematic analysis for the Global Burden of Disease Study 2016. *The Lancet Infectious Diseases*, *18*(11), 1211-1228.

U.N Habitat. (2020). *Impact of COVID-19 on Livelihoods, Food Security, and Nutrition in East Africa: Urban Focus*. https://docs.wfp.org/api/documents/WFP-0000118161/download/?_ga=2.44879076.1580116148.1621545297-2003143752.1621545297.

UNICEF. (2020a). *An additional 6.7 million children under 5 could suffer from wasting this year due to COVID-19.*

UNICEF. (2020b). *Improving Child Nutrition: The Achievable Imperative for Global Progress. .*

UNICEF. (2020c). *UNICEF Conceptual Framework.* https://www.unicef.org/media/113291/file/UNICEF%20Conceptual%20Framework.pdf

UNICEF. (2021). *Conceptual Framework on Maternal and Child Nutrition.* https://www.unicef.org/media/113291/file/UNICEF%20Conceptual%20Framework.pdf

Zemrani, B., Gehri, M., Masserey, E., Knob, C., & Pellaton, R. (2021). A hidden side of the COVID-19 pandemic in children: the double burden of undernutrition and overnutrition. *International Journal for Equity in Health*, *20*(1), 1-4.

APPENDIX I: PARTICIPANT INFORMATION AND CONSENT FORM

PARENTAL CONSENT

Title of study: Nutrition status of children under five years in Kibera informal settlement in Nairobi, Kenya during the Corona virus disease-19 pandemic

Investigator: Lucy Akoritsa, University of Nairobi

INTRODUCTION

I would like to tell you about a study being conducted by Lucy Akoritsa, a Masters of public Health student at the Department of Public and Global Health, University of Nairobi. The purpose of this consent form is to give you the information you will need to help you decide whether or not your child should participate in the study. Feel free to ask any questions about the purpose of the research, what happens if your child participates in the study, the possible risks and benefits, the rights of your child as a volunteer, and anything else about the research or this form that is not clear. When we have answered all your questions to your satisfaction, you may decide if you want your child to be in the study or not. This process is called 'informed consent. Once you understand and agree for your child to be in the study, I will request you to sign your name on this form. You should understand the general principles which apply to all participants in medical research: i) Your child decision to participate is entirely voluntary ii) You child may withdraw from the study at any time without necessarily giving a reason for his/her withdrawal iii) Refusal to participate in the research will not affect the services your child is entitled to in this health facility or other facilities.

May I continue? YES/NO

For children below 18 years of age we give information about the study to parents or guardians. We will go over this information with you and you need to give permission in order for your child to participate in this study. We will give you a copy of this form for your records.

WHAT IS THE PURPOSE OF THE STUDY?

The purpose of the interview is to find out the nutrition status of children less than five years in Kibera informal settlement in Nairobi, Kenya during the Corona virus disease-19 pandemic. Participants in this research study will be asked questions about their socio

demographic characteristics and a Dietary diversity administered using validated questionnaires. Anthropometric measurements will be taken on the participating child, where their height/length, weight and MUAC measurements will be taken.

There will be approximately one hundred and sixteen children in this study randomly chosen. We are asking for your consent to consider your child to participate in this study.

WHAT WILL HAPPEN IF YOU DECIDE YOU WANT YOUR CHILD TO BE IN THIS RESEARCH STUDY?

If you agree for your child to participate in this study, the following things will happen:

You will be interviewed by a trained interviewer in a private area where you feel comfortable answering questions. The interview will last approximately thirty minutes. The interview will cover topics such as age of the child, sex of the child, marital status of the caregiver, income level, education level and common illnesses that the child has had in a certain period, house hold size and food consumed in the past period.   .

After the interview has finished, the child weight will be measured using a standardized weight scale and the height or length (for children below 87cm). We will then take measurement for their Mid Upper Arm Circumference (MUAC) and check for bilateral edema. You will be informed about the results.

We will ask for a telephone number where we can contact you if necessary. If you agree to provide your contact information, it will be used only by people working for this study and will never be shared with others. The reasons why we may need to contact you include: verifying information given.

ARE THERE ANY RISKS, HARMS, DISCOMFORTS ASSOCIATED WITH THIS STUDY?

Medical research has the potential to introduce psychological, social, emotional and physical risks. Effort should always be put in place to minimize the risks.   One potential risk of being in the study is loss of privacy. We will keep everything you tell us as confidential as possible. We will use a code number to identify your child in a password-protected computer database and will keep all of our paper records in a locked file cabinet. However, no system of protecting confidentiality can be absolutely secure so it is still possible that someone could find out your child was in this study and could find out information about your child.

Also, answering questions in the interview may be uncomfortable for you. If there are any questions you do not want to answer, you can skip them. You have the right to refuse the interview or any questions asked during the interview.

We will do everything we can to ensure that this is done in private.

In case of an injury, illness or complications related to this study, contact the study staff right away at the number provided at the end of this document. The study staff will refer the child for treatment for conditions that require more extensive care.

ARE THERE ANY BENEFITS BEING IN THIS STUDY?

We will refer your child to a hospital for care and support if necessary. Also, the information you provide will help us better understand factors affecting the nutrition status of the children in the informal settlement especially in the COVID-19 pandemic context. This information is a major contribution to science and public Health.

WILL BEING IN THIS STUDY COST YOU ANYTHING?

There will be no cost associated with this study.

IS THERE REIMBURSEMENT FOR PARTICIPATING IN THIS STUDY?

There will be no monetary or any sort of reimbursement for participating in this study.

WHAT IF YOU HAVE QUESTIONS IN FUTURE?

If you have further questions or concerns about your child participating in this study, please call or send a text message to the study staff at the number provided at the bottom of this page

For more information about your child's rights as a research participant you may contact the Secretary/Chairperson, Kenyatta National Hospital-University of Nairobi Ethics and Research Committee TelephoneNo.2726300 Ext.44102email uonknh_erc@uonbi.ac.ke.

WHAT ARE YOUR OTHER CHOICES?

Your decision to have your child participate in this research is voluntary. You are free to decline or withdraw participation of your child in the study at any time without injustice or loss of benefits.

Just inform the study staff and the participation of your child in the study will be stopped. You do not have to give reasons for withdrawing your child if you do not wish to do so. Withdrawal of your child from the study will not affect the services your child is otherwise entitled to

CONSENT FORM (STATEMENT OF CONSENT)

The person being considered for this study is unable to consent for him/herself because he or she is a minor (a person less than 18 years of age). You are being asked to give your permission to include your child in this study.

Parent/guardian statement

I have read this consent form or had the information read to me. I have had the chance to discuss this research study with a study counselor. I have had my questions answered by him or her in a language that I understand. The risks and benefits have been explained to me. I understand that I will be given a copy of this consent form after signing it. I understand that my participation and that of my child in this study is voluntary and that I may choose to withdraw it anytime.

I understand that all efforts will be made to keep information regarding me and my child's personal identity confidential.

By signing this consent form,

I have not given up my child's legal rights as a participant in this research study.

I voluntarily agree to my child's participation in this research study: Yes   No

I agree to provide contact information for follow-up: Yes   No

Parent/Guardian signature/Thumb stamp: Date   _____

Parent/Guardian printed name: _

Researcher's statement

I, the undersigned, have fully explained the relevant details of this research study to the participant named above and believe that the participant has understood and has knowingly given his/her consent.

Printed Name:

Signature:

Date

APPENDIX II: DATA COLLECTION TOOL- CHILD HEALTH AND HOUSEHOLD QUESTIONNAIRES

NUTRITION STATUS OF CHILDREN UNDER FIVE YEARS IN KIBERA INFORMAL SETTLEMENT IN NAIROBI, KENYA DURING THE CORONA

Q1_1	IDENTIFICATION	
A	COUNTY	
B	SUB-COUNTY	
C	CLUSTER NAME	
D	CLUSTER NUMBER	
E	TEAM NUMBER	
F	HOUSEHOLD NUMBER	
	INTERVIEWER VISITS	DATE OF INTERVIEW (DD/MM/YYYY)
G	Visit 1	
H	Visit 2	
	OUTCOME OF THE VISIT	CODES
I		1. Completed 2. Partly completed 3. Absent 4. Refused 96. Other (Specify) _____

2.0   HOUSEHOLD DEMOGRAPHICS

		RESPONSE CODES	INSTRUCTIONS
Q2_1	How many people (including children) are currently living in this household?	I____I	
Q2_2	Are there children below 5 years in this household?	1. Yes 0. No 98. Don't know	
Code	*Name*		
Child_1			
Child _2			
Child _3			
Child _4			
Child _5			

3.0	**THIS MODULE IS TO BE ADMINISTERED CAREGIVERS OF CHILDREN 6-59 MONTHS IN A SAMPLED HOUSEHOLD. A SEPARATE MODULE MUST BE COMPLETED FOR EACH HOUSEHOLD**		
Q3_1	Cluster Number		
Q3_2	Household Number		

