Exploring the Factors Influencing Undernutrition Among Children Under Five in Tanzania

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ABSTRACT

Undernutrition is common, especially in low-income countries. Tanzania has the highest number of stunted and wasted children. This present study aims to analyze the determinants of undernutrition among children under the age of five in the country. The Tanzania Demographic and Health Survey Data (TDHS) for 2015/16 was utilized in this research, which employed a cross-sectional survey technique. Research employed a binary logit model to analyze the determinants of undernutrition among under five years in Tanzania. Study outcomes shed light on key determinants of undernutrition among under-five children in the nation. Results illustrate that child age, gender, parental maternal education, marital status, access to clean water, and food security emerge as significant factors influencing the prevalence of stunting. Variables including secondary education, university education, parent education, marital status, food security, and access to clean water were associated with child wasting. Results at the same time indicate that child gender (4.15, with a p-value of 0.000), secondary education (Odds Ratio: 4.06, p-value: 0.019), university education of parents (Odds Ratio=4.53, p-value=0.021), and marital status (2.52, with a p-value of 0.039) are significantly associated with child underweight. These findings highlight the nature of undernutrition, necessitating comprehensive and targeted interventions. Addressing these determinants, which promote educational initiatives, enhance water accessibility, and foster food security, is vital to establishing effective tactics for curbing undernutrition among the vulnerable demographic of under-five children in Tanzania.

Keyword: Malnutrition, Stunting, Under-Five Children, Under-Nutrition

I. INTRODUCTION

Undernutrition in young children below five years old is a significant global public health concern. Data from the World Health Organization (WHO) shows that nearly 144 million children worldwide are stunted and 47 million are wasted. At the same time, 38.3 million people are considered overweight (Feyisa & Dabu, 2023). Incidences of undernutrition are particularly high in low-income nations, with Africa having the highest number of stunted and wasted children. Undernutrition leads to impaired and distorted growth, morbidity, and mortality. As such, they have long-term negative impacts on cognitive and physical development (Mukisa et al., 2024).

The Food and Agriculture Organization (FAO) fact sheet of the United Nations demonstrates that the number of people affected by undernutrition has risen exponentially in the past two years. FAO observed that increased undernutrition has been consistent, from 8% in 2019 to 9.3% in 2020 and 9.8% in 2021 (Fumbwe et al., 2021). According to the data, about 828 million people were experiencing hunger and were undernourished worldwide in 2021. According to the World Food Program, more than 350 million undernourished people are children. Globally, 52 million children under the age of five were wasted, with 17 million severely wasted and approximately 22.9% stunted (Hagag et al., 2022).

Malnutrition continues to be a significant public health concern, particularly in Sub-Saharan Africa, where more than 90% of all nutritional conditions and two-thirds of undernutrition cases originate from poverty (Juma et al. 2019). Children under five years old are particularly affected, with stunting, wasting, and underweight prevalent in various countries. In Ghana, moderate stunting, wasting, and underweight affect 28.0%, 8.0%, and 13.0% of under-

five children, respectively, and stunting and underweight are more prevalent among older children (Kitole et al., 2023; Aheto et al., 2015). In Kenya, 47.0%, 2.6%, and 11.8% of under-five children are stunted, wasted, and underweight, respectively, with child age, sex, informal settlements, and poverty being associated with stunting and wasting (Olack et al., 2017; Kitole and Sesabo, 2022). In Botswana, 38.7%, 5.5%, and 15.6% of children under three years old are affected by undernutrition, with sex, parents' employment status, single parenthood, family income, mother's education, and breastfeeding being associated with undernutrition (Mahgoub et al., 2016).

Tanzania is one of the sub-Saharan African countries struggling with undernutrition among children below the age of five, with a stunting prevalence of 32% as of 2018. However, certain regions, including Ruvuma, Iringa, Rukwa, Kigoma, Njombe, and Songwe, still have a prevalence rate exceeding 40%. In Zanzibar, the rate of stunting ranged from 20% to 24% in Stone Town and Unguja North, respectively. Between 2014 and 2018, there was a significant reduction in the prevalence of stunting in Dodoma, Morogoro, Pwani, Lindi, Tabora, Kagera, Mwanza, and Katavi (Fumbwe et al., 2021).

