EFFECTS OF HOUSEHOLD FOOD EXPENDITURE ON NUTRITIONAL STATUS AMONG CHILDREN AGED 6-23 MONTHS IN VIHIGA COUNTY, KENYA

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A RESEARCH PROJECT SUBMITTED TO THE DEPARTMENT OF ECONOMICS, POPULATION AND DEVELOPMENT STUDIES FOR THE PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF MASTER OF SCIENCE IN HEALTH ECONOMICS & POLICY OF ECONOMICS DEGREE OF UNIVERSITY OF NAIROBI

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DECLARATION

This is to declare that this research project is my original work independently done. I can confirm that it has not been submitted to any college or university for any award of a diploma or degree.

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Date: 24th November 2022 **Registration number: X53/36069/2019**

This is to confirm that this research project has been submitted to the University of Nairobi for examinations with my approval as the University supervisor.

Sign:  Date: 24/11/2022

Dr Martine Oleche

DEDICATION

I dedicate this work to my family that has shown so much belief and support. It has not been easy being away and detached as I pursued this course.

ACKNOWLEDGEMENT

Firstly, I want to thank Dr. Martine Oleche for giving me the chance to work on this project, providing valuable guidance and feedback, and challenging me to grow as a health policy researcher. He challenged me to think about local problems and how I can help policy makers hence the decision to look at the effect of house hold expenditure on nutritional status of children 6-23 months of age in my county of birth Vihiga. To my colleague at The Palladium Development Group Mrs. Joyce Nyaboga who inspired me to take this course, I will always be indebted to you. To the entire Vihiga County health management team, led by Mr. Polycarp Opiyo, I will forever be grateful for your support as I practiced Health Policy and planning skills in the department of health. Lastly, I would like to thank God almighty for bringing me this far to be able to graduate

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ABBREVIATIONS AND ACRONYMS

CNAP	Nutrition Action Plan
KDHS	Kenya Demographic and Household Survey
KIHBS	Kenya Integrated Household Budget Survey
KNBS	Kenya national bureau of statistics
SD	Standard deviation
SDGs	Sustainable Development Goals
SSA	Sub-Saharan Africa
WHO	World Health Organization

ABSTRACT

The children nutritional status in Kenya has not significantly improved over the past ten years, according to data on malnutrition. Nearly three-quarters of the 1.8 million children under five across the counties who are chronically undernourished are in the age range of 6-23 months. Even though Kenya has made efforts to combat malnutrition through a variety of means, the objective of reducing child malnutrition at the county level, including in Vihiga County, is still far from being achieved in light of rising food prices and a sizable portion of the population in the county living in poverty. The purpose of this research was to ascertain the effects of household food expenditure on nutritional status among children aged 6–23 months in Vihiga County, Kenya. Specific objectives included; to determine the patterns of household food expenditure as well as nutritional status amongst children aged 6-23 months in the rural and urban areas of Vihiga County, and to examine the effects of household food expenditure on nutritional status among children from the age of 6–23 months in rural and urban areas of Vihiga County. The study used probit estimation technique to examine the main objective of the research. This study made use of data from the 2015-16 Kenya Integrated Household Budget Survey (KIHBS). From the findings, a percentage of 31.4 percent of children were stunted. A higher proportion (18.5%) of children 6-23 months in the rural areas were stunted compared to those in urban areas (12.9%). Most of the children 6-23 months in rural areas (13.7%) were moderately stunted compared to children in urban areas (10.9%). The proportion of the children 6-23 months who were severely stunted in rural and urban areas were 4.8% and 2.0%, correspondingly. From estimation, the study revealed that household food expenditure significantly had a negative effect to probability of a child aged 6-23 months being stunted. Mother's age, vaccination status, household expenditure, education levels (primary, secondary and higher), socioeconomic status (poorer, middle, richer, richest), employment status had a negative effect, hence welfare enhancing. On the other hand, distance to the nearest health facility and household size were found to be significant with a positive effect, leading to increased undernourishment among children aged 6-23 months in Vihiga County. Based on the study findings, the study generally recommends for an integrated approach for policy by the government to provide government price subsidy on food to reduce the food budget share. The findings suggest that a shift in food prices has a higher effect on the poor's actual purchasing power. This could potentially increase household welfare in terms of healthcare and education, in addition to providing food for homes, particularly the poor. Further the policy shift is required to increases child involvement in growth monitoring clinics, women's education up to a minimum of secondary level, and increased immunization among children aged 6-23 months.

CHAPTER ONE: INTRODUCTION

1.1 Background of the study

Chronic childhood malnutrition is one of the world's most intractable public health crises. Mistakes in eating might contribute to low body weight. Most families, especially in low-income countries, still have trouble meeting the nutritional needs of their children through supplemental foods and loving actions (UNICEF & WHO, 2020). A third of malnutrition can be traced back to poor eating habits, and this number rises or falls depending on factors including population size, geographic location, time of year, and even infectious diseases and food scarcity. In addition, some 6% of under-five deaths, especially in poor countries, can be prevented with the help of supplemental feeding, making a significant impact on the Millennium Development Goal of reducing child mortality. The WHO created eight basic Infant and Young Child Feeding (IYCF) indicators to monitor and guide the feeding behaviors of newborn children. These include exclusive lactation during the first six months, continuing nursing for a full year, the adoption of solid, semi-solid, or soft meals, low dietary variety, least meal frequency, minimum permissible diet, and iron-rich or iron-fortified food intake.

Children have rights to access a safe diet, adequate nutrition and fulfillment which is essential in attaining the highest-level standard of health. Children aged between 6-23 months are usually at a very critical window period. During this time, the nutrition of the child is of essence for ensuring advancement of optimal growth, cognitive development and health (De Onis & Branca, 2016). The nutritional status for children below five years at household level has been used globally to assess well-being and health of the whole population. This is mainly because of the children’s vulnerability to environment and dietary changes. Nutritional deficiencies are commonly associated with malnutrition which reflects poor social and economic development. Isanaka et al. (2019) noted that malnutrition is associated with high-cost care, morbidity, and

mortality. Adverse effects of childhood malnutrition consist of delayed cognitive, physical development and prone to diseases, an impact that may last a lifetime (De Onis & Branca, 2016; UNICEF & WHO, 2020).

Malnutrition among children below-five years is increasingly becoming a global health challenge. A higher concentration has been noted for low- and middle- earning income nations, in this case at least 1/3 of children are not well fed. (Akombi et al., 2017; Mohamed, Leng & Vanoh, 2021). According to the World Health Organization (2020) report, about 7.7% of children globally were wasted, 15% were underweight, and 24.5% were stunted (WHO, 2020). Sub-Saharan Africa (SSA), according to the report, accounted for one 1/3 of undernourished children in the world. The prevalence rate of malnutrition has been highest in Eastern Africa and Western Africa countries contrasting to the Millennium development target for 2015 (Akombi et al., 2017).

According to Mkhize and Sibanda (2020), the nutritive wellbeing of children below 5 is affected by little household earning, food insecurity, lack of enough dietetic intake, lack of knowledge from caretakers, unemployment, eating of monotonous meals, poor caregivers' dietary information, and no access to clean water and sanitation. In India, undernutrition continues to be a significant health concern despite several nutrition intervention programs being put in place. The prevalence of under-nutrition was observed to be higher at 32%, 32% and 25% for underweight, stunting, and feebleness, in that order (Meshram et al., 2019). This was attributed to antenatal, perinatal, and infant feeding practices. Furthermore, children of illiterate mothers and from households of low socio-economic status were much linked with undernutrition.

Poverty and low income are one of the major underlying factors hindering access to adequate food security and acquiring sufficient resources among households with low income. In Sub-Sahara Africa (SSA), one of the significant factors related with food insecurity and starvation

among the people is undoubtedly income (Giller et al., 2021). Poverty and food insecurity are correlated, and they result to malnutrition. In South Africa, a quarter of the households reported running out of money to purchase food items or experiencing food insecurity in 2018, having major implications for a child's nutritional status (Drysdale, Bob & Moshabela, 2021). In 2016, about 27% of South African children aged 5 years and below were stunted, which is higher than the 25% average in developing countries. Ntila et al. (2017) noted that a household income that is low encourages the purchase of food products that are cheap and lack enough nutritional value. As a result, this had negative consequences on the dietary value of children in South Africa.

