Study on Factors Identification on Nutritional Status Among Children: An Econometrics Analysis

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Abstract

Nutritional status is influenced by critical factors as family, food, security and parenting practices, as well as availability of facilities. Underweight, wasting, and stunting are all prevalent in Sri Lanka, and a variety of factors influence children's nutritional status. The primary aim of this study is to analyze the factors that influence nutrient status among children under five years of age. The study was carried out utilizing a quantitative technique with filled 115 questionnaires. The cluster sample technique was utilized to choose households with children under the age of five in the Imaduwa GN Division. The research objectives were met using descriptive statistics, the Chi-Square test, and ordinal regression. Findings were that, the female children have a higher percentage of normal and underweight nutrition status than male children. Furthermore, the study discovered that the history of infection, sanitation facilities, family income, mother's health state, birth order, and place of delivery are all important determinants of children's nutritional status. Children's nutritional status in Sri Lanka must be improved through the development of community-based nutritional interventions, the reinforcement of current nutrition legislation, and the establishment of microfinance programs that addresses newborn feeding practices, food insecurity, and low socioeconomic concerns.

Introduction

The term "Nutrition Status" refers to how individuals' and populations' health and well-being are affected by the nutrients they consume and use. The problems of nutrition apply to both children and adults. A child's capacity for growth, to grow up healthy, avoid illness, and develop great intellectual, emotional, and behavioral development depends on receiving appropriate nutrition (Mukhamedzhanov et al., 2023), (Roberts et al., 2022). There are more than two billion children are living in the world. There were an estimated one hundred and forty-nine million stunted children with twenty-two percent, around forty-five million wasting children (seven percent), and thirty-nine million overweight children (six percent) worldwide (Mukhamedzhanov et al., 2023)

Malnutrition among children has become a policy concern in Sri Lanka because to increased food insecurity resulting by economic and social difficulties, which worsened during the 2022 crisis. All essential food requirements for children had been worsened, particularly stunting, wasting, and underweight in children under the age of five. Underweight children under the age of five increased to 15.3% in 2022, up from 12.2 percent in 2021. The most recent official assessment of the Ministry of Health's Family Health Bureau on the dietary standing of kids below 5 years, conducted in October 2022 under the concept of Nutrition Month, revealed that children's nutritional status declined in 2022, presenting the weakening in family welfare throughout the period of the bad economic situation in the country. All critical nutrition indicators for children, including stunting, wasting, and underweight in children under the age of five, have worsened, according to the evaluation results. The percentage of underweight children under the age of five increased from 12.2 percent in 2021 to 15.3 percent in 2022 at the national level. Stunting and wasting increased to 9.2 percent and 10.1 percent, respectively, among children under the age of five in 2022, up from 7.4 percent and 8.2 percent, respectively, in 2021 (CEB, 2022). Sri Lanka had made significant progress towards improving fundamental health indicators. Despite improved health indices, child undernutrition remains a significant public health issue.

Malnutrition is still the principal reason of death, illness, and wasted potential among today's children. Recently, more than one in every five youngsters did not reach their full growth potential, putting them at risk of long-term cognitive development problems (Akinlolu & Allen, 2019; Roberts et al., 2022). Malnutrition is a severe public health issue that causes morbidity in children and is the root cause of more than half of all child deaths globally, mainly in poor socioeconomic populations in developing nations (Govender et al., 2021). The main health issue in emerging nations is malnutrition among children (Kramer & Allen, 2015). To define the true priorities of child health within a society, the relationships between individual variables and health-related factors in a child population must be determined.

Table 01: Statistics of Child Malnutrition Status

Indicator	% of children under 5 years age						
Year	2016	2017	2018	2019	2020	2021	2022
Underweight	15.6	14.5	14.3	14.0	13.1	12.2	15.3
Stunting	9.2	9.0	8.9	8.4	8.2	7.2	9.2
Wasting	11.3	11.1	10.2	9.9	8.6	8.2	10.1

Source: CEB, 2022

It is critical to understand the exact extent and underlying reasons of a child's nutritional status in order to implement appropriate intervention measures to reduce childhood malnutrition levels. Therefore, the present study had been focused on covering the age groups of children under five years of age as biological factors. Income status, housing conditions, facilities, and nutrition-related factors are covered with social and economic factors.

The main health issue in emerging nations is malnutrition among children. Review of elements that have an impact on various nutritional issues in developing nations. There is a discussion of some specific disease states' prevention and therapy. There are some suggested remedies to the biggest nutritional issues. Families living in Sri Lanka had been divided into various ways. They are classified based on race, religion, income status, etc. There is a large migration of low-income families in Sri Lanka. Low-Income families can be termed as family segments with a very miserable life. Income status depends on various factors. Families face various problems depending on their socioeconomic status. Socioeconomic status depends on family income, parental education level, and parental occupation. The information presented in this study is important for everyone to be understood the disease early on and maintain a healthy lifestyle. Reduced risk factors and healthier lifestyle choices are equally significant for parents who are infected. Also, this study will offer valuable insights that will be mainly helped Sri Lanka's health industry.