Various efforts and initiatives have been put forward by the government of Tanzania, seeking to address the problem of undernutrition, among other health issues. These initiatives include the launch of nutrition awareness campaigns such as Campaign in the Box in November 2022 and the '*Uzinduzi wa Kampeni ya Lishe Bora Kitaifa*' in April 2022. The government has also set goals for the country to improve the people's health through the midterm target of the National Multi-sectoral Nutrition Action Plan 2016–2021, aiming to reduce stunting prevalence from 34% to 32%. (Tanzania Food and Nutrition Centre and World Food Programme, 2019). Furthermore, the government has partnered with various organizations, like the United Nations International Children's Emergency Fund (UNICEF), to elevate the nutritional status of Tanzanians. UNICEF has been building the capacity for district nutritionists to foster the implementation of Tanzania's National Food and Nutrition Policy of 1992 (UNICEF, 2017; Kitole et al., 2023).

Despite the initiatives made by the government, much is still desired in terms of the nutritional problems in the country. In the year 2020, about 34% of children under 5 years of age were stunted in the country, which is higher than the average for the African region (30.7%) (Khamis et al., 2019). According to the Tanzanian Nutritional Profile in 2022, 42% of children between the ages of 0 and 5 are stunted (DHIS-2, 2022). This study is therefore seeking to answer a central question: what are the determinants of undernutrition among under-five children in Tanzania?

II. LITERATURE REVIEW

2.1 Theoretical Framework

This study used Grossman's Theory of the Demand for Health Care; the model is also known as the Grossman Human Capital Framework. The model explains how individuals make decisions regarding their health investments. This theory was developed by Grossman (1972) based on the idea of the human capital framework by Becker (1967) and was concerned with how individuals allocate their resources to produce health. The model assumes that individuals value health but do not value it above all else, that demand for health is constrained by limited income, and that individuals exert a relatively high degree of control over their health by influencing health-affecting consumption patterns, our healthcare utilization, and our environment.

According to Grossman (1972), individuals demand health for both consumption and production purposes. This is because health yields direct utility, as one feels better when people are healthier, and a healthy body increases the number of days available to participate in production activities.

As the producer of health, an individual buys market inputs, including medical care, food, and clothing, and combines them with their own time to produce services that increase their utility. The demand for health analysis is based on human capital theory, which shows how individuals invest in themselves through training or education to increase their productivity. According to the framework, gross investments are produced by the household's production function, which relates an output of health, say nutritional status, to inputs such as medical care, work environment, employment status, income, housing conditions, education, diet and lifestyle, and time spent improving health. Thus, the investment function takes the form of:

$$I = f(M, T, E)$$

Where, I is investment for health, M is market for health inputs, T is time spent on improving health, and E is education.

This theory is relevant to the study on the determinants of undernutrition among under-five children in Tanzania as it provides a framework for understanding the factors that influence health outcomes. As applied to this

study, the theory holds that it is expected that the independent variables, including socio-economic factors, environmental factors, and child characteristic factors, influence the dependent variable, nutritional status. Grossman's model is based on the idea that individuals make choices about their health by allocating time and resources to maintain and improve their well-being. The model identifies three main components that influence health: health inputs, health outputs, and the production function linking inputs to outputs. Whereas, the inputs to investment health are likely to explain the state of health of the child.

Thus, an investment decision given the above variables has a production function of the form given below:

$$NS = f(SE, EF, CC)$$

Whereas NS is nutritional status, SE is socioeconomic factors, EF is environmental factors, and CC is child characteristic factors.

III. METHODOLOGY

3.1 Research Design

This study used a cross-sectional design. The cross-sectional survey technique entails the gathering of information from a large number of cases at a given time. Therefore, the respondents selected should constitute the full population to produce a representative sample (Kothari, 2004; Dimoso & Andrew, 2021). The study will use a cross-sectional survey to investigate the effects of irrigation on agriculture production among smallholder rice farmers, and the data will be obtained from the National Agriculture Sample Census Survey (NASC) of 2019–2022.