The food insecurity prevalence in households, even in its mild forms, usually indicates that food expenditure is affected. In addition, food choices are only limited to options which are affordable regardless of whether the option is able to supply the required and adequate nutrients for wellbeing. Eyinla (2021), noted that the low socioeconomic status of most households in Nigeria leads to a reduction of household purchasing power for food related expenditure. Further, low education level is another factor that may hinder wealth creation hence impacting on household food expenditure. The nutritional status of children included 27.4 % who were stunted compared to 1.8 % of the wasting category.

It has been demonstrated that maternal employment may play a significant role in enhancing child nutrition and health. Nankinga, Kwagala and Walakira (2019) found out that children who had better nutritional results with less odds of stunting were from mothers who engaged in professional, managerial, and technical work compared with other occupation categories. This is attributable to women having more access to income that enhance not only their monetary well-being and autonomy but also are a significant contributor to their children's nutrition.

In Kenya, Ndemwa et al. (2017) revealed that the ratio of malnutrition amongst children under 24 months was quite high: stunting being 29%, underweight at 20.8% and wasting being 19%.

The stunting degree was more than the national mean of 26 percent for children below five (KNBS 2015). The predictor factors included mothers' literacy level, which was proportionally linked to underweight among children, whereas the mother's employment was not statistically significant. Other factors influencing the nutritional status of children include their mother's age, household size, dietary diversity, and morbidity (Cherop, 2017). However, there is an existing gap in knowledge of an unreported link linking household food expenditure and nutritional status amongst children from the age of 6–23 months. Therefore, this research targets to contribute to the existing literature for the household results concerning food expenditure on nutritional status among children aged 6-23 months in Vihiga County, Kenya.

1.2 Statement of the Problem

As envisioned in Sustainable Development Goals (SDGs), improving nutrition meant bringing to an end all kinds of malnutrition such as decreasing stunting and deterioration by 2025 amongst children below 5 years as agreed internationally (United Nations, 2022). All countries, therefore, must take immediate action in order to meet Goal 2 of SDG, which calls for the abolition of all kinds of malnourishment by 2030. Child malnutrition still is a major world public health concern despite existing interventions.

According to UNICEF, approximately 239,446 children agonize from moderate acute starvation, while another 2600 children suffer from severe acute starvation. On the other hand, approximately 35,000 mortalities among children aged 5 and bellow in Kenya each year, are due to chronic malnutrition (Fanzo et al., 2019). Consequently, malnutrition in Vihiga County remains a severe public health problem. According to KDHS (2014) report, the frequency of growing weak amongst children aged below 5 years in Vihiga is 2.6%, stunting is 28.4%, and 14.8% for underweight. In comparison to the national figure, 4% of children under the age of 5 years are wasted, while 26% are stunted and 11 percent are underweight (KNBS, 2015). The

county government of Vihiga has established a commitment to preventing malnutrition through the development of the Vihiga County Nutrition Action Plan (CNAP) 2019–2023, in the scale-up of nutrition mediations for a period of five years. Despite nutritional initiatives and frameworks put in place, malnutrition still remains a major challenge in Vihiga County, Kenya. Studies done in Kenya have majored on dietary and nutritional assessment and socio-demographic attributes associated with under five children. There is an existing gap, however, on the consequence of family food expenditure on nutritional status amongst children aged 6–23 months in Vihiga County, Kenya. Therefore, the present study seeks to fill this gap.

1.3 Research questions

The research was steered by the following questions.

i. What are the trends in household food expenditure and nutritional status amongst children of ages 6–23 months in rural and urban areas of Vihiga County?
ii. How does family food expenditure affect nutritional status among children aged 6–23 months in Vihiga County?

1.4 Objectives of the Study

The main purpose of the research was to ascertain the effects of household food expenditure on nutritive status among children aged 6–23 months in Vihiga County, Kenya. Specific objectives include:

i. To determine the patterns of household food expenditure and nutritional status amongst children aged 6-23 months in the rural and urban areas of Vihiga county
ii. To establish the effect of household food expenditure on nutritional status among children from the age of 6–23 months in rural and urban areas of Vihiga County.
iii. To develop policy recommendations based on the findings above.

1.5 Significance of the study

Notwithstanding the several initiatives employed by the government to curb the spread of malnutrition, it still remains a challenge, posing questions about the possible factors affecting this spread. The study will identify priority areas that should be targeted that will have the most impact in reducing the prevalence of undernutrition. Thus, policy makers in the health ministry will find this important as they make strategic policies that can be applied to deal with the burden of malnutrition among the children from the age of 6 and 23 months in Vihiga County, Kenya.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

For the drive of implementing efficient and effective food security as well as nutrition policies, it is essential to comprehend the elements that control children's nutritive status; more specifically, the role that is played by the amount of money spent on food by households on the nutrition of children. This chapter gives a selective assessment of the literature on the topic of the relationship between the amount of money spent by households on food and nutritive status of children. It also synthesizes the literature and presents an overview of the same with possible gaps to be filled.

2.2 Theoretical Literature

This research is going to be based on different theories: the model of human capital, the Andersen model of healthcare utilization, and the concept of planned conduct.

2.2.1 Theory of human Capital Model

According to Grossman (1972), health is treated as a durable good and consumption good. It yields productivity from investing in it and yields direct benefits of utility. However, he noted that health as a stock degrades overtime. It is therefore of essence that consumers invest in good health. Some of the investments may include prevention and management of infections. From the model, we can predict that the stock of health may be influenced by socio-demographic attributes. Empirical literature shows malnutrition among children under five years old contributes to higher chances of suffering from other ailments. Other socio-economic factors like family income and high education levels boost healthy days as demand for health increases.

2.2.2 Andersen Healthcare utilization model

Andersen and Newman (1973) model explained that three components determine health utilization. The first component is an individual's predisposing factors, which include social and demographic characteristics including age, literacy levels, sex as well as vaccination status among others. The second component is enabling factors that facilitate usage of services such as family income and wealth. These factors enable an individual to have purchasing power for health services. One's perception or influence on the need to utilize health services is the third component. At an individual level, people assess and evaluate their own general health status. This is in terms of function and symptoms of illness and the need to seek professional health care once sick. At the contextual level, socioeconomic and population factors and also environmental factors were linked to utilizing health services among children, hence lower odds of developing malnutrition.

2.2.3 Theory of planned behavior

A person's health conduct is foreseen by their intent to do an action. In accordance with the theory as developed by Ajzen in 1991, an individual's intention to perform an action (behavioral intention) is foreseen by the individual's attitude toward their conduct as well as subjective customs about the conduct in question. According to Bosnjak, Ajzen and Schmidt (2020), customs that individuals trust can regulate over their behavior are formed due to effect of their social and environmental surroundings as well as their discernment of regulating their own deeds. Positive attitudes and subjective standards, in general, lead to more perceived regulatory and a bigger chance of intentions leading to changes in conduct.

2.3 Empirical Literature

Mutisya et al. (2015) investigated the influence of family food spending on children nutritional status in Kenya for children aged six to sixty months. The study used household food budget share instead of household food spending to represent poverty and income features of households, which the former cannot adequately describe. This research employed the Instrumental Variable (IV) probit technique to analyze the underlying linkages using the KIHBS-2005/2006. Percentage of household food budget and participation in child growth clinics has been discovered to be endogenous. After accounting for endogeneity, the findings indicated that the greater the family food budget share, the greater the likeliness of children being malnourished. As a measure of poverty, it revealed that malnutrition disproportionately impacts the poor, who use bigger portion of their earning on food. The findings also demonstrated that starvation worsens with age. Exclusive breast-feeding minimizes the risk of infant malnutrition, as does participation in a child growth monitoring clinic. Secondary education for women helps to minimize malnutrition, and single parenthood, whether by choice or by circumstance (death, divorce, or separation), increases the likelihood of child malnutrition**.**

Siddiqui et al (2020) did research on the link between poverty and malnutrition, and the study findings suggested that in spite of social and economic improvement, the world burden of malnutrition remained unacceptably high. There is a critical link between nutritional condition, human capital, and economic position. Malnutrition has an adverse effect on people's physiological and mental capabilities, which reduces production and brands them and their nations as exposed to poverty. Hunger and shortage are interdependent, generating a vicious sequence in which one causes the other. Malnourishment leads to poverty by lowering the demographic economic capability, while poverty fosters malnourishment via insecurity of food.