Literature Review

Empirical Review

Various nutritional problems could be seen in the world. Malnutrition is a major nutrition problem. Vitamin deficiency and obesity are other nutrition problems. According to the Sri Lanka Journal of Child Health, 2019 the Prevalence of stunting was around thirty six percent, underweight was forty three percent, and wasting was around nineteen percent, in children 6 months to 59 months in rural areas of Sri Lanka (Samarasekara et al., 2019).

Male, low birth weight, and father smoking were substantially linked with wasting in children aged 6-59 months. In contrast, longer nursing, lower maternal education level, and low birth weight were strongly associated with stunting and underweight. Paternal

alcohol misuse and birth order are greater than two were both strongly linked to being under-weight but not to stunting or wasting (Ahmad et al., 2020).

WHO-recommended classification shows that there were 172 (45.2%), 243 (63.8%), and 79 (20.7%) cases of underweight, stunting, and wasting, respectively. Upper respiratory tract infection was found to be more common in children, with a prevalence of 78 (20.48%), than anaemia, which had a high prevalence of morbidity of 125(32.08) age affects only stunting (Carolin et al., 2022) (WHO, 2016). The study "Factor Affecting the Nutritional Status of Angawali Children" conducted by Jain used 1085 children of 0-6 years. Males made up by 28.68% of the underweight population, compared to 35.85% of females. Whereas 38.91% of children who were not inoculated were underweight, 31.34% of immunized children were underweight. Moreover, more people in the normal weight range received supplemental nourishment than those who did not. According to this study, the nutritional status of a child is strongly correlated with gender, birth order, and immunization status. According to this study, those who had received supplemental nourishment had a lower prevalence of malnutrition than those who did not (Jain et al., 2020).

According to the United Nations classification of Asia, countries in Southern Asia have higher rates of stunting (57.9 million or 71% of the population), wasting (25.3 million or 75% of the population), and obesity (5.5 million or 30% of the population), as well as more severe malnutrition overall. According to this research, Among the 2497 total children in the sample, 1193 were male and 1304 were female, representing 47.78% and 52.22%, respectively. The estimated mean value was 1.62, and the standard deviation was 0.465. According to this study, childhood malnutrition is significantly influenced by several factors, including gender, age, place of residence, level of maternal education, family income, family size, adequate food access, and vaccine coverage (Ahmad et al., 2020)".

People in underserved urban communities were already experiencing food insecurity as a result of covid pandemic situation. They were more nutritionally vulnerable than the rest of the country, with a greater frequency of child malnutrition and obesity among mothers (Jayatissa et al., 2021). Following the first wave of the COVID-19 epidemic, the prevalence of child malnutrition and obesity had been increased in Sri Lanka's neglected urban communities. Overall, kid waste is frighteningly high, and we advocate providing supplemental meals to children under the age of five, with a focus on overweight children (Jayatissa et al., 2023).

Further, the research by Hasfsah T, Shabrina, shows that low birth weight is related to the nutritional status of kids between the ages of 12 and 23 in the West Java province, with the result that low birth weight has a 2.6 higher likelihood of malnutrition. To increase awareness and understanding about pregnancy and the early years of childhood, it is, therefore, necessary to improve the quality of prenatal control programs. P 0.05 was chosen as the threshold for significance. (Hasfsah et al., 2019). The majority of

their children (86%) had good nutritional status, according to the researchers. Meanwhile, it was shown that among their peers, 4.76% of youngsters suffered from malnutrition and 28.57% from undernutrition, and those depend on many of the factors (Purba et al., 2020), (Kassie & Workie, 2020; Yirga et al., 2019). In a study by Indra Pal Ishwarji Meshram MD, While the prevalence of wasting remained relatively stable over the periods (22% vs 23%), the prevalence of underweight and stunting had dramatically decreased (49% vs 57%, 51% vs 58%, respectively). Across the periods, there was a slight decline in food and nutrient intake, which was below the suggested values. Children of illiterate moms and kids from the poorest and middle-class homes had a considerably (p0.01) increased risk of being underweight and stunted, according to stepwise regression. Morbidities during the previous two weeks increased the likelihood of being underweight and wasting by 1.3 times. In conclusion, undernutrition is one of the serious health issue among tribal children and is linked to morbidities, the household wealth index, and mothers' literacy levels. Hence, using suitable nutritional intervention measures and improving family food quality security through public distribution systems, food intakes, socioeconomic conditions, and literacy of parents and personnel.