3.2 Data Source

The study used data from the Tanzania Demographic and Health Survey Data (TDHS) conducted in 2015/16 to analyze the determinants of undernutrition among children under five in Tanzania. The TDHS is a nationally representative survey implemented by the Tanzania National Bureau of Statistics (NBS). The TDHS collects detailed information on fertility, family planning, infant and maternal mortality, and maternal and child health. Moreover, the survey collects information on breastfeeding, nutrition, malaria, and household assets, among others. The survey covered all regions of the country, and a representative probability sample of 10,300 households was selected. The survey covered a total of 8023 children under five years old. In this case, the sample size used was calculated using the Fischer et al. (1991) and Kitole et al. (2024) formula, and 322 children were obtained. The 2015/16 TDHS sample was stratified, clustered, and collected in a two-stage probabilistic sampling method based on the list of enumeration areas of the Tanzania Population and Housing Census for 2002. The TDHS sample was selected in two stages. In the first sampling stage, 475 clusters were selected from the list of enumerations extracted from the Population and Housing Census of 2002. Twenty-five percent (25%) of sample points were selected from Dar es Salaam, and 18 were selected in each of the other regions of mainland Tanzania. Additionally, 18 clusters were selected in each region for a total of 90 sample points in Zanzibar.

The second stage consisted of a complete household listing, which was carried out in all selected clusters. Households were then systematically related for participation in the survey, where twenty-two (22) households were selected from each of the clusters in all regions except for Dar es Salaam, where ten (l0) listed households were selected.

3.3 Analytical Modelling

The study used all data from TDHS 2015/2016 on determinants of undernutrition among underfives in Tanzania. The data were analyzed using descriptive statistics and inferential statistics (regression analysis). First, descriptive statistics for the variables in the study were computed. Second, inferential statistics (binary logit model) were used to analyze the determinants of undernutrition among underfives in Tanzania. The data were analyzed using STATA 17.

3.3.1 Binary Logit Model

This study analyzes the determinants of undernutrition among under-fives in Tanzania. Binary response models such as Logit or Probit are more useful when choices fail to exceed more than two. Therefore, when these choices exceed two and responses are not in order, the binary logit is more useful (Adzawla et al., 2019; Wooldridge, 2002). Binary logit was desired because a child had one alternative from the group responses. The three categories of undernutrition include stunted, wasted, and underweight.

A binary logistic model was used to establish the relationship between the dependent variable and the independent variables. The binary logistic model estimates the probability of falling into either of the binary values of the dependent variables, given the effect of the explanatory variables.

The logistic regression model takes the form below:

$$log\left(\frac{p_i}{1-p_i}\right) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \ldots\ldots + \beta_n X_n + \varepsilon \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Whereas log (p) is the natural log of odds of an event to occur and is the dependent variable. p_i is the probability that the event will occur, while $1 - p_i$ is the probability of an event will not occur. α is the constant, β's represents the coefficient of the independent variables, X indicates the independent variables, $\beta_n X_n$ is the nth number of coefficients and their respective variables while ε is the error term. Moreover, other variables and their description as used in this study are presented in Table 1.

Table 1

Description of Variables and Measurements

Variables	**Measurement**	**Categories (Scale)**	**Expected outcome**
Nutritional status (Dependent variable)	The child's state of nutrition Stunted = 1 otherwise = 0 Wasted =1 otherwise = 0 Underweight = 1 otherwise = 0	Binary	
Independent variables			
Child Age (CA)	Number of years/months a child has lived	Continuous	+
Child Sex (CS)	1 if the child is male 0 if the child is female	Binary	+
Education (EY)	Households' years of schooling	Continuous	+
Marital status (MS)	The relationship of the child's parents 1 for married 0 unmarried	Binary	+
Working status(WS)	1 If a household is working or 0 not working	Binary	+
Households' income (HI)	Amount of money households earn from various sources	Continuous	+
Family size (FS)	Number of household members of the respondent	Continuous	–
Type of birth (Birth)	If the baby was born within the period of >37 gestational weeks or not	Normal baby=1, premature= 0	–
Food security (FS)	Accessibility, availability and utilization of food by the household Food secure= 1, food insecure= 0	Binary	-
Access to clean water (Acl)	Availability and utilization of clean and safe water by the household	Binary	+