Thompson et al. (2020) investigated the relationship between the cost of nutritious meals and malnutrition. According to the research, rises in food charges often result in changes in the number and variety of goods bought. This may lead to a reduction in eating food and/or the replacement of more costly foods with less expensive meals, which frequently have a reduced nutritious component. Over time, such changes can have a detrimental impact on nutrition, both in terms of the number of meals taken to maintain energy balance and the quality of foods ingested to maintain adequate intakes of body building foods, lipids, and micronutrients such as protective foods, minerals, and trace elements. Grownups' capacity to work and fight sickness may suffer as a result, and if this scenario becomes widespread and sustained, it may put a damper on the economy. This lowers birth weight, increases the frequency of low-birth-weight newborns, and increase maternal and child death in women of childbearing age. These meals are essential for young children's growth and development. The frequency and cruelty of undernutrition in children, plus stunting, micronutrient shortages, and wasting, may rise, as the number of children fatalities from malnutrition. Higher food prices may almost certainly result in lower spending on vital services (e.g., health care, school fees), which may have both instant and long-term negative impacts on the development of young children.

Lower family income has been consistently connected with lower diet quality. This was analyzed and appraised by the study that was carried out by French et al. (2019) on household income linked to nutritional quality of food purchases. Food purchases by households are an important intervention target that may be used to enhance the quality of diets among people with low incomes. The initiative of this research was to evaluate the connotations between household revenue and the nutritive quality of food that is bought by households. A total of 202 urban families participated in the research regarding food shopping, and over the course of 14 days, their receipts

for food purchases were gathered. The data on purchases was analyzed utilizing NDS-R software, and the results were rated using the Healthy Eating Index 2010. According to the results of the research, families with higher incomes had considerably higher HEI overall scores. According to the findings, when education, marital status, and race are taken into account, it is found that families with lower incomes buy less nutritious meals than households with higher incomes, despite the fact that lower income households have lower levels of schooling and are less probable to be married. It is possible that discrepancies in nutritional intake quality are mediated by socioeconomic patterns of food acquisition.

Poor diets are a significant, preventable risk factor for chronic disorders and obesity. The association between family food consumption at home and food spending habits was examined by Ghazaryan et al. in 2021. The Healthy Eating Index-2015 and its components are used in this study to examine families without and with a participant reporting type 2 diabetes (T2D), obesity, smoking and cardiovascular disease (CVD), in terms of changes in the nutritional quality of family purchase of food. The Purchase-to-Plate Crosswalk and IRI Med Profiler datasets, as well as the 2015 IRI Consumer Network's nationally representative domestic food shopping scanner data, were used in the study. The study's findings showed that limited budgets for food are related with low quality foods, and households with at least one chronically sick member often purchase food of lower quality than is recommended. Puspita- Sari et al. (2020) investigated the impact of food security and household expenditure on status of nutrition in young children and pregnant women. This was an observational research project with a cross-sectional design that took place in Puskesmas Wonosobo, Lampung Province, Indonesia, between May and August of 2020. Anamnesis and a questionnaire were used to evaluate food security status and family food expenditure. The data was gathered and analyzed using the SPSS 21 program. According to the

results of this research, increased food security and family food spending would have an impact on young children's and pregnant women's nutritional status.

2.4 Overview of the Literature

From theoretical review, consumption is a function of predisposing, enabling and need factors. Theories have demonstrated that both demographic, socioeconomic, and environmental factors can determine the health outcomes of an individual. Empirical studies have categorically identified factors related with e nutritional status of an individual. The following factors were related with women's nutritional status: food security, and family food spending (Puspita et al., 2020), families with at least one chronically ill member and low budgets on food (Ghazaryan et al., 2021), demographic and environmental; factors. Studies linking food expenses on child nutritional status in the context of this study were scarce. It is by this account that this research mainly is done to establish the effects of household food expenditure on nutritious status amongst children aged 6–23 months in Vihiga County, Kenya.

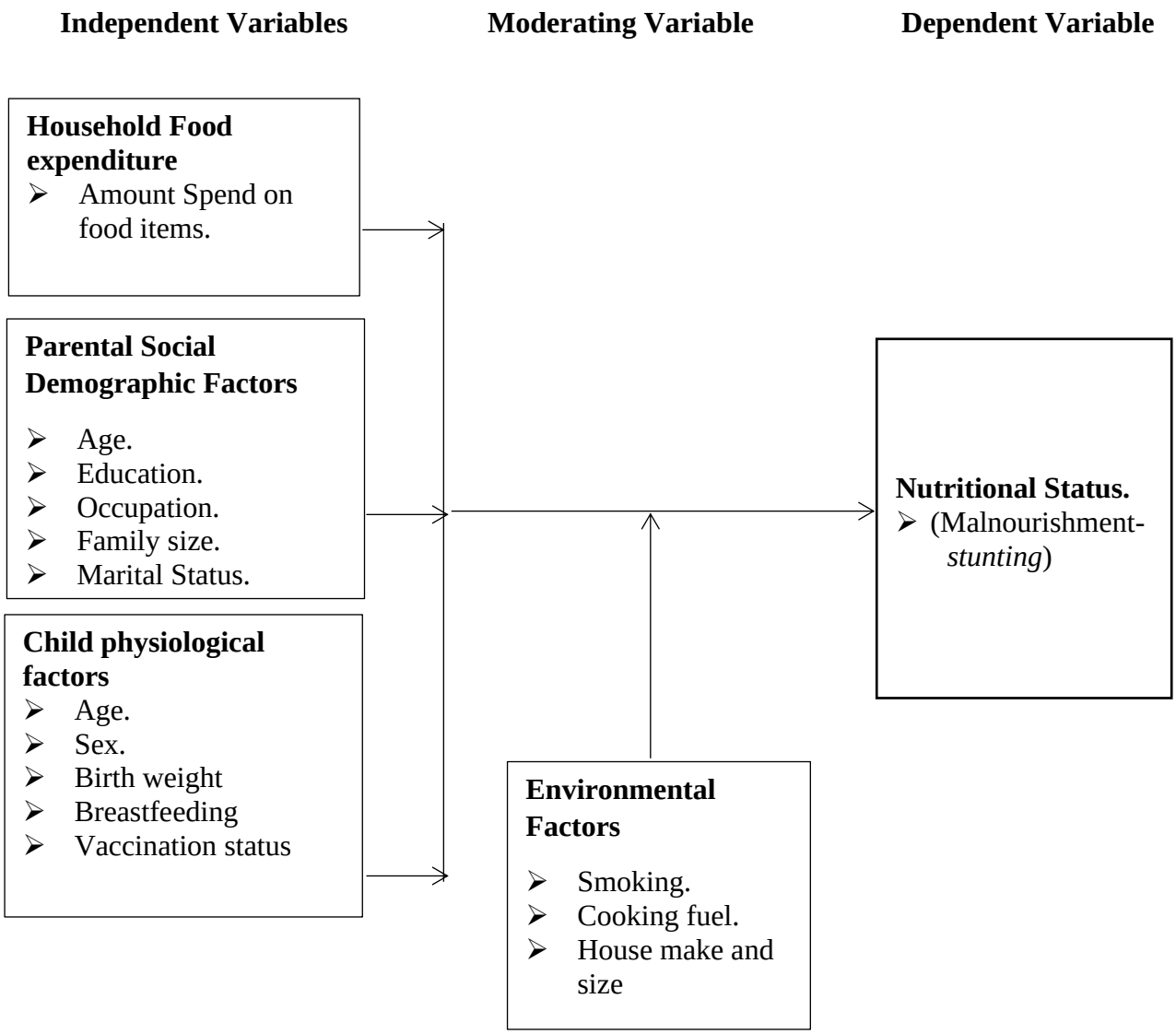
CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the conceptual framework that is utilized to describe the association between various determinants and nutritional status. It describes the model specification and the data source. It also demonstrates the definition, measurement, and sign of the variables.