According to Tulsi Ram Bhandari, better socioeconomic status, mother's ages between 20 to 35, first or second birth order, gaps of more than two years between pregnancies, early recommendations for additional nutrients, full immunization, and prompt attention looking for needed confidence affect children's health, which were also statistically significant. Between 5% and 60% of children fell below the two standard deviation and about one-fourth fell below the three standard deviation when weight-for-height, height-for-age, BMI-for-age, and MUAC-for-age were taken into account (Nepal) (Bhandari & Chetri, 2013). Malnutrition was observed in 32% of children in a research conducted by Mahmood et al. In Pakistan, 68% of children were adequately nourished, whereas 14% and 18% were moderately and severely malnourished, respectively. This study found a strong correlation between hunger and maternal illiteracy and having a family member with special needs. Malnutrition was not significantly correlated with gender, family size, income, breastfeeding, or the presence of siblings under the age of five (Mohomood, 2016). A study by Hidaya et al. "Factors affecting nutritional status in children aged 6–24 months in Lamongan regency, Indonesia", This study showed that growth rate, nutritional quality, and The economic standing of parents, particularly mothers, were linked to mental health, scholastic success, IQ, mortality rate, and accidents. According to the findings of this study, better parenting enhanced the nutritional quality of children aged 6-24 months when compared to preserving food security. Thus, the Community Health Center could give parenting improvement programs priority (Hindaya et al, 2020). According to Joy Kinko Luzingu that the Stunting, being underweight, and wasting all had prevalence rates of 42.7%, 21.9%, and 8.2%, respectively. While sex was not linked to the three indicators of undernutrition, a growing child's age was a risk factor for stunting and being underweight. Mothers who worked in the 12 months before the survey and mothers with low levels of education. Stunting chances were higher for children who lived in the Kasai Western province, were

born in a hospital, and were thought to be born very little by their mothers. Children from the Kasai Western province, mothers who had worked in the year before the survey, and mothers' perceptions that their infants were born extremely small or small were all connected with being underweight. Children who were born to women between the ages of 35 and 49, as well as children breastfed in conjunction with drinking water, were at a higher risk of wasting (Luzingu1, 2022). According to Li et al, 299 353 children between the ages of 12 and 59 months had stunting in 38.8% (95% CI, 38.6%-38.9%), underweight in 27.5% (95% CI, 27.3%-27.6%), and wasting in 12.9% (95% CI, 12.8%-13.0%) (Li et al,2020).

Review of Literature and Hypothesis Development

Numerous factors influence the children's nutrition status. These factors could be classified as both biological and non-biological. Biological aspects include age, gender, growth, disease conditions, and genetic makeup. According to the study conducted by Gonete et al, low birth weight, continued nursing for longer than two years and lower maternal education are all strongly linked to a higher risk of stunting (Gonete et al, 2021). Birth order above two, low birth weight, prolonged nursing beyond two years, poorer maternal education level, and paternal smoking and alcohol misuse were all significantly linked to a higher risk of being underweight. Children's undernutrition was not substantially correlated with recent acute illnesses, parental work status, or fathers' educational attainment. low birth weight and smoking are associated with stunting, underweight, and wasting. (Samarasekara et al., 2019). According to Ahamad, the childhood malnutrition is significantly associated with gender, age, place of residence, level of maternal education, family income, family size, adequate food access, and vaccine coverage. Low birth weight is the only significant factor that has been associated with the nutritional status of children under the age of two; as a result, children with low birth weight had a 2.6 greater risk of malnutrition in their early years (Ahmad et al., 2020), found that age and gender are significant risk factors for undernourishment in children (Hasfsah et al., 2019).

Socio-economic factors such as income, belief, spending patterns, level of education, family size and structure, housing conditions, and population size could all be considered. Exclusive breastfeeding and mothers' perceptions of their children's nutritional status are linked to the nutritional status of young children under the age of five (Purba et al., 2020). According to Samarasekara and Mettananda's research of "Analysis of nutritional status and factors associated with undernutrition in children aged 6-59 months in a rural area of Sri Lanka" Stunting and underweight in male sex were significantly correlated with lower maternal education levels (Samarasekara et al., 2019). A study of "Effect of socioeconomic factors on malnutrition among children in Pakistan" identifies the Area, maternal education level, and family size are derived characteristics that are strongly linked to undernutrition in children (Ahmad et al., 2020). Parents, education level, source of drinking water, place or religion, etc., hope to be

used in this study. This alternative hypothesis is there is a relationship between social factors on children's nutrition.