Q3_3	In which year were you born (Record in year)	___ ___ _____	*If Date of Birth not available skip to Q3_4*
Q3_4	Please tell me how old you are. What was your age at	_____	

	your last birthday? RECORD AGE IN COMPLETED YEARS.		
Q3_5	What is your marital status?	1. Single 2. Married 3. Divorced 4. Separated 5. Widowed 96. Others (Specify)	I____I
Q3_6A	Have you ever been to school?	1. Yes 0. No	I____I
Q3_6B	What is the highest level of education that you have completed?	1. Primary 2. Secondary 3. Tertiary 4. University 96. Others (Specify) _____	I____I
Q3_7	What is your Religion?	1= Christian 2= Muslim 3= Hindu 96= Other	I____I
Q3_8	What's Main Occupation of the Household Head?	1=Employed (salaried) 2=Waged labor (Casual) 3=Petty trade 4=Merchant/trader 96=Others	I____I
Q3_9	What is your current income range (Kshs?)	1=No income 2= 100-1000 3= 1000-5000	I____I

		4= 5000-10000	
		5= above 10000	
		96=Other-Specify	
Q3_10	Was there any change in your income during the COVID-19 pandemic?	1. Yes 0. No	I____I
Q3_10 A	If yes, by what margin?	1= 100-1000 2= 1000-5000 3= 5000-10000 4= above 10000 96=Other-Specify	
Q3_10 B	What were the reasons for your change in income status?	1= Laying off job 2= Sickness 3= Salary reduced 4= Salary increased 5= Closed Business 6= No casual jobs available 7= Not able to travel to work 96= Other specify	I____I
Q3_11	Is there any other source of income?	1. Yes 0. No	I____I
Q3_11A	If yes specify_____	1= Rental income 2=Remittances from relatives 96= Other Specify	I____I
4.0	WATER AND SANITATION		
Q4_1	What is the MAIN source of drinking water for the	1= Public Tap 2= Water Kiosk	I____I

	household?	3=Bore hole	
		4= Tanker	
		5= Cart	
		6=Unprotected well	
		7= Protected well	
		86 Other, specify	
Q4_2	What is the Current Trekking distance to the current main water source?	1= less than 500 meters 2= More than 500 meters to less than 2km 96= Others, Specify	I____I
Q4_3	Do you queue for water?	1= Yes 2= No (if No skip to Q4_4	I____I
Q4_3A	If yes, how long?	1=less than 30 minutes 2= 30-60 minutes 3= More than one hour	I____I
Q4_4	Is anything done to your water before drinking?	1= Yes 2= No (if No skip to Q4_5	I____I
Q4_4A	If yes, what do you do	1= Boiling 2=Chemicals 3= Pot fillers	Multiple responses expected
Q4_5	Where do you store water for drinking?	1= Open Container 2= Closed Container	I____I
Q4_6	How much water did your household use yesterday? (*Ask the question in the number of 20L jerrican and convert to liters write down the total quantity used in liters*)		I____I

Q4_7	Do you pay for water?	1= Yes 2= No (if No skip to Q4_8	I____I
Q4_7A	If yes, how much per 20L jerrican (*in Kshs*)		I____I
Q4_7B	If paid per month, how much?		I____I
Q4_8	Where do members of your household mainly relieve themselves?	1=Toilet 2= Latrine 96= Other, specify	I____I
Q4_9	What instances do you wash your hands?	1= After toilet 2= Before Cooking 3=Before eating 96= Other specify	I____I
Q4_9A	What do you use to wash the hands?	1= Only water 2= Soap and water 96= other, specify	I____I
5.0	**HOUSEHOLD FOOD SECURITY**		
	HOUSEHOLD DIETARY DIVERSITY SCORE		**Multiple responses expected**
	Did any member of your household consume food from any these food groups in the last 24 hours (from this time yesterday to now)? Include any snacks consumed? Fill each food group	**Q5_1**. Cereals & cereal products **Q5_2**. White Roots & Tubers **Q5_3**Legumes, Nuts & seeds **Q5_4**Dark green leafy vegetables **Q5_5**Yellow or Orange fleshed tubers and vegetables/Vitamin A rich **Q5_6**Other vegetables	

		Q5_7Vitamin A rich fruits	
		Q5_8Other Fruits	
		Q5_9Meat & Offal	
		Q5_10Eggs	
		Q5_11Fish and Sea foods	
		Q5_12Milk & milk products	
		Q5_13Sugar and honey	
		Q5_14Oils/fats	
		Q5_15Condiments (Spices, tea & coffee)	
6.0	**FOOD CONSUMPTION SCORE**		
	Over the last 7 days, how many days did your household consume the following foods? (Fill number of days from 1 to 7)	(A) Cereals & tubers (maize, rice, sorghum, cassava, potatoes, etc.)?	
		(B). Pulses (beans, peas, groundnuts, green grams, etc.)?	
		(C) Vegetables?	
		(D) Fruits?	
		(E). Animal source foods (meat, fish, eggs)?	
		(G). Sugar and honey (e.g., Sweetened foods, drinks, chocolates, sweets, candies, etc.)?	
		(H). Oils/fats (e.g., fat or oil, butter, ghee, margarine added to food or used for cooking)?	
7.0	**REDUCED COPING**		

	STRATEGY INDEX		
	In the past 7 days, if there have been times when you did not have enough food or money to buy food, how often (days) has your household had to: (Fill number of days 1 to 7)	(A). Rely on less preferred and less expensive foods?	
		(B). Borrow food, or rely on help from a friend or relative?	
		(C). Limit portion sizes at meal times?	
		(D). Restrict consumption by adults so that small children can eat?	
		(E). Reduce the number of meals eaten in a day?	

8.0 SCREENING FOR CHILDREN AGED 6-59 MONTHS (*Fill this module for each household*)

TO BE COMPLETED FOR ALL ELIGIBLE CHILDREN (6-59 MONTHS) IN THE HOUSEHOLD.

Before you begin this module, ask the caregiver to bring the child's Birth certificate, Health records or Immunization Card for reference.

Q8_1	Q8_2	Q8_3	Q8_4	Q8_5	Q8_6
Child Code	List Name of child 6-59-month-old	What's the sex of the child? 1.Male 2.Female	Date of Birth (from birth card or health records) (*dd / mm / yyyy)* If NOT known skip to **Q8_6**	How was the age verified? 1. Birth certificate 2. Immunization card 3. Health card	What's the child's age. Use the Calendar of events to estimate age where birth records are not available. Fill in the age in completed months.
Child_1					
Child _2					
Child _3					
Child _4					
Child _5					

9.0	**CHILD ANTHROPOMETRY AND HEALTH MODULE** **TAKE MEASUREMENTS OF ALL CHILDREN 6-59 MONTHS HOUSEHOLD. FILL THE ANTHROPOMETRIC MODULE FIRST FOR CHILD ELIGIBLE.** **FOR DISABLED CHILDREN 6-59 MONTHS, TAKE POSSIBLE MEASUREMENTS, SKIP THE IMPOSSIBLE MEASUREMENTS, RECORD THE REASON IN THE CLUSTER CONTROL FORM AND PROCEED WITH OTHER APPLICABLE MODULES.**

9.0 ANTHROPOMETRIC AND CHILD HEALTH QUESTIONNAIRE

TO BE COMPLETED FOR ALL ELIGIBLE CHILDREN (6-59 MONTHS) IN THE SAMPLED HOUSEHOLDS PER CLUSTER.

USE ONE FORM PER CLUSTER

COUNTY		CLUSTER NAME	
SUB-COUNTY		TEAM NUMBER	
CLUSTER NUMBER		DATE OF SURVEY	

Q9_1	Q9_2	Q9_3	Q9_4	Q9_5	Q9_6		Q9_7		Q9_8	Q9_9	Q9_10
Child no.	Household Number. (number in order of visit)	What's the sex of the child? 1. Female 2. Male	Date of Birth (from birth card or clinical card dd/mm/yy)	Age in months (use calendar of events)	Record the WEIGHT of the child in Kg [XX.X], with minimal/no clothing		Height (24-59) /Length (6-23) in cm [XX.X]		Check for presence of bilateral OEDEMA (both feet) 1. Yes, oedema 0. No oedema *If No skip to Q9_10*	If YES in q9_8, take a photo of both legs (for verification by survey manager)	Record the MUAC of the child in cm [XX.X]. *Take note of MUAC below 12.5 cm for referral*
					Q9_6a	**Q9_6b**	**Q9_7a**	**Q9_7b**			
						Weight taken with minimal	**Height** or **Length**	Length for 24-59m, enter **l,** Height for			
1											

72

2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											

Q10_1	Q10_2	Q10_3	Q10_4	Q10_5	Q10_6
Pick from Module 9		**MORBIDITY _ 2 WEEKS RECALL (CHILDREN 6-59 M)**			
Child no.	Household Number. (number in order of visit)	Was (NAME) sick in the past 2 weeks 1. Yes 2. No	If yes, what was the type of illness? 1. Fever* 2. Cough** 3. Diarrhoea 4. Acute respiratory infection 96. Others (Specify) _____ **Multiple responses possible**	Did you seek treatment when (NAME) was ill? 1. Yes 2. No **Q10_5A** If no, why? 0. Inadequate resources 1. Distance 2. Religion 96. Others (Specify)	If yes, where did you seek treatment? 1. Primary health care centers 2. Dispensaries 3. Hospital 4. Pharmacy/chemist 5. Religious leaders 6. Relative/friend 96. Others (Specify)
1					
2					