IV. FINDINGS & DISCUSSIONS

4.1 Results

Results in Table 2 show that the mean head of household age is 33.674 years, with a standard deviation of 8.524614, suggesting a diverse age range among the households. This diversity implies varying levels of experience, resources, and potential vulnerabilities across different age groups, which influence the understanding of undernutrition determinants. The mean age of the child was 2.8879 years, with a standard deviation of 1.945234. Thus, the study included a range of age groups, from very young to older children. This variability is crucial in exploring how different age brackets among under-five children might be associated with distinct undernutrition patterns, allowing for age-tailored interventions. Income's natural logarithm, with an average of 9.4794 and a standard deviation of 5.387688, demonstrates a broad range of income. The log transformation is an implication of initiatives to deal with skewed distributions. This diversity in income distribution highlights the need to consider economic factors when examining the determinants of undernutrition and underscores potential disparities in access to resources. The

mean family size of 3.2671, coupled with a standard deviation of 1.898541, reveals variability in household composition. The range from 1 to 11 members underscores the importance of understanding the social dynamics within households. Larger family sizes may present challenges in resource allocation, impacting the potential risk of undernutrition among children.

Table 2
Descriptive Statistics for Continuous Variables

Variable	Mean	Std. dev.	Min	Max
Households Age	33.674	8.524614	18	49
Child Age	2.8879	1.945234	0.1	33
ln Income	9.4794	5.387688	0	13.38473
Family size	3.2671	1.898541	1	11

Results presented in Table 3 show that 69.57% of respondents were male children, while 30.43% were females. This gender distribution is essential to consider when examining potential gender-based differences in undernutrition prevalence among under-five children. A significant majority of respondents (77.33%) are married, compared to 22.67% who are unmarried. Marital status can influence household dynamics, socioeconomic factors, and access to resources, all of which may contribute to undernutrition risks. Respondents' educational backgrounds vary, with 18.63% having no formal education, 19.88% having primary education, 42.55% having secondary education, and 18.94% having college or university education. Educational levels among caregivers are crucial determinants that may influence their understanding of and practices related to child nutrition. The prevalence of stunting is observed in 47.83% of the children, wasting in 63.04%, and underweight in 74.22%. These high percentages underscore the significant burden of undernutrition among under-five children in the study population, highlighting the urgency of targeted interventions.

Table 3:
Descriptive Statistics for Categorical Variables

Variable	**Category**	**frequency**	**percentage**
Sex	Male	224	69.57%
	Female	98	30.43%
Marital status	Unmarried	73	22.67%
	Married	249	77.33%
Education	none	60	18.63%
	Primary	64	19.88%
	Secondary	137	42.55%
	Collage/university	61	18.94%
Stunting	stunted	154	47.83%
	Not stunted	168	52.17%
Wasting	wasted	203	63.04%
	not wasted	119	36.96%
Underweight	underweighted	239	74.22%
	not underweighted	83	25.78%
Food security	food secured	188	58.39%
	food insecure	134	41.61%
Working status	Working	123	38.20%
	Not working	199	61.80%
Type of birth	Normal	111	34.47%
	Premature	211	65.53%
Access to clean water	access to clean water	4(40%)	6(60%)
	no access to clean water	73(51.4%)	69(48.5%)

Also, the majority of households (58.39%) are classified as food-secured, while 41.61% are food-insecure. This distinction emphasizes the potential link between household food security and undernutrition. This suggests that

addressing food security is crucial to mitigating undernutrition risks. A considerable segment of participants (61.80%) are not working presently, which could negatively affect their economic stability and, therefore, their capacity to provide adequate nutrition for their young children. Employment status is a vital contextual element to take into consideration in undernutrition research. The data shows that 65.53% of the children were premature at birth, while 34.47% were delivered normally. This variable can be important in comprehending the potential effect of birth conditions on the nutritional status of children under five years old. Clean water accessibility is reported by 40% of participants, while 51.4% lack access. This stresses the importance of water quality as a determinant factor of undernutrition, implying that addressing clean water accessibility may lead to improved health for a child.