3.2 Conceptual framework

Malnourishment is the most common cause of children below-5 illness and death. Many socio-cultural, population, and environmental risk aspects incline children to not only malnutrition but also contracting other ailments (Alemayehu et al., 2019). The study's conceptual framework depicts malnourishment and related risk variables. After analyzing the relevant literature, a conceptual framework is as shown below. The dependent variable in this circumstance is undernutrition. The explanatory variables are categorized into three parts. These are; environmental factors (moderating), child physiological factors and parental social demographic factors (control variables). The independent variable of concern is household food expenditure.


Independent Variables
Moderating Variable
Dependent Variable
Household Food expenditure
Amount Spend on food items.
Parental Social Demographic Factors
Age.
Education.
Occupation.
Family size.
Marital Status.
Child physiological factors
Age.
Sex.
Birth weight
Breastfeeding
Vaccination status
Environmental Factors
Smoking.
Cooking fuel.
House make and size
Nutritional Status.
(Malnourishment-stunting)

3.3 Empirical Model

A binary probit model was estimated. This is because the model is more robust than logit and linear probability models (Orayo, 2020). The model makes assumption on normal distribution. The probit model describes the inverse standard normal probability distribution as a linear combination of predictors. This sort of regression is probabilistic, with the dependent variable taking either 0 or 1 as a value.

Following Machio (2018) these models are grounded on the hypothesis that persons have to select amid two alternatives as well as the selection of any of the two is dependent on certain issues. It is presumed that the probability of children between the ages of 6-23 months in Vihiga county being malnourished or not is determined by an underlying response variable.

Observed variable, denoted Y, which may take on the values 0 or 1, and describe the latent variable Y* as follows:

$$Y^* = \beta X_i + \varepsilon \quad \text{………………………………………………………………….i}$$

Where Y* is the dependent variable of being diagnosed with undernutrition or not

Xi are the independent variables that determine undernutrition such as household food expenditure, income(s), age, education level, residence and sex of the child among others.

β are the coefficients to be estimated and, ε is the error term that is normally distributed with N (0,1)

Here, the dependent variable Y can be observed if y>0 which signifies undernutrition, and y=0 which signifies absence, that is;

Yi= 1, if a 6–23-month-old child is malnourished.....ii

0, Otherwise

In order to assess the likelihood that Y=1 given X, then we have the following equation:

Prob (Y = 1/X = Φ(X'β) ……. iii

In this formula, prob stands for probability, for the cumulative standard normal distribution function, and ß for a vector of the parameters that need to be evaluated. Equation (iii) may be seen as a conditional probability that a certain event occurs. The 6–23-month-old child in Vihiga County displays symptoms of malnourishment given household food expenditures and some identified factors Xi. The same model was developed using the likelihood function from where we estimate βˆ that maximizes the log likelihood function.

The research estimated a binary regression model to examine the determinants of undernutrition among 6–23-month-old children in Vihiga County, Kenya. Orayo (2014) argues that estimating the marginal effects in equation (iii) is necessary for making sense of the sign and size of the results. Changes in the likelihood that y = 1 for each unit shift in the independent variable X may be seen in the marginal effects.

Therefore, the estimable model was specified as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \varepsilon$$

Where Y is the undernutrition (stunted), X_1 = Household food expenditure, X_2 = education level of a parent, X_3 = marital status, X_4 = sex of child, X_5 = employment, X_6 = wealth Index, X_7 = residence, X_8 = age of child, X_9 = vaccination status, X_{10} = mother's age, X_{11} = breastfeeding, and ε=error term.

3.4 Definition of Variables

Table 3.1 indicates the variables definition and measurement for both dependent and independent variables under study.

Table 3.1: Definition of the variables and their expected signs

Variable	Definition	Measurements	Expected sign
Dependent Variable			
Nutritional status	Based on height-for-age (stunted)	Dummy variable 1 if stunted, 0 if otherwise	
Independent Variables			
Mother's age	Age in years	Age in complete years	Positive
Age of child	Age in months	Age in complete months	Positive
Sex	Whether male or female	Dummy variable 1 if male 0 if female	Positive
Household food expenditure	Amount in Kenya shillings spent on food	This is continuous variable measures in Kenya shillings	Negative
Breastfeeding practices	Whether child was exclusively breastfed during the first 6 months of life or not	Dummy variable 1 if exclusive breastfeeding 0 if otherwise	Negative
Vaccination status	Whether a child is fully immunized or not	Dummy variable 1 if fully immunized 0 if otherwise	Negative
Marital Status	Whether respondent is married or not	Dummy variable 1 if married 0 if not married	Negative
Educational levels	Levels of education	Dummy variable 1 if no education, 0 otherwise 2 if primary education, 0 otherwise	Negative

		3 if secondary education, 0 otherwise 4 if higher education, 0 otherwise	
Wealth Index	Measure of living standards based on aggregate of household assets	1 if poor, 0 otherwise 2 if middle, 0 otherwise 3 if rich, 0 otherwise	Negative
Distance to the nearest Health center	Distance travelled or covered to the nearby health facility	1 if far,(>5km) 0 if near (<5km)	Positive
Employment Status	Whether family head is employed or not	Dummy variable 1 if employed 0 if otherwise	Negative
Residence	Area of residence whether urban or rural	Dummy variable 1 if rural 0 if urban	Positive
Household size	Number of members in the same household	This is discrete variable measures in numbers	Positive

3.5 Diagnostic Tests

3.5.1 Multicollinearity

Collinearity occurs when the explanatory factors are each associated or related. This suggests that one predictor variable can predict the others. It also generates a big estimate for the regression variables' standard deviation. As a result, even if there is a connection between the response variables and the descriptive variables, the computed regression coefficient would not be statistically significant on its own. This may result in redundant information and further skewing of the regression model's results.

3.5.2 Heteroscedasticity

The term “heteroscedasticity” statistically means a collection of random variables that is non-similarity in the variance of errors for all observations or simply the opposite of homoscedasticity. This may make the estimation of variances unreliable. Scatter plots were used to check for the same and if found robust standard errors are used (Berry et al., 1985).

3.6 Data source

This study made use of data from the 2015-16 Kenya Integrated Household Budget Survey (KIHBS). The KIHBS for 2015/16 is Kenya's eighth such survey, after similar efforts in 1981/82, 1983/84, 1992, 1997, and 2005/06. The primary goal of the 2015–16 KIHBS is to provide a current picture of household spending trends across all of the Counties. There was a total of 5,360 clusters. There are 2,568 people living in urban areas and 2,792 people living in rural areas. The KIHBS 2015/16 sample was chosen from the whole population using a two-stage stratified random sampling technique. A total of 44 clusters were found in the county with the smallest sample size, while 80 clusters were found in the county with the largest sample size. KIHBS 2015/16 has a total national sample size of 23,880 homes, drawn from a total of 2,388 clusters.

The KIHBS for 2015–16 was carried out over a twelve-month period in order to add up-to-date information on a variety of socioeconomic variables needed to track the execution of development projects. The survey gathered information on household traits, general health traits, housing circumstances, education, nutrition, family credit and income, family transfers, information and communication technologies, domestic travel, access to justice and shocks to family welfare. The results are displayed at the national, county, rural and in urban areas.