3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					

11.0	**INFANT AND YOUNG CHILD FEEDING 6-23 MONTHS (THESE QUESTIONS ARE ASKED FOR ALL LIVING CHILDREN UNDER 24 MONTHS)** ***This tool was designed based on the WHO 2021 IYCF indicator guide** **Fill this module for each eligible child in the household**		
Q11_1A	Is **[NAME]'s** natural mother present?	1. Yes 0. No 98. Don't know I____I	**If "No" or "Don't know" skip to 11_1E**
	Question about feeding immediately after birth (Include ALL 6-23 months children living)		
Q11_1B	Was **[NAME]** ever breastfed?	1. Yes 0. No 98. Don't know	I____I **If "No" or "Don't Skip to Q11_1E**
Q11_1C	How long after birth was **[NAME]** first put to the breast? 0. Immediately (within first 1 hour) I____I 1. Hours (1 hour - < 24 hours) 2. Days (>24 hours)		
Q11_1D	**Question about current breastfeeding (include only living children)**		
Q11_1D	Was **[NAME]** breastfed yesterday during the day or at night?	1. Yes 0. No 98. Don't know	I____I

Q11_1E	Is **[NAME]'s** primary caregiver present?	1. Yes 0. No 98. Don't know I____I	**If "No" or "Don't know" skip to 12.0**
Q11_2	Now I would like to ask you about liquids that [NAME] had yesterday during the day or at night. Please tell me about all drinks, whether [NAME] had them at home or somewhere else. *Yesterday during the day or at night, did [NAME] have…? (follow list of liquids)*		
Q11_2A	Plain water?	1. Yes 0. No 98. Don't know	I____I
Q11_2B	Infant formula?	1. Yes 0. No 98. Don't know	I____I **If "No" or "Don't know" skip to Q11_2C**
Q11_2BNUM	If "**yes**": How many times did [**NAME**] drink formula?	|___|	**If 7 or more, record "7"** **If number of times not known, record "98"**

77

Q11_2C	Milk from animals, such as fresh, tinned or powdered milk?	1. Yes 0. No 98. Don't know	I____I **If "No" or "Don't know" skip to Q11_2D**
Q11_2CNUM	If **"yes"**: How many times did [**NAME**] drink milk?	|___|	**If 7 or more, record "7"** **If number of times not known, record "98"**
Q11_2CSWT	If **"yes"**: Was the milk or were any of the milk drinks a sweet or flavored type of milk?	1. Yes 0. No 98. Don't know	I____I
Q11_2D	Yogurt drinks	1. Yes 0. No 98. Don't know	I____I **If "No" or "Don't know" skip to Q11_2E**
Q11_2DNUM	If **"yes"**: How many times did [**NAME**] drink yogurt?	|___|	**If 7 or more, record "7"** **If number of times not known, record "98"**
Q11_2SWT	If **"yes"**: Was the yogurt or were any of the yogurt drinks a sweet or flavored type of yogurt drink?	1. Yes 0. No 98. Don't know	I____I
Q11_2E	Chocolate-flavored drinks including those made from syrups or powders?	1. Yes 0. No 98. Don't know	I____I

Q11_2F	Fruit juice or fruit-flavored drinks including those made from syrups or powders?	1. Yes 0. No 98.　Don't know	I____I
Q11_2G	Sodas, malt drinks, sports drinks or energy drinks?	1. Yes 0. No 98.　Don't know	I____I
Q11_2H	Tea, coffee, or herbal drinks?	1. Yes 0. No 98.　Don't know	I____I **If "No" or "Don't know" skip to Q11_2I**
Q11_2HSWT	If **"yes":** Was the drink/ Were any of these drinks sweetened?	1. Yes 0. No 98.　Don't know	I____I
Q11_2I	Clear broth or clear soup (**chicken broth, beef broth, vegetable broth, bone broth**)?	1. Yes 0. No 98.　Don't know	I____I
Q11_2J	Any　　　other　　　liquids?	1. Yes 0. No 98.　Don't know	I____I **If "No" or "Don't know" skip to Q11_3**
Q11_2J_other	If "yes": what was the liquid or what were the liquids? List the liquid (s) in the provided space		

Q11_2JSWT	If "yes": Was the drink or were any of these drinks sweetened?	1. Yes 0. No 98. Don't know	I____I

Q11_3	**Now I would like to ask you about everything that [NAME] ate yesterday during the day or the night. I am interested in foods your child ate whether at home or somewhere else.** Think about when [**NAME**] woke up yesterday. Did (he/she) eat anything at that time? If "yes" ask: Please tell me everything [**NAME**] ate at that time. Probe: Anything else? **Record answers using the food groups below.** What did [**NAME**] do after that? Did he/she eat anything at that time? Repeat this series of questions, recording in the food groups, until the respondent tells you that the child woke up this morning. If a mixed dish is mentioned: Probe: What were the main ingredients in the **MIXED DISH**? Record answers in the correct food groups **8_3A - 8_3R**		
Q11_3A	Yogurt, other than yogurt drinks?	1. Yes 0. No 98. Don't know	I____I **If "no" or "Don't know" skip to Q11_3B**
Q11_3ANUM	If **"yes"**: How many times did [**NAME**] eat yogurt?	|___|	**If more than 7, record "7"** **If number of times not known, record**

Q11_3B	Porridge, bread, rice, noodles, pasta or other including foods made from grains like rice dishes, noodle dishes, toast, rice, wheat pasta, barley, maize, etc.?	1. Yes 0. No 98. Don't know	I____I
Q11_3C	Pumpkin, carrots, sweet red peppers, squash or sweet potatoes that are yellow or orange inside?	1. Yes 0. No 98. Don't know	I____I
Q11_3D	Potatoes *(all skin colors (e.g., white, yellow, blue, purple, black) and all flesh colors **EXCEPT** orange/deep yellow),* Sweet potato *(white/pale yellow- fleshed)* or other commonly consumed starchy tubers or starchy tuberous roots that are white or pale inside ?	1. Yes 0. No 98. Don't know	I____I
Q11_3E	Dark green leafy vegetables, commonly consumed vitamin A-rich dark green leafy vegetables?	1. Yes 0. No 98. Don't know	I____I
Q11_3F	Any other vegetables (Artichoke, Asparagus, Avocado, Beans, Beets, Brussels sprouts, Cabbage, Cauliflower, Celery, Corn *(fresh, not dried/flour/ meal) (green),*	1. Yes 0. No 98. Don't know	I____I

	Cucumbers, Eggplant, Fennel, Green pepper, Lee kerrat, Lettuce, Mushroom, Okra, Olives, Peas, Radish, Tomato, Zucchini)?		
Q11_3G	Commonly consumed **Vitamin A-rich** fruits (Ripe mangoes, ripe papayas, Apricot (fresh and dried), Cantaloupe melon (ripe), Passion fruit (ripe), Peaches (dried), Persimmon (ripe))?	1. Yes 0. No 98. Don't know	I____I
Q11_3H	Any other fruits (Apple, Banana, Blackberry, Black current, Blueberry, Cactus pear, Cherries, Coconut flesh, Cranberry, Dates, Figs, Grapefruit, Grapes, Guava, Jujube, Kiwi, Lemon, Lime, Litchi, Mandarin orange, Mango (unripe), Nectarine, Papaya unripe, Orange, Peach, Pear, Pineapple, Plum, Pomegranate, Prune, Strawberry, Sugar cane, Tamarind, Tangerine, Watermelon)?	1. Yes 0. No 98. Don't know	I____I
Q11_3H	Liver, kidney, heart, gizzard or other commonly consumed organ meats?	1. Yes 0. No 98. Don't know	I____I
Q11_3I	Sausages, hot dogs, ham, bacon, smokies, canned meat and other commonly consumed	1. Yes 0. No 98. Don't	I____I

	processed meats?	know	
Q11_3J	Any other meat, such as **beef, pork, lamb, goat, chicken, duck, turkey, pigeon, rabbit,** or other commonly consumed meat?	1. Yes 0. No 98. Don't know	I____I
Q11_3K	Eggs? (**Chicken, Duck, Guinea fowl, Quail eggs**)?	1. Yes 0. No 98. Don't know	I____I
Q11_3L	Fresh fish, frozen, dried fish or smoked fish, Canned fish (**anchovies, tuna and sardine**), Clams, mussels, oysters and scallops, Shrimp, lobster, crayfish and crabs, sea urchins, octopus, squid and cuttlefish, shellfish?	1. Yes 0. No 98. Don't know	I____I
Q11_3M	Beans, peas, lentils, nuts, seeds or commonly consumed foods made from beans, peas, lentils, lima bean fool, lupin, nuts, or seeds?	1. Yes 0. No 98. Don't know	I____I
Q11_3N	Hard or soft cheese such as, Gouda, Swiss, Cream cheese, Feta, Fresh mozzarella?	1. Yes 0. No 98. Don't know	I____I
Q11_3O	Sentinel sweet foods: such as chocolates, caramels, candies, pastries, cakes, biscuits, baklava, fruit "gummies" or frozen treats like ice cream and popsicles, or other	1. Yes 0. No 98. Don't know	I____I

	commonly consumed sentinel sweet foods?		
Q11_3Q	Sentinel fried and salty foods: Chips, crisps, puffs, French fries, fried dough, instant noodles or other commonly consumed sentinel fried and salty foods?	1. Yes 0. No 98. Don't know	I____I
Q11_3R	Other solid, semi-solid or soft foods? List all other solid, semi-solid or soft foods that do not fit food groups [Mentioned Above]		
		For each food group not mentioned after completing the above, ask: *Just to make sure, did [NAME] eat [FOOD GROUP ITEMS] yesterday during the day or the night?*	
CHECK	**CHECK11_3A** through **11_3R**. If not a single "yes" is recorded skip to 12.0		
Q11_4	How many times did [NAME] eat any solid, semi-solid or soft foods yesterday during the day or night?	Number of times	I____I **If 7 or more times, record "7".** **If number of times not known, record "98"**