Table 4:
Logistic Regression Model Outcomes for the Undernutrition Determinants among Children Under Five Years in Tanzania

	Stunted				Wasted				Underweight			
Variables	**Odds ratio**	**Std. Err.**	**z**	**P>z**	**Odds ratio**	**Std. Err.**	**z**	**P>z**	**Odds Ratio**	**Std. Err.**	**Z**	**P>Z**
Parent Age	0.9871973	0.017286	-0.74	0.462	0.9551054	0.0373652	-1.17	0.240	0.9872627	0.016984	-0.75	0.456
Child Age	1.098448	0.061766	1.67	0.095	1.007594	0.2612099	0.03	0.977	1.120211	0.061617	2.06	0.039
Child Gender	4.148634	1.45777	4.05	0.000	0.5159288	0.371971	-0.92	0.359	4.372455	1.576574	4.09	0.000
Parent Maternal education												
Primary education	1.510915	0.949296	0.66	0.511	0.1450088	0.1950262	-1.44	0.151	1.301031	0.793283	0.43	0.666
Secondary education	4.060257	2.432807	2.34	0.019	0.0455739	0.0569741	-2.47	0.013	3.099712	1.857493	1.89	0.059
University/college education	4.533219	2.957973	2.32	0.021	0.0821905	0.1162228	-1.77	0.077	3.649617	2.4252	1.95	0.051
Marital status (Married)	2.523277	1.129164	2.07	0.039	6.513699	3.931384	3.1	0.002	2.852028	1.183796	2.52	0.012
Food Security (Food insecure)	1.366315	0.503251	0.85	0.397	0.2721179	0.1955572	-1.81	0.070	1.450032	0.523434	1.03	0.303
LnIncome	1.007438	0.025092	0.3	0.766	0.9913747	0.0463953	-0.19	0.853	1.005854	0.02523	0.23	0.816
Household size	0.9883554	0.104468	-0.11	0.912	1.285278	0.2509979	1.29	0.199	0.9979552	0.097766	-0.02	0.983
Working status	1.499137	0.517154	1.17	0.241	1.138828	0.6864657	0.22	0.829	1.130549	0.444648	0.31	0.755
Type Birth (Normal)	1.259291	0.477703	0.61	0.543	1.920694	1.261345	0.99	0.320	0.7980624	0.386112	-0.47	0.641
Access to clean water	2.37333	0.684919	2.99	0.003	3.849487	2.009335	2.58	0.010	0.5748228	0.241818	-1.32	0.188
_Constant	0.0290341	0.024233	-4.24	0.000	134.1549	225.1118	2.92	0.004	0.0841019	0.08868	-2.35	0.019

Outcomes depicted on Table 4 above illustrate that age of a child was statistically significant at 10% (p=0.095). In addition, the odds ratio for child age is 1.098448. This implies that per every one-unit increase in child age, there is 1.10 times higher odds of being stunted. At the same time, for each one-unit increase in child age, the odds of underweight increase by approximately 12% (OR = 1.120, p = 0.039). This suggests that older children are more likely to experience undernutrition compared to their younger counterparts.

The results show that child gender (male) was statistically significant at 1% (p=0.000). The findings revealed that the odds ratio for Child Gender is 4.15, with a p-value of 0.000. This indicates that being a male child is associated with 4.15 times higher odds of being stunted compared to female children. Male children are approximately 4 times less likely to be stunted compared to their female counterparts. Together, male children have significantly higher odds of being underweight compared to females (OR = 4.372, p < 0.001). This indicates a gender-based disparity in undernutrition, with males being more vulnerable than females.