CHAPTER FOUR: RESULTS AND DISCUSSIONS

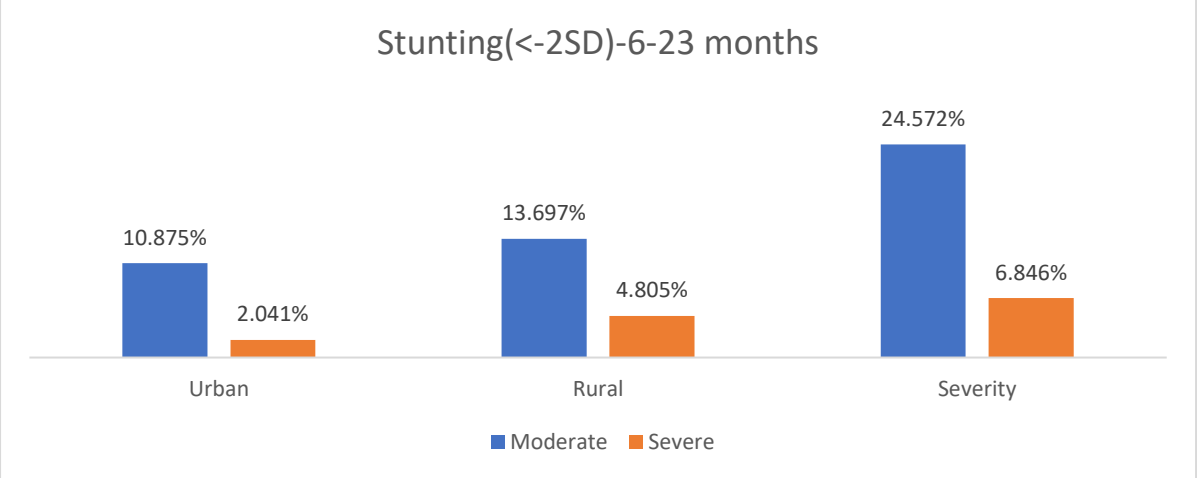
4.1 Introduction

This section presents the research outcomes as well as discussions of the impacts of household food expenditure on nutritional status among children aged 6-23 months in Vihiga County, Kenya. Presentation as well as discussion of descriptive statistics, and empirical findings are presented.

4.2 Trends on nutritional outcomes of children aged 6-23 months old in Vihiga County

Nutrition refers to data on breastfeeding, feeding behaviors, and the health state of children of ages 6-23 months at the time of the survey. In Vihiga county, an average of 31.4 percent of children were stunted (short for their age), according to the statistics on stunting (short for their age). The severity data indicates that at the county level, 24.6% of children were moderately stunted (that is, -2SD) and 6.8% were severely stunted (-3SD). The findings are shown in figure 4.1.

Figure 4.1: Trends in stunting of children aged 6-23 months in urban and rural areas in Vihiga County



A greater percentage of children in rural regions (18.5%) were stunted compared to urban areas (12.9%). Specifically, the majority of rural children (13.7 percent) were moderately stunted

compared to urban children (10.9 percent). The percentage of children severely stunted in urban and rural areas were 2% and 4.8 % respectively.

4.3 General Profiles of Mothers and Children aged 6-23 months in Vihiga County

Table 4.1 shows the mean age of participants was thirty years where the oldest being 85 years and the youngest 15 years. The children mean age was 13 months with the oldest being 23 months old and with the youngest being 6 months. Approximately 52 percent of the children were male. The study showed that 43.36% children were fully immunized, on the breastfeeding status 34.36% of the children were breastfed exclusively during first six months. The mean household expenditure on food, was 5,163 Kenya shillings per month, with the lowest being 3,816 Kenya shillings per month and the highest being 7,356 shillings per month. On marital status, majority of the respondents were married (52 percent). In assessing educational attainment, 3 percent had no education while 71 percent had basic level of education. About 22% had secondary education whereas 3 percent had higher education level.

A review of the economic status demonstrated that many of the population in the sample were found in the second (poorer) and first (poorest) quintiles and these were 34% and 35 % of the respondents respectively. Those in the middle level were at 18% and rich and riches were 10% and 2% in that order. The research showed that only 30% of the respondents were working. In addition, about 65 percent of respondents were residing in rural areas of the county whereas the rest resided in the urban areas. The nearest health centre was 4.08 kilometres on average and ranged between 2 and 14 kilometres.

Table 4.1 further shows that most of the households had 6 members on average where 16 members being the highest number of members in largest household whereas 1 indicated a household with

lower members. Lastly, the study assessed individuals who had exposure to mass media where about 78 percent owned and frequently listened to radio. More details are as shown in table 4.1.

Table 4.1: Descriptive Statistics

Variable	Observation	Mean	Std. Dev.	Min	Max
Mothers Age	452	29.57	10.71	15	85
Age of child	452	13.43	4.862	6	23
Sex (Male=1)	452	.5243	.5000	0	1
Vaccination status	447	.4336	.4524	0	1
Breastfeeding status	433	.3436	.4749	0	1
Household food expenditure	419	5,163	1,870	3,816	7,356
Marital Status	452	.5354	.4221	0	1
Education levels					
No Education	452	.0310	.1734	0	1
Primary	452	.7124	.4532	0	1
Secondary	452	.2235	.4170	0	1
Higher	452	.0332	.1793	0	1
Wealth Index					
Poorest	452	.3429	.4752	0	1
Poorer	452	.3540	.4787	0	1
Middle	452	.1814	.3858	0	1
Richer	452	.0996	.2997	0	1
Richest	452	.0221	.1472	0	1
Employment Status	409	.4326	.4954	0	1
Place of Residence	452	.6540	.3787	0	1
Distance to Nearest Health Facility	438	4.0819	.8983	2	14
Household Size	452	6.0022	2.6550	1	16

Source: Computation Based on KHIBS (2015/16)