END OF THE INTERVIEW

12.0	Thank the respondent for their time and end the interview. Countercheck the form to ensure all required information is captured and complete the cluster control form		
Q12_1	What is the outcome of the study	1. Completed 2. Not completed	I____I
Q12_1 a	If not completed, indicate the reasons		_____
13.0	**Questionnaire Validation**		
	Team Leader Name _____	*Signature:* _____	*Date: _____*
	Supervisor Name _____	*Signature:* _____	*Date: _____*

APPENDIX III: SWAHILI – DIBAJI NA DODOSO

PARTICIPANT INFORMATION AND CONSENT FORM- SWAHILI

Title of Study: Nutrition status of children under five years in Kibera informal settlement in Nairobi, Kenya during the Corona virus disease-19 pandemic

Investigator: Lucy Akoritsa, University of Nairobi.

DIBAJI

Ningetaka kuwaeleza kuhusu utafiti unaofanywa na Bi Lucy Akoritsa, mwanafunzi wa shahada yauzamili (MPH) katika chou kikuu cha Nairobi. Madhumuni ya fomu hii ni kukupa taarifa itakayokusaidia kufanya uamuzi kama utakuwa au hutakuwa mshiriki katika utahite huu. Kuwa hurukuuliza swali lolote kuhusu madhumuni yautafiti huu, kitakachotendeka iwapo utashiriki, hatari na faida za kushiriki, haki zako kama mshiriki na lolote lile linalohusiana na utafiti huu au lolote ambalo alieleweki katika fomu hii. Utakaporidhishwa na majibu yetu ndipo utafanya uamuzi kama utashiriki au la. Utaratibu huu ndio unajulikana kama utoaji idhini". Utakapoelewa na kukubali kuwa mshirika katika utafiti huu utahitajika kuandika jina lako na kutiasahihi katika fomu hii, unapaswa kuelewa kanuni za jumla zinazofuatwa na washirika wote wautafiti wa matibabu;

  i.   Uamuzi wa kuwa mshiriki ni kwa hiari yako.
 ii.   Unaweza kujitoa kwenye tafiti wakati wowote bila kulazimika kupeana sababu yeyote ya kujitoa.
iii.   Kutoshiriki katika utafiti huu hutaathiri huduma unazopewa katika kituo cha afya chochote. Tutakupa nakala ya hii fomu kama kumbukumbu yako.

Nawezaendelea? NDIO/LA

UTAFITI HUU UNAHUSU

Mchunguz ialiyetajwa hapo awali anawahoji walezi wenye Watoto walio na umri chini ya miaka mitano. Malengo ya mahojiano ni kujua athiri ya janga kubwa la Korona virusi-kumi na tisa kwa lishe ya Watoto wenye miaka chini ya tano wanaoishi kwenye makazi duni ya Kibera, jijini Nairobi, Kenya. Baadhi ya maswali yatakayoulizwa washirikani; Umri wa watoto, jinsia ya watoto, kiwango cha elimu cha mlezi, kiwango cha mapato cha mlezi, ukubwa wa kaya zao, hali yao ya ndoa, magonjwa yanayopatwa na Watoto kila saa na hali zao za ajira. Kutakuwa na takriban washirika mia moja na kumi na sita watakaochaguliwa kwa nasibu.

KUTATOKEA NINI KAMA UTAAMUA KUSHIRIKI KATIKA UTAFITI HUU?

Kama utakubali kushiriki katika utafiti huu utahojiwa na mtaalamu kwenye chumba binafsi utakapoweza kujibu maswali faraghani. Mahojiano yatachukua muda wa dakika thelathini.

JE KUNA HATARI, MADHARA AMA USUMBUFU UNAOHUSISHWA NA UTAFITI HUU?

Utafiti wa aina hii una uwezo wa kuanzisha hatari za saikolojia, hisia na kimwili. Mmojawapo ya hatari kuweka siri zako wasi. Habari utakayotoa kwetu tutaiweka kama siri iwezekanavyo. Tutatumia msimbo kukutambulisha katika tarakilishi iliyolindwa na nywila. Nakala za kumbukumbu zitahifadhiwa vyema kwenye droo iliyofungwa. Hata hivyo hakuna njia yeyote yakuhifadhi iliyo bora kwa asilimia mia, kwa hivyo kuna njia mtu anaweza jua ulikuwa mshiriki katika utafiti nakuweza kupata Habari uliyopeana. Pia kujibu maswali mengine inaweza kuwasijambo la kurudhishakwako, kama kuna swali hautaki kujibu una huru wa kulipita. unao uhuru wa kukataa kuhojiwa au kujibu swali/maswali mengine wakati wa mahojiano. Kama kutakuwa na dalili zozote za dhiki yakisychologia, basi tutasimamisha mahojiano na tukupeleke kwa daktari anayehusika na ushauri.

Tutafanya juu chini kuhakikisha Habari yako utakayotupa haitajulikana.

Iwapo kuna jeraha, ugonjwa au matatizo yanayo husiana na utafiti huu, wasilianana wafanyakazi wa utafiti mara moja kwa nambari iliyotolewa mwishoni mwa waraka huu.

Wafanyikazi wa utafiti watampeleka mtoto kwa matibabu kwa hali zinazohitaj iutunzajiwa kina zaidi

JE KUNA MANUFAA YA KUSHIRIKI HUU UTAFITI?

Tutampeleka mtoto wako hospitali kwa matunzo na usaidizi ikibidi. Pia maelezo utakayotoa yatatusaidia kuelewa vyema mambo yanayoathiri hali ya lishe ya Watoto katika makazi yasiyo rasmi hasa katika muktadha wa janga la COVID-19.

Habari hii ni mchango mkubwa kwa sayansi na afya ya umma.

JE KUSHIRIKI HUU UTAFITI UTAKUGHARIMU?

Hakutakuwa na gharama inayohusishwa na utafiti huu.

JE KUNA FEDHA UKAYOPEWA KUSHIRIKI HUU UTAFITI?

Hakutakuwa na pesa au aina yoyote ya malipo kwa kushiriki katika utafiti huu.

SIRI

Tutaweka Habari inayo kuhusu kwa siri ili kwamba hakuna mtu atayeweza kukutambua. Tutatumia namba ya siri na hatuta Andika majina yako kwa fomu yoyote.

JE KAMA KUNA MASWALI YATAKAYOIBUKA USONI?

Kama utakuwa na maswali zaidi au wasiwasi wowote kutokana na kuwamshiriki katika huu Utafiti unaweza wasiliana nasi kwa njia ya kupiga simu au kuandika ujumbe kwa mchunguzi kupitia nambari ya mtafiti. Kwa Habari Zaidi kuhusu haki zako kama mshirika katika huu utafiti wasiliana na katibu au mwenye kiti wa kamati ya maadili ya utafiti ya hospitali kuu wa nambari ya simu 272630044102 au kupitia barua pepe kupitia: uonknh_erc@uonbi.ac.ke.

UCHAGUZI MWINGINE

Uamuzi wa kuwa mshirika katika huu utafiti ni wa kujitolea. Una huru wa kukataa kushiriki au kujiondoa katika utafiti bila udhalimu au kupoteza dhamana yoyote.

Taarifa ya mzazi/mlezi

Nimesoma fomu hii ya idhini au nimesomewa maelezo. Nimepata nafasi ya kujadili utafiti huu na mshauri wa utafiti. Nimejibu maswali yangu kwa lugha ninayoielewa. Hatari na faida zimeelezewa kwangu. Ninaelewa kuwa nitapewa nakala ya fomu hii ya idhini baada ya kuitia saini. Ninaelewa kuwa ushiriki wangu na wa mtoto wangu katika utafiti huu ni wa hiari na kwamba ninaweza kuchagua kuuondoka wakati wowote.

Ninaelewa kuwa juhudi zote zitafanywa ilikuweka maelezo kunihusu na ya mtoto wangu kuwa siri. Kwa kutia Saini fomu hii ya idhini, sijaacha haki za kisheria za mtoto wangu kama mshiriki katika utafiti huu.

Ninakubali kwa hiari ushiriki wa mtoto wangu katika utafiti huu wa utafiti: Ndiyo/Hapana

Ninakubali mtoto wangu afanyiwe uchunguzi: Ndiyo/Hapana

Ninakubali (kufafanua sampuli) kuhifadhiwa kwa ajili ya utafiti wa baadaye: Ndiyo Hapana

Ninakubali kutoa maelezo ya mawasiliano kwa ufuatiliaji: Ndiyo Hapana

Sahihi ya Mzazi/Mlezi /Muhuri wa kidole gumba: Tarehe

Jina lililochapishwa la Mzazi/Mlezi:

Kauli ya mtafiti

Mimi, aliyetia sahihi hapa chini, nimeeleza kikamilifu maelezo muhimu ya utafiti huu kwa mshiriki aliyetajwa hapo juu na ninaamini kuwa mshiriki ameelewa na ameto aridhaa yake akijua.