The results show that both Secondary education (Odds Ratio: 4.06, p-value: 0.019) and University/college education (Odds Ratio: 4.53, p-value: 0.021) show significant associations with undernutrition. Children with mothers having secondary or higher education levels have higher odds of being stunted compared to those with only primary

education. Also, children whose caregivers have completed secondary education have significantly lower odds (OR = 0.046, p = 0.013) of being wasted. Further, children whose caregivers have a university/college education show a trend towards lower odds (OR = 0.082, p = 0.077) of being wasted. Parents with secondary education show a trend towards higher odds of having underweight children with OR = 3.100, p = 0.059). lastly, parents with university/college education show a trend towards higher odds of having underweight children (OR = 3.650, p = 0.051).

The findings indicate that the odds ratio for Marital Status (Married) is 2.52 with a p-value of 0.039, suggesting statistical significance for a child to be stunted. The findings revealed that being a married parent is associated with 2.5 times higher odds of having a stunted child compared to not married parent. Being married is associated with a 2.5 times higher likelihood of a child being stunted. This could indicate potential economic or social factors related to marital status impacting child nutrition. Also, the findings show that marital status (Married) has a highly significant odds ratio of 6.51 with a p-value less than 0.005 (p = 0.002). Outcomes illustrate that children born to married couples are significantly 6.51 more likely to undergo wasting compared to children for unmarried couples. This implies that marital status is an essential determinant, with married households possessing a greater risk of undernutrition in their children.

Clean water accessibility is significantly linked with an odds ratio of 2.37 and a p-value of 0.003. Children having access to clean water have 2.37 times higher odds of being stunted in comparison to children lacking access to clean water. Findings demonstrate the essence of water quality in a child's nutrition status. Research outcomes also indicate that access to clean water is significantly connected to wasting, with an odds ratio of 3.85 and a p-value less than 0.005 (p = 0.010). Similarly, the odds of undernutrition are considerably higher for families with limited access to clean water. This is an illustration that a lack of access to clean water is linked with an enhanced risk of undernutrition among under-five children.

Study outcomes demonstrate that food security is statistically significant at 5%. The odds of undernutrition among under-five children are significantly lower (OR = 0.272, p = 0.07) for families categorized as food secure. Research results illustrate that households which are food secure have 0.272 times lower odds of being wasted as compared to households considered food insecure. This abrupt direction of association might indicate a counterintuitive connection between food insecurity and undernutrition.

4.2 Discussions

This analysis implies that the age of a child plays a significant role in undernutrition. Older children possess a higher chance of stunting and being underweight. As the age of a child increases, there is a corresponding increase in the odds of undernutrition. This illustrates that older children are more prone to these issues as compared to their younger counterparts. This aligns with a survey done on forensic age estimation in living children, which summarized that age estimation techniques may involve the understanding the nutritional status of children (Nang et al., 2023). In a related research by Hagag et al. (2022) on the prevalence and determinants of malnutrition among children under five years in Egypt, outcomes demonstrated that contributing factors for malnutrition were socio-economic status, mother's age while having her first birth and child birth weight. Kejo et al. (2018) did a research on the prevalence and predictors of under nutrition among children under five years in Arusha-Tanzania. Research found that age exceeding 2 years and being male was linked with stunting. Factors including age exceeding 2 years, nonexclusive breastfeeding of children, and residing in Seliani and Oturumeti were linked with being underweight. Research results are in agreement with that of Mdimu et al. (2020) who undertook a survey on the risk factors linked with under nutrition among children aged 6-59 months in Ngorogoro-Tanzania. They indicated that undernutrition was connected to young age of initiation.