4.4 Diagnostic Tests

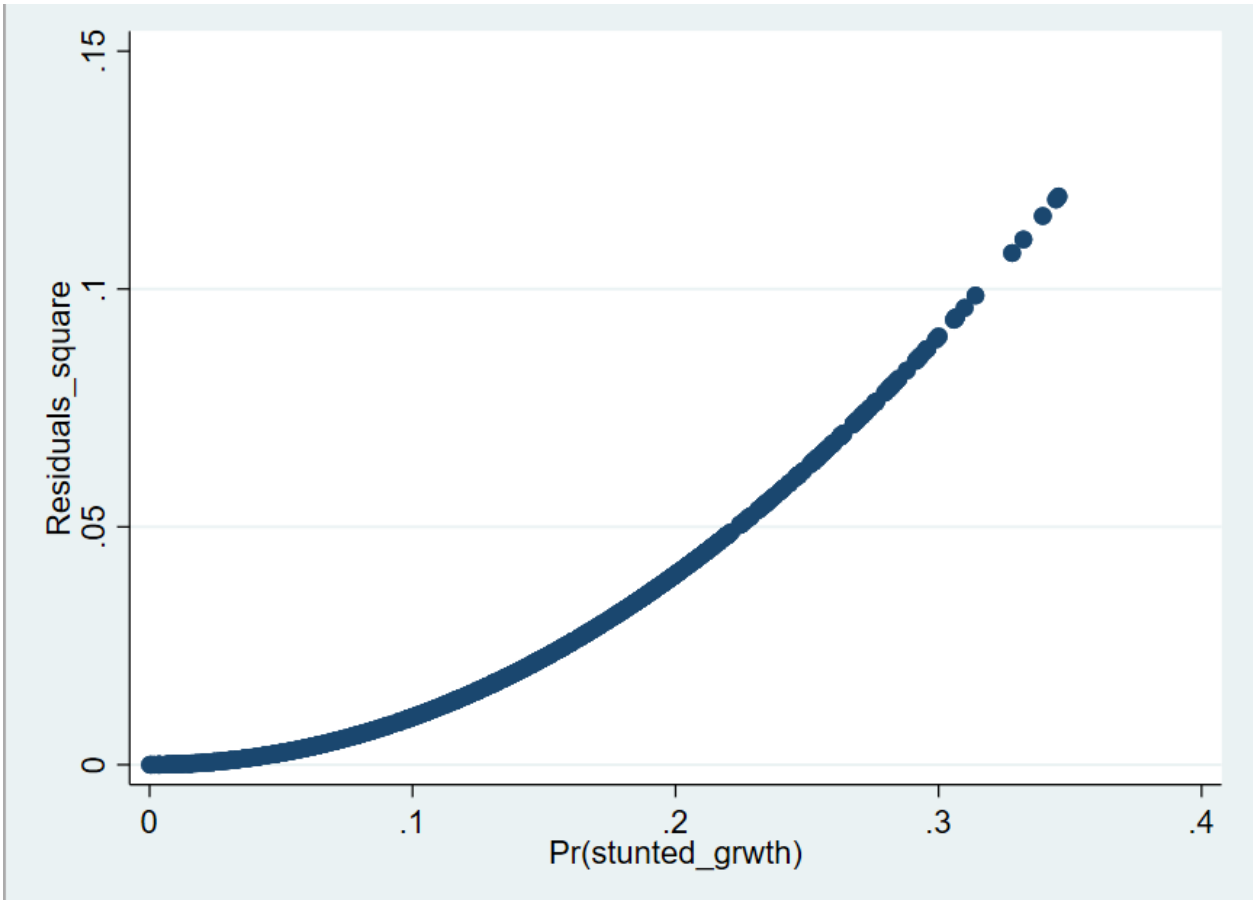
4.4.1 Multicollinearity Test

Appendix 1 presents the results for matrix of correlation as explained in the methodology. Correlation coefficients were assessed where nutritional status correlation coefficient was positively correlated with mother and child's age, breast feeding, household expenditure, vaccination status, marital status and household size. On the other hand, child's gender, education levels, wealth index, employment, residing place and distance to the nearest provider were found to have a negative correlation coefficient with dependent variable which is nutritional status. The positive correlation coefficients imply that, as dependent variable changes positively so are the independent. On the other hand, the negative correlation implies as dependent variable increases (decreases) the independent variable decreases (increases) In conclusion, it can be observed, the coefficients of correlation were less than |0.5| meaning multicollinearity was absent.

4.4.2 Heteroscedastic Test

In order to determine heteroscedasticity, residual plots were used. If homoscedasticity exists, there should be no regular pattern between the variables when they are plotted. The findings are as shown in Figure 4.2.

Figure 4.2: Heteroscedasticity Test



4.5 Estimation (Household Food Expenditure and Nutritional Status)

In the subsequent objective, the research was intended to investigate the impact of household food expenditure on nutritional status among children from the age of 6-23 months in rural and urban areas of Vihiga County. In estimation Probit regression model was used. The study considered marginal effects of variables for interpretation purposes. From the estimated model, the overall p-value was less than 5% level of significance (Prob > ichi2=0.0000) implying that food expenditure and other control variable identified (both enabling, predisposing and need factors) significantly explained the response variable (nutritional status among children aged 6-23 months in Vihiga County, Kenya). Further, the pseudo R2 of 27% indicates the proportion or percent the food

expenditures and other variables that explain the dependent variable (nutritional status). The outcomes for average marginal effect(s) are as shown in table 4.2.

Table 4.2: Marginal effects (Nutritional status model)

Probit regression
Number of obs = 393
Wald chi2(18) = 242.32
Prob > chi2 = 0.0000
Log pseudo-likelihood = -1511.1174
Pseudo R2 = 0.2703

Nutritional Status	Marginal effects	Robust Std. Err.	t	P>t	[95% Conf. Interval]	
Mother's Age	-.0120582**	.0060311	-2.00	0.046	-.023879	-.0002375
Age of child (months)	-.0121363	.0118649	-1.02	0.036	-.0353912	.0111186
Sex	.0006019	.0246928	0.02	0.981	-.047795	.0489988
Vaccination status	-.0814594**	.0172379	-4.73	0.000	-.115245	-.0476738
Breastfeeding status	-.0118071	.0194595	0.61	0.044	-.0263328	.0499469
Household food expenditure	.-1940021**	0.016234	-11.98	0.000	-.2257037	-.1623423
Marital Status	-.0131002	.0130164	-1.01	0.314	-.038612	.0124116
Education levels						
Primary	-.0856105**	.0195504	--4.38	0.000	-.1239286	-.0472925
Secondary	-.0977826**	.0226865	-4.31	0.000	-.1422474	.-0533179
Higher	.-0956041**	.0310801	-3.08	0.002	-.15652	-.0346882
Wealth Index						
Poorer	-.0254761	.0144503	-1.76	0.078	-.0537982	.0028461
Middle	-.0814594**	.0172379	-4.73	0.000	-.115245	-.0476738
Richer	-.0898854**	.0180255	-4.99	0.000	-.1252148	-.054556
Richest	-.1199587**	.021226	-5.65	0.000	-.1615609	-.0783565
Employment	-.1023269**	.0114716	-8.92	0.000	-.1248109	-.079843
Place of Residence	.0107156	.0118406	0.90	0.365	-.0124916	.0339228
Distance	.0289915**	.011859	2.44	0.014	.0057484	.0522346
Household Size	.0460483**	.0203922	2.26	0.024	-.0860163	-.0060803

(**) Significant at 5% level

The outcomes in Table 4.2, indicates the marginal effects computed from the probity model. The coefficient on mother's age (β= -0.0120582, p =0.046) was found to be negative and statistically

significant at 5 percent level. This implies that an increase in the respondent's age decreased the nutritional status (stunting) of a child by 1.21%. This implies that a year increase in the age of the mother enhances a well-nourished child. The on-child's age coefficient (β= -0.0121363, p =0.036) was found to be negative and statistically significant at 5% level. This means that the age increase of a child decreases the probability of child's nutritional status (stunting) by 1.21%. The coefficient of child's gender was positive and not statistically significant (β=.0006019, p =0.981). The findings show that the probability of a child who was a male having a stunted nutritional status, was increased by 0.06 percent.

The coefficient on breastfeeding status (β= -0. 0118071, p =0. 0.044) was revealed to be inverse and at 5% level of significance. This implies efficacy and positive effect of breastfeeding children between 6-23 months in reducing nutritional status which is stunting by 1.18%. The coefficient on household expenditure (β= -0.1940021, p =0.000) was negative and at 5% level significant statistically. This implies that increase in the household expenditure by a shilling of the respondent, decreases the probability of child's nutritional status; stunting by 19.4%. On vaccination status, the coefficient ((β= -.0814594, p =0.000) was found to be negative and at 5% level statistically significant. This implies efficacy and positive effect of immunizations in children between 6-23 months in reducing nutritional status such as stunting by 8.15 percent.

On the basis of educational attainment, moms with elementary, high school, and postsecondary education were related to those without education. The elementary education coefficient was -0.0856105 with a p-value of 0.000, showing that participants with a basic education were more likely to maintain a healthy nutritional outcomes. This indicates that the likelihood of a child's nutritional condition being stunted dropped by 8.56 percent relative to those with no formal education with a p value of 0.000, the coefficient for secondary education was -0.0977826. This

shows that respondents who completed high school were more likely to have a better nutritional status. This made it less likely that a child's growth would be stunted by 9.78%, comparing to those who were not educated. Also, the results showed that the tertiary education coefficient (=-0.0956041, p value=0.002) was inverse as well as significant statistically. This implies that mothers who were reported to have higher level of education had an increased probability of maintaining a higher nutritional status of their children compared to those who had no education. Hence the likelihood of a child developing a nutritional status that is stunted was reduced by 9.56 percent.

The study explored wealth quintiles of individuals who were surveyed. The study used the first wealth group as a starting point. The second wealth quintile had a coefficient of -0.0254761 (p = 0.078), which was not statistically significant. The 3rd wealth quintile coefficient was -0.0815 (p = 0.000), which means that children in the 3rd wealth quintile were more probable to have better nutrition than those in the first wealth quintile. The probability of a child from a 3^{rd} wealth quantile developing a nutritional status which is stunted was reduced by 8.15 percent ceteris paribus. The fourth wealth quintile had a coefficient of -0.0898854 and 5% level significant statistically (p value of 0.000). The findings revealed that a child in the 4^{th} wealth quintile were more probable to have a better nutritional status hence reducing the likelihood of having a nutritional status which is stunted by 8.98 percent compared to those in the first wealth quintile holding other factors constant. Likewise, the fifth wealth quintile coefficient was negative and 5% level significant statistically (*ß* = -0.1199587, p value of 0.000). This indicated that a child from the 5^{th} quintile were 12 percent less likely to have a malnourished status; stunting compared to those in the first socioeconomic level. The results on wealth quintiles generally mean that people who are on higher socioeconomic status have higher likelihood of enhancing a better nutritional welfare in Vihiga County, Kenya.