Jina Lililochapishwa:

Sahihi:

Tarehe:

NUTRITION STATUS OF CHILDREN UNDER FIVE YEARS IN KIBERA INFORMAL SETTLEMENT IN NAIROBI, KENYA DURING THE CORONA VIRUS DISEASE-19 PANDEMIC

Q1_1	KITAMBULISHO	
A	KAUNTI	
B	KAUNTI NDOGO	
C	JINA LA KUNDI	
D	NAMBA YA KUNDI	
E	NAMBARI YA TIMU	
F	NAMBA YA KAYA	
	ZIARA ZA WAHOJI	TAREHE YA MAHOJIANO (DD/MM/YYYY)
G	Tembelea 1	
H	Tembelea 2	
	MATOKEO YA ZIARA HIYO	MSIMBO
I		1. Imekamilika 2. Imekamilika kwa sehemu 3. Kutokuwepo 4. Alikataa 96. Nyingine (Bainisha)

2.0 DEMOGRAFIA ZA KAYA

		KANUNI ZA MAJIBU	MAAGIZO
Q2_1	Ni watu wangapi (pamoja na watoto) wanaishi katika kaya hii kwa sasa?	I____I	
Q2_2	Je, kuna watoto chini ya miaka 5 katika kaya hii?	1. Ndiyo 2. Hapana 98. Sijui	
Code	*Jina*		
mtoto_1			
mtoto _2			
mtoto _3			
mtoto _4			
mtoto _5			

3.0	**MODULI HII INATAKIWA KUONGOZWA WALEZAJI WA WATOTO MIEZI 6-59 KATIKA KAYA ILIYOPIGWA SAMPULI. MODULI TENGE LAZIMA IKAMILISHWE KWA KILA KAYA**		
Q3_1	Nambayakikundi		

Q3_2	Nambaya kaya		

Q3_3	Ulizaliwa mwaka gani (Rekodi katika mwaka)	___ ___ _____	*Ikiwa Tarehe ya Kuzaliwa haipatikani ruka hadi Q3_4*
Q3_4	Tafadhali niambie una umri gani. Ulikuwa na umri gani katika siku yako ya kuzaliwa ya mwisho? REKODI UMRI KATIKA MIAKA ILIYOIKAMILIKA.	_____	
Q3_5	Je, hali yako ya ndoa ikoje?	1. Hajaolewa 2. Aliyeolewa 3. Aliyeachana 4. Aliyetengana 5. Mjane 96. Wengine (Taja)	I____I
Q3_6A	Je, umewahi kwenda shule?	1. Ndiyo 2. Hapana	I____I
Q3_6B	Je, ni kiwango gani cha juu cha elimu ambacho umemaliza?	1. Msingi 2. Sekondari 3. Elimu ya Juu 4. Chuo Kikuu 96. Nyingine (Taja) _____	I____I

92

Q3_7	Dini yako ni ipi?	1= Mkristo	
		2= Muislamu	
		3= Mhindu	I____I
		96= Nyingine	
Q3_8	Nini Kazi Kuu ya Mkuu wa Kaya?	1=Wameajiriwa (wanalipwa)	
		2=Kazi ya kulipwa (Kawaida)	
		3=Biashara ndogondogo	I____I
		4=Mfanyabiashara	
		96=Nyingine	
Q3_9	Mapato yako ya sasa ni yapi (Kshs?)	1=Hakuna mapato	
		2= 100-1000	
		3= 1000-5000	
		4= 5000-10000	I____I
		5= zaidi ya 10000	
		96=Taja-Nyingine	
Q3_10	Je, kulikuwa na mabadiliko yoyote katika mapato yako wakati wa janga la COVID-19?	1. Ndiyo	
		0. Hapana	I____I
Q3_10 A	Kama ndiyo, kwa kiasi gani?	1= 100-1000	
		2= 1000-5000	
		3= 5000-10000	
		4= zaidi ya 10000	
		96=Taja-Nyingine	
Q3_10 B	Ni sababu zipi zilikufanya ubadilishe hali yako ya mapato?	1= Kuachishwa kazi	I____I
		2= Ugonjwa	

		3= Mshahara umepunguzwa	
		4= Mshahara umeongezwa	
		5= Biashara Iliyofungwa	
		6= Hakuna kazi za kawaida zinazopatikana	
		7= Hana uwezo wa kusafiri kwenda kazini	
		96= Nyingine bayana	
Q3_11	Je, kuna chanzo kingine chochote cha mapato ?	1. Ndio 0. Hapana	I____I
Q3_11A	Kama ndiyo taja	1= Mapato ya kukodisha 2=Malipo kutoka kwa jamaa 96= Nyingine Taja	I____I
4.0	**MAJI NA USAFI**		
Q4_1	Nini chanzo KUU cha maji ya kunywa kwa kaya?	1= Gonga hadharani 2= Kioski cha Maji 3=Shimo la kuchimba 4= Tangi 5= Mkokoteni 6=Haijahifadhiwa vizuri 7= Imelindwa vyema	I____I

94

		96 Nyingine, taja	
Q4_2	Je, ni umbali gani wa Sasa wa Kutembea hadi kwenye chanzo kikuu cha maji cha sasa?	1= chini ya mita 500 2= Zaidi ya mita 500 hadi chini ya 2km 96= Nyingine, Taja	I____I
Q4_3	Je, unapanga foleni kutafuta maji?	1= Ndiyo 2= Hapana (ikiwa Hapana ruka hadi Q4_4	I____I
Q4_3A	Kama Ndiyo, muda gani?	1=chini ya dakika 30 2= dakika 30-60 3= Zaidi ya saa moja	I____I
Q4_4	Je, kuna kitu kinafanywa kwa maji yako kabla ya kunywa?	1= Ndiyo 2= Hapana (ikiwa Hapana ruka hadi Q4_5	I____I
Q4_4A	Ikiwa ndio, unafanya nini?	1= Kuchemka 2=Kemikali 3= Vichungi vya kujaza sufuria	Majibu mengi yanatarajiwa
Q4_5	Je, unahifadhi wapi maji ya kunywa?	1=Kontena Iliyowazi 2= Kontena Iliyofungwa	I____I
Q4_6	Je, kaya yako ilitumia maji kiasi gani jana? (*Uliza swali katika idadi ya jerican*		I____I

	20L na ubadilishe kuwa lita andika jumla ya kiasi kinachotumika katika lita)		
Q4_7	Je, unalipiamaji?	1= Ndiyo 2= Hapana (ikiwa Hapana ruka hadi Q4_8	I____I
Q4_7A	Kama ndiyo, ni kiasi gani kwa kila lita 20 za jerican (kwa Kshs)		I____I
Q4_7B	Ikiwaunalipakwamwezi, nikiasigani?		I____I
Q4_8	Washiriki wa kaya yako hujisaidia wapi hasa?	1=Choo 2= Choo 96= Nyingine, taja	I____I
Q4_9	Je, unanawa mikono katika matukio gani?	1= Baada ya choo 2= Kabla ya Kupika 3=Kabla ya kula 96= Nyingine bayana	I____I
Q4_9A	Unatumia nini kunawa mikono?	1= Maji tu 2= Sabuni na maji 96= nyingine, bainisha	I____I
5.0	**USALAMA WA CHAKULA CHA KAYA**		
	ALAMA YA UTOFAUTI WA LISHE YA KAYA		**Majibu mengi yanatarajiwa**

	Je, kuna mwanakaya yeyote alikula chakula kutoka kwa vikundi hivi vya vyakula katika muda wa saa 24 zilizopita (kuanzia wakati huu jana hadi sasa)? Je, unajumuisha vitafunio vyovyote vinavyotumiwa? Jaza kila kikundi cha chakula	**Q5_1**.Nafaka na bidhaa za nafaka **Q5_2**. Mizizi Nyeupe & Mizizi **Q5_3** Kunde, Karanga & Mbegu **Q5_4** Mboga za majani zenye rangi ya kijani kibichi **Q5_5** Mizizi na mboga zenye rangi ya manjano au Machungwa/Vitamini A kwa wingi **Q5_6** Mboga Nyingine **Q5_7** Matunda yenye vitamini A **Q5_8** Matunda Mengine **Q5_9** Nyama & Offal **Q5_10** Mayai\ **Q5_11** Vyakula vya Samaki na Bahari **Q5_12** Bidhaa za Maziwa na maziwa **Q5_13** Sukari na asali **Q5_14** Mafuta/ chai/kahawa	
6.0	**ALAMA YA UTUMIAJI WA CHAKULA**		
	Katikasiku 7 zilizopita, kaya	(A) Nafaka na mizizi (mahindi, mchele,	

		mtama, mihogo, viazi n.k)?	
	yakoilikulavyakulavifuatavyokwasiku ngapi? (Jazaidadiyasikukutoka 1 hadi 7)	(B). Kunde (maharagwe, mbaazi, karanga, gramu za kijani, nk)?	
		(C) Mboga?	
		(D) Matunda?	
		(E). Vyakula vya wanyama (nyama, samaki, mayai)?	
		(F). Sukari na asali (k.m. vyakula vitamu, vinywaji, chokoleti, peremende,	
		(G). Mafuta/mafuta (k.m. mafuta au mafuta, siagi, samli, siagi iliyoongezwa kwenye chakula au inayotumika kupikia)?	
7.0	**ILIPUNGUZA MKAKATI WA KUCHUKUA**		
	Katika siku 7 zilizopita, ikiwa kumekuwa na nyakati ambapo hukuwa na chakula cha kutosha au pesa za kununulia chakula, ni mara ngapi (siku) kaya yako imelazimika kufanya hivyo: (Jaza idadi ya siku 1 hadi 7)	(A). Je, unategemea vyakula visivyopendelewa zaidi na vya bei nafuu?	
		(B). Kuazima chakula, au kutegemea msaada kutoka kwa rafiki au jamaa?	