Research exposes a significant gender-based difference in undernutrition. Male children are more vulnerable than females, according to the findings.. Being a male child is associated with a considerably higher chances of stunting in comparison to female children. This variations in gender extends to underweight status as well and stresses the need to consider gender dynamics in addressing undernutrition among children. This aligns with existing research, for instance the survey on gender differences in young children's temperament traits. Outcomes showed that gender influences different aspects of a child's growth, including vulnerability to specific health conditions (Olino et al., 2013).Mrema et al. did a research in 2021 on prevalence and determinants of under nutrition among children 6 to 59 months old in Kilosa district, Tanzania. Outcomes of the research showed that the prevalence of stunting was linked with a child's sex (male).

The educational level of caregivers, particularly secondary and university/college education, is associated with undernutrition. Children with mothers who have attained secondary or higher education levels are more likely to

experience stunting. However, completion of secondary education among caregivers is linked to lower odds of wasting. This suggests a complex relationship between parental education and child undernutrition, warranting further exploration.This aligns with broader research on the relationship between maternal education and child well-being, which highlights the multifaceted nature of this association (Jackson et al. 2017). Together with, Safari et al. (2015) studied on the prevalence and factors associated with child malnutrition in Nzega district-Tanzania and revealed that mother's education was associated with child stunting.

The findings indicate that marital status, specifically being married, is linked to a higher likelihood of child stunting and wasting. Children sired by married couples face greater odds of undernutrition, underscoring potential economic or social elements associated with marital status that may affect a child's nutrition. Divergent outcomes were derived by Mdimu et al. (2020) in a research done on the risk factors associated with under nutrition among children aged 6-59 months in Ngorogoro-Tanzania. The results showed that undernutrition was associated with married couples.

Accessibility to clean water is a significant element affecting undernutrition among young children. Children accessing clean water have higher odds of stunting and wasting in comparison to those lacking such access. This highlights the vital function of water quality in child nutrition, stressing the importance of interventions dealing with clean water accessibility to reduce undernutrition risks. Research results are in agreement with those of Mdimu et al. (2020) who performed a survey on the risk factors associated with under nutrition among children aged 6-59 months in Ngorogoro-Tanzania. The results showed that undernutrition was associated to accessibility of drinking water.

Research shows a significant correlation between food security and undernutrition. Households that are classified as food secure have decreased odds of wasting among children under five years. This outcomes were unexpected and suggests a relationship between food insecurity and undernutrition. The results stresses the need for explicit techniques to grasping the effect of food security on child nutrition. Research results agree with those of Mutisya et al. (2015) who detailed that food secured households are associated with wasting. Also, Lwanga et al. (2015) demonstrated that food secure households were associated with wasted children.

V. CONCLUSIONS & RECOMMENDATIONS

5.1 Conclusion

Study outcomes shed light on major determinants of undernutrition among under-five children in Tanzania. Factors that influence stunting prevalence are: Child age, gender, parental maternal education, marital status, access to clean water, and food security. Outcomes depict the vulnerability of older children, the gender-based differences, and the effect of education level of parents and marital status on undernutrition. Clean water accessibility is singled out as a vital element, with unexpected associations noted in food security scope. These revelations underscore the multidimensional aspect of undernutrition in Tanzania, stressing the need for targeted interventions that take into account the different socio-demographic variables affecting child health and nutrition.

5.2 Policy Implications

Outcomes of the study on the determinants of undernutrition among under-five children in Tanzania have vital policy implications for public health and welfare. These include acknowledging the higher vulnerability of older children to undernutrition. As such, policies in public health ought to take into account targeted interventions for this age group. In this regard, programs in nutritional support, educational campaigns, and healthcare projects should be customized to the specific needs of older children. Policymakers should formulate interventions that deal with the unique obstacles faced by male children, identifying the distinct variables contributing to their increased vulnerability to stunting and underweight. Policymakers should also establish educational support initiatives for caregivers, emphasizing on availing resources and guidance to boost their capacity to ensure the nutritional well-being of their children. Awareness should be created by policymakers about the potential economic and social factors linked to marital status. Support programs could be established to help married couples in ascertaining the nutritional needs of their children are fulfilled. Policies should put first endeavors that promote water quality and availability. This is especially in vulnerable communities, to cut the risk of undernutrition among under-five children.

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