The results on employment (β= -0.1023269, p value=0.000) was positive and 5% level of significance. The outcomes show that a child from an employed mother reduced the probability of having a poor nutritional status (stunting) significantly by 10.2 percent holding other factors constant. This is expected because a child whose mothers are employed are likely to have an access to better diet and the ability to pay for medical costs compared to a child whose mother is unemployed. The coefficient on place of residence (β= .0107156, p value=0.365) was positive and not at 5% significance level. The outcomes depict that a child from a rural region increased the probability of having a poor nutritional status (stunting) significantly by 1.1% other factors kept constant.

Distance to the nearest health facility coefficient was at 5% negative and significant statistically (β= 0.0289915, p value=0.014). The outcomes depict that an additional Kilometer to the nearest hospital had a positive effect increasing probability on poor nutritional status; stunting of a child by 2.9 percent ceteris paribus. This implies that distances to nearest health facility is an impediment to better nutritional status among the populations of Vihiga County, Kenya.

Lastly, coefficient on household size was positive and 5% level significant statistically (β = 0.0460483, p = 0.024). This means that holding other factors constant, an additional member of a household leads to an increase in nutritional status; stunting at 5% level of significance by 4.6 percent. This implies an increase in household size was likely to a lower nutritional status compared their counterparts. This is because larger households are likely to compete for scarce resources and thus may not afford to consume better diet and pay for medical costs.

4.6 Discussion of the results

From the regression outcomes; age of the respondents who were mothers was found to be negative and significant statistically in establishing nutritional status in Vihiga County, Kenya. This may be

attributed to the fact that older mothers in the society are more experienced and thus more likely to enhance a child's welfare by ensuring a good nutritional status which is not stunted. The study finding complies with that of (Cherop, 2017) who noted that mother's age was significant in determining nutritional status of the child.

The findings reveal that child's age (6 – 23months), were found to be statistically significant and negatively associated with stunted nutritional status. This implies that there is increased probability of children between 6-23 months acquiring better nutritional status in Vihiga County, Kenya. The research outcomes concur with Ndemwa et al. (2017) who revealed that the ratio of malnutrition amongst children under 24 months was quite high, through stunting.

The household coefficient expenditure was found to be negative and significant statistically influencing the nutritional status, meaning an additional household expenditure of the respondent increases the probability of better nutritional status. The study results comply with that of Asinobi, Nweke, and Cole, (2004) on the influence of household food spending on nutritional outcomes of preschoolers in cassava producing areas of Nigeria. They found that the households total food spending rather than household spending on individual food items determined the nutritional status of the preschool children. In addition, Mutisya et al. (2015) who investigated the influence of family food spending on children nutritional status in Kenya for children aged six to sixty months. The study used household food budget share instead of household food spending to represent poverty and income features of households, which the former cannot adequately describe. After accounting for endogeneity, the findings indicated that the greater the family food budget share, the greater the likeliness of children being malnourished. As a measure of poverty, it revealed that malnutrition disproportionately impacts the poor, who use bigger portion of their earning on food. The findings also demonstrated that starvation worsens with age. Exclusive breast-feeding

minimizes the risk of infant malnutrition, as does participation in a child growth monitoring clinic. Secondary education for women helps to minimize malnutrition, and single parenthood, whether by choice or by circumstance (death, divorce, or separation), increases the likelihood of child malnutrition**.**

In addition, the findings show that the probability of a child who was a male having a stunted nutritional status was high. The coefficient was not statistically significant. The findings differ with (Woldeamanuel & Tesfaye 2019) who found out that male child wase statistically significant. However, the data support this study's conclusion that male gender was strongly connected with nutritional status. Previous research has shown that males had a far worse nutritional condition than girls.

The study established that vaccination status of a child was statistically significant influencing nutritional status in Vihiga County, Kenya. It was revealed that, a child who was vaccinated was less likely to get stunted compared to those who were not vaccinated. This implies efficacy and positive effect of immunizations in children between 6-23 months in reducing nutritional status. The study outcomes are in tandem with the research outcomes found by Faye, Fonn, and Levin, (2019) who found that, timely child immunization to be significant factor related with time to recover from stunting within the first 6-23 months of life.

On education accomplishment, the research compared individuals with basic, high school and tertiary education to those individuals without education. The findings show that respondents with basic, secondary and tertiary level of education experienced significantly increased probability of ensuring children had good nutritional status in Vihiga County, Kenya compared to those who were not educated. This may be attributed to the fact that individuals who are educated are more likely to understand the framework for better nutritional status of children. This means education

increases the awareness among mothers of the need to seek better nutrition. It also means that those with education are more likely to have a higher income and therefore able to afford good diet and other costs related to better nutritional status of children. Our findings are similar to those by Eyinla (2021), who noted low education level hindered wealth creation hence impacting on household food expenditure. The nutritional status of children included 27.4 % were stunted compared to 1.8 % of the wasting category. In a related study, French et al. (2019) analyzed and appraised a study on how household income was linked to nutritional quality of food purchases. The initiative of this research was to evaluate the connotations between household revenue and the nutritive quality of food that is bought by households. According to the findings, when education, marital status, and race are taken into account, it is found that families with lower incomes buy less nutritious meals than households with higher incomes, despite the fact that lower income households have lower levels of schooling and are less probable to be married. It is possible that discrepancies in nutritional intake quality are mediated by socioeconomic patterns of food acquisition

Wealth index was used to measure socio-economic status of households. The coefficients of some wealth quintiles or categories were found to have a significant outcome on nutritional status. Specifically, it was shown that individuals in the third, fourth and fifth (middle, rich and richest) wealth quintiles were more likely to experience positive and significant effect on utilization of better nutritional status of their children in Vihiga County, Kenya. These results were in tandem with Ntila et al. (2017), who noted that a household income that is low encourages the purchase of food products that are cheap and lack enough nutritional value leading to stunting as one of major malnutrition status in children under five. Also according to the results of French et al. (2019), families with higher incomes had considerably higher HEI overall scores. According to the findings, when education, marital status, and race are taken into account, it is found that families

with lower incomes buy less nutritious meals than households with higher incomes, despite the fact that lower income households have lower levels of schooling and are less probable to be married. It is possible that discrepancies in nutritional intake quality are mediated by socioeconomic patterns of food acquisition.

The study also revealed that the coefficient on employment significantly increased the utilization of better nutritional status in Vihiga County in Kenya. Like the coefficient of wealth quintiles which were significant, employment is a source of income and supports the acquisition of better nutritional status for children below 5. Some of the better nutritional status is expensive such as good health care and better diet and employed people are more likely to afford reaching them. The finding is similar to (Nankinga, Kwagala and Walakira 2019) who found out that children who had better nutritional results with less odds of stunting were from mothers who engaged in professional, managerial, and technical work compared with other occupation categories.

The results of these research showed that residence was positive and not at 5% statistically significant. The outcomes show that a child from a rural region increased the probability of having a poor nutritional status (stunting) significantly. The studies differ with (Woldeamanuel & Tesfaye 2019) who found out that place of residence to be statistically significant. However, the findings concur with this study in that child born in rural regions had a high probability of being severely stunted. The possible cause may be attributed to lack of healthcare and food insecurity programs in rural areas.

Similarly, how far the hospital is was found to have a statistically significant effect on utilization of better nutritional status. It was found that an additional distance in terms of an extra kilometre led to a decrease in utilization health services which leads to lower nutritional status in Vihiga County, Kenya. The finding was supported by the outcomes of Kimani et al., (2016) who revealed

that distance contributes to lower use of health services. In contrast, Muriithi (2013) who determined of health-seeking behaviour established that distance had a negative significant impact on selection of health services in Nairobi slums.