98

			(C). Je, ungependa kupunguza ukubwa wa sehemu wakati wa chakula?	
			(D). Kuzuia matumizi ya watu wazima ili watoto wadogo waweze kula?	
			(E). Kupunguza idadi ya milo inayoliwa kwa siku	

8.0 UCHUNGUZI KWA WATOTO WENYE UMRI WA MIEZI 6-59 (Jaza moduli hii kwa kila kaya)

ILI KUKAMILISHWA KWA WATOTO WOTE WANAOSTAHIKI (MIEZI 6-59) KATIKA KAYA.

Kabla ya kuanza moduli hii, mwambie mlezi alete cheti cha Kuzaliwa cha mtoto, rekodi za Afya au Kadi ya Chanjo kwa ajili ya kumbukumbu.

Q8_1	Q8_2	Q8_3	Q8_4	Q8_5	Q8_6
Kanuni ya Mtoto	Orodha Jina la mtoto mwenye umri wa miezi 6-59	Jinsia ya mtoto ni nini? 1.Mwanaume 2.Mwanamke	Tarehe ya Kuzaliwa (kutoka kwa kadi ya kuzaliwa au rekodi za afya) (dd / mm / yyyy) IWAPO HAIjulikani ruka hadi Q8_6	Umri ulithibitishwaje? 1. Cheti cha kuzaliwa 2. Kadi ya chanjo 3. Kadi ya afya	Umri wa mtoto ni nini. Tumia Kalenda ya matukio kukadiria umri ambapo rekodi za kuzaliwa hazipatikani. Jaza umri katika miezi iliyokamilishwa.
Mtoto_1					
Mtoto _2					
Mtoto _3					
Mtoto _4					
Mtoto _5					

9.0	ANTHROOMETRI YA MTOTO NA MODULI YA AFYA
	CHUKUA VIPIMO VYA WATOTO WOTE WA KAYA WA MIEZI 6-59. JAZA MODULI YA ANTHROPOMETRIC KWANZA KWA MTOTO ANAYESTAHILI.
	KWA WATOTO ULEMAVU MIEZI 6-59, CHUKUA VIPIMO UNAVYOWEZA, RUKA VIPIMO AMBAVYO AMBAVYO HAIWEZEKANI, REKODI SABABU KATIKA FOMU YA KUDHIBITI KLASTA NA UENDELEE NA MODULI NYINGINE ZINAZOTUMIKA.

9.0 DODOSO LA ANTHROPOMETRIC NA AFYA YA MTOTO

ILI KUKAMILISHWA KWA WATOTO WOTE WANAOSTAHIKI (MIEZI 6-59) KATIKA KAYA ILIYOPIGWA KWA KILA KUNDI.

TUMIA FOMU MOJA KWA KILA KUNDI

KAUNTI					JINA LA KUNDI				
KAUNTI NDOGO					NAMBA YA TIMU				
NAMBA YA KUNDI					TAREHE YA UTAFITI				

Q9_1	Q9_2	Q9_3	Q9_4	Q9_5	Q9_6		Q9_7		Q9_8	Q9_9	Q9_10
Nambayamtoto	Nambari ya Kaya. (idadi katika mpangilio wa ziara)	Jinsia ya mtoto ni nini? 1. Mwanamke 2. Mwanaume	Tarehe ya Kuzaliwa (kutoka kwa kadi ya kuzaliwa au kadi ya matibabu dd/mm/yy	Umri katika miezi (tumia kalenda ya matukio)	Rekodi UZITO wa mtoto katika Kg [XX.X], ukiwa na nguo ndogo/bila nguo		Urefu (24-59) /Urefu (6-23) kwa sentimita [XX.X		Angalia uwepo wa EDEMA ya nchi mbili (miguu yote miwili) 1. Ndiyo,	Ikiwa NDIYO katika q9_8, piga picha ya miguu yote miwili	Rekodi MUAC ya mtoto katika cm [XX.X]. Zingatia MUAC chini ya cm 12.5 kwa rufaa
					Q9_6a	**Q9_6b**	**Q9_7a**	**Q9_7b**			

			)			Uzito unaochukuliwa na nguo ndogo, rekodi y - Ndiyo, n - Hapana	Urefu	Urefu wa 24-59m, ingiza 1, Urefu kwa 6-23m = h	edema 0. Hakuna edema Ikiwa Hapana ruka hadi Q9_10	(ili kuthibitishwa na msimamizi wa utafiti)	
1											
2											
3											
4											
5											
6											
7											
8											
9											

10										10	
11											
12											
13											
14											
15											
16											

Q10_1	Q10_2	Q10_3	Q10_4	Q10_5	Q10_6
Pick from Module 8		**UKUMBUFU WA WIKI 2 (WATOTO 6-59 M)**			
Nambayam toto	Nambari ya Kaya. (idadi katika mpangilio wa ziara)	(NAME) alikuwa mgonjwa katika wiki 2 zilizopita 1. Ndiyo 0. Hapana	Ikiwa ndio, ni aina gani ya ugonjwa? 1. Homa* 2. Kikohozi** 3. Kuharisha 4. Maambukizi makali ya njia ya hewa 96. Nyingine (Taja) _____ **Majibu mengi yanawezekana**	Je, ulitafuta matibabu (JINA) alipokuwa mgonjwa? 1. Ndiyo 0. Hapana	Ulitafuta matibabu wapi? 1. Vituo vya afya ya msingi 2. Zahanati 3. Hospitali 4. Duka la dawa/kemia 5. Viongozi wa dini 6. Ndugu/rafiki 96. Wengine (Taja)
1					
2					
3					
4					
5					
6					

7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					

11.0	**KULISHA MTOTO MCHANGA NA MDOGO MIEZI 6-23 (MASWALI HAYA YANAULIZWA KWA WATOTO WOTE WANAO HAI CHINI YA MIEZI 24)**		
	Jaza moduli hii kwa kila mtoto anayestahiki katika kaya		
Q11_1A	Je, mama wa asili wa [NAME] yupo?	**1. Ndiyo**	**Ikiwa "Hapana" au "Sijui" ruka hadi 11_1E**

		0. Hapana 98. Sijui |_____|	
	Swali kuhusu kulisha mara tu baada ya kuzaliwa (Jumuisha watoto WOTE wa miezi 6-23 wanaoishi)		
Q11_1B	Je, [JINA] aliwahi kunyonyeshwa?	1. Ndiyo 0. Hapana 98. Sijui	I_____I Ikiwa "Hapana" au "Usiruke hadi Q11_1E
Q11_1C	Muda gani baada ya kuzaliwa [JINA] alikuwa wa kwanza kuweka kwenye matiti? 3. Mara moja (ndani ya saa 1 ya kwanza) I__I Saa 4 (saa 1 - chini ya masaa 24) 5. Siku (> masaa 24)		
Q11_1D	**Swali kuhusu unyonyeshaji wa sasa (jumuishe watoto wanaoishi tu)**		

Q11_1D	Je, [JINA] alinyonyeshwa jana mchana au usiku?	1. Ndiyo 0. Hapana 98. Sijui	I____I
Q11_1E	Je, mlezi mkuu wa [NAME] yupo?	1. Ndiyo 0. Hapana 98. Sijui I____I	**Ikiwa "Hapana" au "Sijui" ruka hadi 12.0**
Q11_2	Sasa ningependa kukuuliza kuhusu kimiminika ambacho [JINA] alikuwa nacho jana mchana au usiku. Tafadhali niambie kuhusu vinywaji vyote, kama [JINA] alikuwa navyo nyumbani au mahali pengine. Jana mchana au usiku, [JINA] alikuwa na…? (fuata orodha ya vinywaji)		
Q11_2A	Maji ya kawaida?	1. Ndiyo 0. Hapana 98. Sijui	I____I

Q11_2B	Fomula ya watoto wachanga?	1. Ndiyo 0. Hapana 98. Sijui	I____I Ikiwa "Hapana" au "Sijui" ruka hadi Q11_2C
Q11_2BNUM	Kama "ndiyo": [JINA] alikunywa fomula mara ngapi?	|___|	**Ikiwa 7 au zaidi, rekodi "7"** **Ikiwa idadi ya nyakati haijulikani, rekodi "98"**
Q11_2C	Maziwa kutoka kwa wanyama, kama vile maziwa safi, ya bati au ya unga?	1. Ndiyo 0. Hapana 98. Sijui	I____I **Ikiwa "Hapana" au "Sijui" ruka hadi Q11_2D**
Q11_2CNUM	Kama "ndiyo": [JINA] alikunywa maziwa mara ngapi?	|___|	**Ikiwa 7 au zaidi, rekodi "7"** **Ikiwa idadi ya nyakati haijulikani, rekodi "98"**
Q11_2CSWT	Kama "ndiyo": Je, maziwa au kinywaji chochote cha maziwa kilikuwa tamu au aina ya ladha ya maziwa?	1. Ndiyo 0. Hapana	I____I

		98. Sijui	
Q11_2D	Vinywaji vya mtindi	1. Ndiyo 0. Hapana 98. Sijui	I____I Ikiwa "Hapana" au "Sijui" ruka hadi Q11_2E
Q11_2DNUM	Kama "ndiyo": [JINA] alikunywa mtindi mara ngapi?	|__|	**Ikiwa 7 au zaidi, rekodi "7"** **Ikiwa idadi ya nyakati haijulikani, rekodi "98"**
Q11_2SWT	Kama "ndiyo": Je, mtindi au kinywaji chochote cha mtindi kilikuwa tamu au aina ya kinywaji chenye ladha ya mtindi?	1. Ndiyo 0. Hapana 98. Sijui	I____I
Q11_2E	Vinywaji vyenye ladha ya chokoleti pamoja na zile zilizotengenezwa kwa sharubati au poda?	1. Ndiyo 0. Hapana 98. Sijui	I____I
Q11_2F	Maji ya matunda au vinywaji vyenye ladha ya matunda ikiwa ni pamoja na yale yaliyotengenezwa kutoka kwa syrups au poda?	1. Ndiyo 0. Hapana 98. Sijui	I____I

Q11_2G	Soda, vinywaji vya kimea, vinywaji vya michezo au vinywaji vya kuongeza nguvu?	1. Ndiyo 0. Hapana 98. Sijui	I____I
Q11_2H	Chai, kahawa, au vinywaji vya mitishamba?	1. Ndiyo 0. Hapana 98. Sijui	I____I Ikiwa "Hapana" au "Sijui" ruka hadi Q11_2I
Q11_2HSWT	Kama "ndiyo": Je, kinywaji/ Je, mojawapo ya vinywaji hivi vilitiwa utamu?	1. Ndiyo 0. Hapana 98. Sijui	I____I
Q11_2I	Mchuzi wa wazi au supu ya wazi (mchuzi wa kuku, nyama ya nyama, mchuzi wa mboga, mchuzi wa mfupa)?	1. Ndiyo 0. Hapana 98. Sijui	I____I
Q11_2J	Majimaji mengine yoyote?	1. Ndiyo 0. Hapana 98. Sijui	I____I Ikiwa "Hapana" au "Sijui" ruka hadi Q11_3
Q11_2J_other	Ikiwa "ndiyo": kioevu kilikuwa nini au ni maji gani? Orodhesha kioevu (vi) katika nafasi iliyotolewa		

Q11_2JSWT	Kama "ndiyo": Je, kinywaji hicho kiliongezwa utamu au mojawapo ya vinywaji hivi vilitiwa utamu?	1. Ndiyo 0. Hapana 98. Sijui	I____I

Q11_3	Sasa ningependa kukuuliza kuhusu kila kitu ambacho [JINA] alikula jana mchana au usiku. Ninavutiwa na vyakula ambavyo mtoto wako alikula iwe nyumbani au mahali pengine. Fikiria ni lini [NAME] aliamka jana. Je, (yeye) alikula chochote wakati huo? Kama "ndiyo" uliza: Tafadhali niambie kila kitu [JINA] alikula wakati huo. Probe: Kitu kingine chochote? Rekodi majibu kwa kutumia vikundi vya vyakula vilivyo hapa chini. [JINA] alifanya nini baada ya hapo? Je, alikula chochote wakati huo? Rudia mfululizo huu wa maswali, ukirekodi katika vikundi vya chakula, hadi mhojiwa atakapokuambia kuwa mtoto aliamka asubuhi ya leo. Ikiwa sahani iliyochanganywa imetajwa: Chunguza: Je, ni viungo gani kuu katika sahani iliyochanganywa? Rekodi majibu katika makundi sahihi ya vyakula 8_3A - 8_3R

113

Q11_3A	Mtindi, zaidi ya vinywaji vya mtindi?	1. Ndiyo 0. Hapana 98. Sijui	I____I Kama "hapana" au "Sijui" ruka hadi Q11_3B
Q11_3ANUM	Kama "ndiyo": [JINA] alikula mtindi mara ngapi?	|___|	**Ikiwa zaidi ya 7, rekodi "7"** **Ikiwa idadi ya nyakati haijulikani, rekodi "98"**
Q11_3B	Uji, mkate, wali, tambi, tambi au vingine ikiwa ni pamoja na vyakula vilivyotengenezwa kwa nafaka kama sahani za wali, sahani za tambi, tosti, wali, pasta ya ngano, , shayiri, mahindi, n.k.?	1. Ndiyo 0. Hapana 98. Sijui	I____I
Q11_3C	Maboga, karoti, pilipili tamu nyekundu, boga au viazi vitamu vyenye njano au chungwa ndani?	1. Ndiyo 0. Hapana 98. Sijui	I____I
Q11_3D	Viazi (rangi zote za ngozi (k.m. nyeupe, njano, bluu, zambarau, nyeusi) na rangi zote za nyama ISIPOKUWA chungwa/njano iliyokolea), viazi vitamu (nyeupe/njano iliyokolea) au mizizi ya wanga inayotumiwa kwa kawaida au mizizi yenye wanga ambayo ina nyeupe au rangi ya	1. Ndiyo 0. Hapana 98. Sijui	I____I

114

	ndani ?		
Q11_3E	Mboga za majani zenye rangi ya kijani kibichi, mboga za majani za kijani kibichi na giza zinazotumiwa kwa kawaida?	1. Ndiyo 0. Hapana 98. Sijui	I____I
Q11_3F	Mboga nyingine yoyote (Artichoke, Asparagus, Parachichi, Maharage, Beets, Brussels sprouts, Kabeji, Cauliflower, Celery, Mahindi (safi, si kavu/unga/ unga) (kijani), Matango, Biringanya, Fennel, Pilipili ya Kijani, Lee kerrat, Saladi, Uyoga, Bamia, Mizeituni, Mbaazi, Radishi, Nyanya, Zucchini)?	1. Ndiyo 0. Hapana 98. Sijui	I____I
Q11_3G	Matunda yenye vitamini A yanayotumiwa kwa wingi (Embe mbivu, mapapai yaliyoiva, Apricot (mbichi na kavu), tikitimaji ya Cantaloupe (yaliyoiva), Matunda ya Passion (yaliyoiva), Pechi (zilizokaushwa), Persimmon (zilizoiva))?	1. Ndiyo 0. Hapana 98. Sijui	I____I

115

Q11_3H	Matunda mengine yoyote (Apple, Banana, Blackberry, Blackberry, Blueberry, Cactus pear, Cherries, Nyama ya Nazi, Cranberry, Tende, Tini, Grapefruit, Zabibu, Guava, Jujube, Kiwi, Limau, Chokaa, Litchi, Mandarin orange, Mango (mbichi), Nectarine, Papai bichi, Chungwa, Pechi, Peari, Nanasi, Plum, Pomegranate, Prune, Strawberry, Sukari, Tamarind, Tangerine, Tikiti maji)?	1. Ndiyo 0. Hapana 98. Sijui	I____I
Q11_3H	Ini, figo, moyo, gizzard au nyama zingine zinazotumiwa kwa kawaida?	1. Ndiyo 0. Hapana 98. Sijui	I____I
Q11_3I	Sausage, mbwa wa moto, ham, bacon, smokies, nyama ya makopo na nyama nyingine za kusindika zinazotumiwa kwa kawaida?	1. Ndiyo 0. Hapana 98. Sijui	I____I
Q11_3J	Nyama nyingine yoyote, kama vile nyama ya ng'ombe, nguruwe, kondoo, mbuzi, kuku, bata, bata mzinga, njiwa, sungura, au nyama nyingine inayotumiwa sana?	1. Ndiyo 0. Hapana 98. Sijui	I____I

Q11_3K	Mayai? (Kuku, Bata, ndege wa Guinea, mayai ya Kware)?	1. Ndiyo 0. Hapana 98. Sijui	I____I
Q11_3L	Samaki wabichi, waliogandishwa, waliokaushwa au samaki wa moshi, Samaki wa makopo (anchovi, tuna na dagaa), Nguruwe, kome, oysters na kokwa, Shrimp, kamba, kamba na kaa, urchins baharini, pweza, ngisi na ngisi, samakigamba?	1. Ndiyo 0. Hapana 98. Sijui	I____I
Q11_3M	Maharage, mbaazi, dengu, karanga, mbegu au vyakula vinavyotumiwa kwa wingi kutoka kwa maharagwe, njegere, dengu, maharagwe ya lima, lupin, njugu au mbegu?	1. Ndiyo 0. Hapana 98. Sijui	I____I
Q11_3N	Jibini ngumu au laini kama vile, Gouda, Uswisi, Jibini la Cream, Feta, Mozzarella safi?	1. Ndiyo 0. Hapana 98. Sijui	I____I