Lastly the coefficient on household size was indicated to lower the nutritional status in Vihiga County, Kenya. It was shown that having an additional member in a household lead to a negative and significant decrease in utilization of nutritional status in Vihiga County, Kenya. Larger households are likely to compete for scarce resources and thus may not afford to compete for scarce resources and thus may not afford to consume good diet and pay for medical costs. Considering this finding, Kimani et al., (2016) who found that in Pakistan, the association between poverty and size disappears when the size elasticity of the cost of living is included. They discovered that household size had a substantial effect on nutritional outcomes. This is the flexibility suggested by a modified version of the food share approach for establishing scales. In contrast, several indicators of the nutritional health of children suggested an elasticity of unity.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND POLICY RECOMMENDATIONS

5.1 Introduction

The chapter presents summary as well as conclusion with regard to the link between family food spending and children's nutritional health between the ages of 6 and 23 months. As a strategy to close the gap, future policy recommendation and topics for more research are proposed.

5.2 Summary of the study findings

Nutritional deficiencies are commonly associated with malnutrition which reflects poor social and economic development. Malnutrition is associated with high-cost care, morbidity, and mortality. Adverse effects of childhood malnutrition consist of delayed cognitive, physical development and prone to diseases, an impact that may last a lifetime. Additionally, western counties in Kenya including Vihiga county have a high fertility rate and a steadily growing population of children below the age of five. In Vihiga county, budgetary restrictions on households are caused by the high poverty rate. Given the present increase in food prices, malnutrition among the children aged 6-23 months in the county is expected to get double in the near future. The drive of this research was to ascertain the effects of household food expenditure on nutritional status among children aged 6–23 months in Vihiga County, Kenya. Specific objectives include; to determine the patterns of household food expenditure also nutritional status amongst children aged 6-23 months in the rural and urban areas of Vihiga county, and to investigate the effect of household food expenditure on nutritional status among children from the age of 6–23 months in rural and urban areas of Vihiga County. This research was based on the model of human capital, Andersen healthcare utilization model, and the theory of planned conduct.

To attain the study objectives, the research used probit regression model to examine the main purpose of the research was to ascertain the effects of household food expenditure on nutritional outcomes among children aged 6–23 months in Vihiga County, Kenya. This research employed data from the 2015-16 KIHBS. The significance was tested at five percent levels. Dependant variable was nutritional status among children from the age of 6–23 months in rural and urban areas of Vihiga County. Apart from food expenditure, other control determinants considered in this study include; Mother's age, Age of child (months), Sex (male=1), Vaccination status, Breastfeeding status, Marital Status, Education levels (Primary, Secondary and Higher), Socioeconomic status (richest, richer, middle, poorer), Employment status, Place of Residence, Distance and Household Size

5.3 Conclusions

From the study findings relating to stunting, a proportion of 31.4 percent of children were stunted. According to the severity statistics, at the county level, 24.6% of children were moderately stunted (-2SD), and 6.8% were severely stunted (-3SD). Compared to children in urban areas (10.9%), the majority of children in rural regions (13.7%) had mild stunting. On the other hand, the percentage of kids who had severe stunting in rural and urban areas were 4.8 percent and 2.0 percent, respectively.

The study revealed from estimation that household food expenditure significantly had a negative effect to likelihood of a child aged 6-23 months being stunted. The other factors that were significantly linked to well-being of children aged 6-23 months old, they include; mother's age, vaccination status, household expenditure, education levels (primary, secondary and tertiary), socioeconomic status (poorer, middle, richer, richest), employment status had a positive effect. On

the other hand, distance to the nearest health facility and household size were revealed to be significant with a positive impact.

5.4 Policy Recommendations

Kenyan children under the age of one commonly die from malnutrition. Long-term malnutrition can have a cumulative effect on an adult's ability to work, raise their risk of disease, and experience absenteeism from work. Based on the study findings, food expenditure was found to be welfare enhancing among children aged 6-23 months in Vihiga county. The research as a whole suggests an integrated approach for policy that increases child involvement in growth monitoring clinics, women's education up to a minimum of secondary level, optimal exclusive breastfeeding, and government subsidy of food prices to reduce the food budget share.

The study specifically urges the government to allocate funds to start children growth monitoring clinics that include lessons on child nutrition knowledge and to support the initiative by giving extra foods rich in nutrients to kids who are identified as having serious malnutrition issues at a young age. In general, it would be beneficial to provide children (within the first six months of their lives), pregnant women, and nursing mothers nutritional supplements. Furthermore, although the government is pursuing the WHO's (2001) advice that infants should only be breastfed for the first six months of their lives, a preferable strategy would be to encourage community-based promotion initiatives. Long-term, it might be appropriate for workplaces to have a children's corner where working moms can periodically breastfeed their children if they are unable to express milk at work and choose to leave them at home or take a six-month leave.

Additionally, compared to wealthier households, poorer households typically spend a bigger percentage of their overall household budget on food. The findings suggest that a shift in food

prices has a higher effect on the poor's actual purchasing power. According to the results of the food budget share, poverty levels climb as the food budget share rises. Due to their incapacity to switch to cheaper options because they are likely currently using the cheapest food sources, the wellbeing of low-income households is thus likely to deteriorate when food prices rise. To reduce the amount of the money allocated to food, the study suggests that the government subsidize food costs. This increases household welfare in terms of healthcare and education, in addition to providing food for homes, particularly the poor.

Finally, it is imperative that everyone in the county get ongoing health education about baby and small child feeding habits. Additional sporadic campaigns to promote vaccinations and raise awareness. In order to end poverty and increase households' ability to care for their under-five children, empowerment programs are essential. To reduce the distance, more medical facilities are needed.

5.5 Areas for Further Studies

The research has mostly focused at determining the effects of household food expenditure on nutritional status among children aged 6–23 months in Vihiga County, Kenya. The study basically concentrated at child health outcomes that is anthropometric measures. In the future, research can evaluate the effects of household food budget shares. Given that the impacts could be long-lasting, further research should be done on children's nutrition over a longer period of time.

The second step is to examine the results, taking into account data on Kenya's episodes of hunger and utilizing calories as a gauge of young children's nutritional health. The research thus suggests for alike studies focusing exploring child health outcomes (stunting, Wasting and underweight) in

other counties in Kenya for comparison purposes. It also suggests for a use of other different estimation techniques.

It should be noted that Vihiga county is one of the rural counties in Kenya. Experiencing malnutrition in rural areas and in informal settlements can experience very high cases of fatalities or morbidities. The study suggests for more studies focusing at establishing levels of OOP spending in counties as well as evaluate the possible determinants for household spending for better child health outcomes controlling for introduction of national framework on nutrition.

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APPENDICES

Appendix 1: Correlation Matrix

Variables	Nutritional status	Mother's Age	Age of child	Sex	Breastfeeding status	Household expenditure	Vaccination status	Marital status	Education	Wealth index	Employment	Residence	Distance	Household size
Nutritional status	1.0000													
Mother's Age	0.6404	1.0000												
Age of child	0.1367	0.3435	1.0000											
Sex	-0.0767	0.1697	0.0805	1.0000										
Breastfeeding status	0.0838	0.1290	0.0984	0.3443	1.0000									
Household expenditure	0.1062	0.3885	0.1796	0.1157	-0.1193	1.0000								
Vaccination status	0.3965	0.4187	0.1413	0.1597	-0.1659	-0.0222	1.0000							
Marital status	0.2894	0.1965	0.5108	-0.2053	.2973	-0.0584	0.1652	1.0000						
Education	-0.3697	-0.1311	0.1157	0.1210	.2851	-0.0471	-0.1889	-0.2605	1.0000					
Wealth index	-0.1411	0.1228	0.3443	0.2025	.2246	0.1138	-0.2929	-0.0752	0.3398	1.0000				
Employment	-0.2229	-0.2547	-0.2079	-0.2524	.2020	0.1597	0.0182	-0.0163	0.0454	-0.0588	1.0000			
Residence	-0.3004	-0.0044	0.0944	0.1337	.1534	.1453	0.1413	-0.0659	0.3400	0.1405	0.0134	1.0000		
Distance	-0.0138	0.1703	0.1831	0.1548	.0278	.0172	.3212	0.1056	0.2072	0.1234	-0.0522	0.0113	1.0000	
Household size	0.2531	-0.1041	0.3965	-0.3709	-.0062	.0984	.2874	-0.0266	-0.1523	-0.1839	0.1791	-0.1057	-0.0115	1.0000

Source: Computation Based on KHIBS (2015/16)