Q11_3O	Vyakula vitamu vya Sentinel: kama vile chokoleti, caramels, peremende, keki, keki, biskuti, baklava, matunda "gummies" au chipsi zilizogandishwa kama vile aiskrimu na popsicles, au vyakula vingine vitamu vinavyotumiwa sana?	1. Ndiyo 0. Hapana 98. Sijui	I____I
Q11_3Q	Sentinel vyakula vya kukaanga na chumvi: Chips, crisps, puffs, french fries, unga wa kukaanga, noodles za papo hapo au vyakula vingine vya kawaida vya sentinel kukaanga na chumvi?	1. Ndiyo 0. Hapana 98. Sijui	I____I
Q11_3R	Vyakula vingine vigumu, nusu-imara au laini? Orodhesha vyakula vingine vyote vigumu, nusu-imara au laini ambavyo haviendani makundi ya vyakula [Imetajwa Hapo juu]		

		Kwa kila kikundi cha chakula ambacho hakijatajwa baada ya kumaliza *hapo juu, uliza:* *Ili tu kuhakikisha, je, [NAME] alikula [VITU VYA KUNDI LA CHAKULA]* *jana mchana au usiku?*
ANGALIA	ANGALIA 11_3A hadi 11_3R. Ikiwa si "ndiyo" moja iliyorekodiwa ruka hadi 12.0	
Q11_4	Je, ni mara ngapi jana [JINA] alikula chakula kigumu, kigumu au laini wakati wa mchana au usiku?	Idadi ya nyakati	I____I **Ikiwa mara 7 au zaidi, rekodi "7".** **Ikiwa idadi ya nyakati haijulikani, rekodi "98"**

	MWISHO WA MAHOJIANO		
12.0	Asante mhojiwa kwa muda wao na kumaliza mahojiano. Kagua fomu ili kuhakikisha kuwa taarifa zote zinazohitajika zimenaswa na ujaze fomu ya udhibiti wa nguzo		
Q12_1	Nini matokeo ya utafiti	1. Imekamilika 2. Haijakamilika	I____I
Q12_1a	Ikiwa haijakamilika, onyesha sababu	_____	
13.0	**Uthibitishaji wa Hojaji**		
	Team Leader Name _____	*Signature:* _____	*Date:* _____
	Supervisor Name _____	*Signature:* _____	*Date:* _____

APPENDIX V: DISTRIBUTION OF PARTICIPANTS BY VILLAGES

Table 15:Distribution of participants by villages

Variable	Category	Frequency (n)	Percent (%)
Village name	Gatwekera	75	14.7
	Kisumu ndogo	15	2.9
	Kenyatta	11	2.2
	Kianda	15	2.9
	Kichinjio	16	3.1
	Laini Saba	105	20.5
	Lindi	91	17.8
	Makina	30	5.9
	Makongeni	15	2.9
	Mashimoni	15	2.9
	Raila	19	3.7
	Sarang'ombe	45	8.8

Table 16: Clustering of population size by villages

Geographical Unit (Villages)	Population Size	Resulting Clusters (As generated by the ENA software)
Gatekwera	24263	1,2,3,4,5
Laini Saba	29605	6,7,8,9,10,11
Makina	13982	12
Kenyatta	9405	13,14
Lindi	35618	15,16, 17,18,19,20
Kisumu Ndogo	3000	21
Olympic/Kianda	14601	22,23
Raila	5155	24
Makongeni	4411	25
Mashimoni	6544	26
Sarang'ombe	15303	27,28
Siranga	10152	29,30
Kichinjio	4000	31
Soweto	9738	32,33

APPENDIX VI: WORKPLAN

ACTIVITY	Nov 2020	Jan 2021- December 2021	J	F	M	A	M	J	J	A	S	O	N	D
Concept development and defense	■													
Proposal development		■												
Review of the proposal by the ethics board			■	■	■	■								
Piloting and data collection						■	■							
Data cleaning and analysis							■							
Paper development, Thesis development &Publication								■	■	■	■			

APPENDIX VII: BUDGET

Item	Number of items	Cost per Item (Kshs)	Total (Kshs)
Questionnaire	400	50	20000
STATA software	1	12,000	12,000
Printing and binding of proposal	6	550	3,300
Printing and binding of thesis	6	1000	6,000
Publication cost	1	20,000	20,000
Travel cost	10	1500	15,000
Remuneration for Research Assistants	3	45000	45,000
Stationary			3,000
TOTAL			**124,300**

APPENDIX VIII: ETHICS APPROVAL LETTER

UNIVERSITY OF NAIROBI
FACULTY OF HEALTH SCIENCES
P O BOX 19676 Code 00202
Telegrams: varsity
Tel:(254-020) 2726300 Ext 44355

KNH-UON ERC
Email: uonknh_erc@uonbi.ac.ke
Website: http://www.erc.uonbi.ac.ke
Facebook: https://www.facebook.com/uonknh.erc
Twitter: @UONKNH_ERC https://twitter.com/UONKNH_ERC

KENYATTA NATIONAL HOSPITAL
P O BOX 20723 Code 00202
Tel: 726300-9
Fax: 725272
Telegrams: MEDSUP, Nairobi

25th May, 2022

Ref: KNH-ERC/A/201

Lucy Akoritsa Mulama
Reg. No. H57/87632/2016
Dept. of Public and Global Health
Faculty of Health Sciences
University of Nairobi

Dear Lucy,

RESEARCH PROPOSAL: NUTRITIONAL STATUS OF CHILDREN UNDER FIVE YEARS IN KIBERA INFORMAL SETTLEMENT IN NAIROBI, KENYA DURING THE CORONA VIRUS DISEASES-19 PANDEMIC   (P12/01/2022)

This is to inform you that KNH-UoN ERC has reviewed and approved your above research proposal. Your application approval number is **P12/01/2022**. The approval period is 25th May 2022– 24th May 2023.

This approval is subject to compliance with the following requirements;

i.   Only approved documents including (informed consents, study instruments, MTA) will be used.
ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by KNH-UoN ERC.
iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to KNH-UoN ERC 72 hours of notification.
iv. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to KNH-UoN ERC within 72 hours.
v.   Clearance for export of biological specimens must be obtained from relevant institutions.
vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
vii. Submission of an executive summary report within 90 days upon completion of the study to KNH-UoN ERC.

Protect to discover

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) https://research-portal.nacosti.go.ke and also obtain other clearances needed.

Yours sincerely,

DR. BEATRICE K.M. AMUGUNE
SECRETARY, KNH-UoN ERC

c.c.   The Dean, Faculty of Health Sciences, UoN
         The Senior Director, CS, KNH
         The Chairperson, KNH- UoN ERC
         The Assistant Director, Health Information, KNH
         The Chair, Dept. of Public and Global Health, UoN
         Supervisors: Dr. Rose Opiyo, Dept. of Public and Global Health, UoN

APPENDIX VIII: NACOSTI PERMIT

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION.

Ref No: **422047**

Date of Issue: **22/June/2022**

RESEARCH LICENSE

This is to Certify that Miss.. **Lucy Akoritsa Mulama** of University of Nairobi, has been licensed to conduct research in Nairobi on the topic: **NUTRITION STATUS OF CHILDREN UNDER FIVE YEARS IN KIBERA INFORMAL SETTLEMENT IN NAIROBI, KENYA, DURING THE CORONA VIRUS DISEASE-19 PANDEMIC** for the period ending : **22/June/2023.**

License No: **NACOSTI/P/22/18136**

422047

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

THE SCIENCE, TECHNOLOGY AND INNOVATION ACT, 2013

The Grant of Research Licenses is Guided by the Science, Technology and Innovation (Research Licensing) Regulations, 2014

CONDITIONS

1. The License is valid for the proposed research, location and specified period
2. The License any rights thereunder are non-transferable
3. The Licensee shall inform the relevant County Director of Education, County Commissioner and County Governor before commencement of the research
4. Excavation, filming and collection of specimens are subject to further necessary clearence from relevant Government Agencies
5. The License does not give authority to tranfer research materials
6. NACOSTI may monitor and evaluate the licensed research project
7. The Licensee shall submit one hard copy and upload a soft copy of their final report (thesis) within one year of completion of the research
8. NACOSTI reserves the right to modify the conditions of the License including cancellation without prior notice

Roy 28/11/2023.

Turnitin *Originality Report*

- Processed on: 07-Nov-2023 07:58 EAT
- ID: 2220276667
- Word Count: 15742
- Submitted: 1

NUTRITION STATUS OF CHILDREN UNDER FIVE YEARS... *By Lucy Akoritsa*

Similarity Index

9%

Similarity by Source

Internet Sources:

7%

Publications:

4%

Student Papers:

3%

mode:

1% match (Internet from 17-Jan-2023)

http://erepository.uonbi.ac.ke

<1% match (Internet from 10-Nov-2022)

http://erepository.uonbi.ac.ke

<1% match (Internet from 14-Dec-2022)

http://erepository.uonbi.ac.ke

<1% match (Internet from 16-Jan-2023)

http://erepository.uonbi.ac.ke

<1% match (Internet from 15-Feb-2023)

https://www.researchgate.net/publication/337067796_Determinants_of_nutritional_status_a
mong_children_under_age_5_in_Ethiopia_further_analysis_of_the_2016_Ethiopia_demograph
ic_and_health_survey

<1% match (Internet from 12-Feb-2023)