Economic factors are significant with a possible effect on someone's nutrition status and health. Economic decision-making aspects such as income and food pricing influence people's eating habits. Furthermore, food prices are restricting low-income families from adopting good eating choices. Economics may assist us to understand how socioeconomic status interacts with human nutritional status and health, as well as how to address these issues. Other than in "home economics," economics is not currently connected with conventional nutrition science or practice. In the management and prevention of food emergencies, there should be a greater emphasis on collaborative, interdisciplinary nutritional economics research (Lo et al., 2009). According to "Effect of Socioeconomic Factors on Malnutrition among Children in Pakistan" this study said, Childhood malnutrition is highly affected by variables resulting from family income (Ahmad et al., 2020). Monthly family income, parents' occupation, etc. hope to be used in this study. This alternative hypothesis and there is a relationship between Economic factors on children's nutrition.

Low birth weight, malnutrition, not nursing, crowded living conditions, contaminated food and water, and poor hygiene habits are all threats which are affecting to children's health. Stunting and underweight male sex had a substantial connection with low birth weight, prolonged nursing, and paternal smoking. In children aged 6 to 59 months, wasting was significantly correlated with low birth weight and father smoking (Samarasekara et al., 2019). In "Effect of Socioeconomic Factors on Malnutrition among Children in Pakistan", researchers found that childhood malnutrition is derived from factors and is strongly correlated with adequate food access and full immunization (Ahmad et al., 2020). Many of the social, biological, economic, and health-related factors determine the status of child nutrition (Kassie & Workie, 2020; Netenda & Chuang, 2018; Picbougoum et al., 2023; Silva et al., 2020). This alternative hypothesis and there is a relationship between Physical factors on children's nutrition.

The above theoretical and empirical literature reviews help the researcher to identify that many of these have been conducted in plantation and suburban areas. No studies had been conducted in considering specific areas of children's nutrition. Further, this special reference to the Imaduwa DS Division has a specific gap. In those studies, they were not going on for a large number of factors. The literature on the factors affecting nutrition status appears hardly narrow to the Sri Lankan context resulting in a knowledge gap. Therefore, the research gap is not fully attained through previous research. Many researchers had used multivariate data analysis, and logistic regression analysis, but this study used ordinal regression analysis. The present study aimed to fill the existing literature gap by assessing the factors affecting the nutrition status of under-five children in the Imaduwa DS Division. According to the above literature gap, we hope to use, children's birth order, exclusive breastfeeding, parents' occupation, parents' education level, family income, birth type, history of childhood infection, Age

which at complementary foods, place of delivery, family members, mother health status, mother knowledge, the status of the toilet, source of water, age and the birth weight.

Materials and Methods

This study is reportedly and mostly based on examining the effects of variables on the prevalence of children's nutrition. It may be referred to as data-based research, and observations of the findings and their implications may be used to confirm it. Also, this study was carried out using a quantitative methodology, and it can be viewed as an explanation. The major aim of the questionnaire in this study is to collect data on a wide range of factors by considering the participation of 115 children in selected domains which are belonging to the Imaduwa Divisional Secretary in the Galle District of Sri Lanka. The pilot survey was utilized in this case to clearly comprehend the questionnaire clearance. The researchers used primary data from the residents who are in the Imaduwa division through structured questionnaire methods. The questionnaire is designed to obtain needed information relevant to the researcher's objectives.

It is rare for researchers to be able to collect information from each person in a group of people they are studying. This study population is the parents of under-five year children in Imaduwa DS Division. In the current study, the select Imaduwa DS Division is the study area to find the factors affecting the Children's nutrition in Under five-year. According to the statistics, the prevalence of wasting and underweight was higher than the national prevalence comparing to other GN. Imaduwa Division Secretary has 43 GN Divisions (Statistics, 2020). Initially, the cluster sampling approached and the basic random sample method were employed in that procedure for the selection of five Grama Niladari (GN) from the 43 available GNs (Table 02). The final sample was drawn using a simple random sampling method.

Sample size calculation had been done by online free statistics Calculators. The anticipated effect size is 0.3, the Desired Statistics power level is 0.8, the Number of Predictors is 35, and the Probability level is 0.05.

Table 2: Distribution of Families in the Selected Sample

GN division	GN population	Sample size
Haupe	58	18
Hettigoda	115	23
Kodagoda/S	127	28
Kodasoda/E	82	21
Andugoda	138	25

Source: Sample Survey, 2023

The questionnaire is divided into three primary components. The first portion includes information about children and parents such as gender, age, weight, and those who have been diagnosed with Children's nutrition. The second socioeconomic factor, as well as the third section, is concerned with physical issues. The researcher had been attempted

to arrange all of the questions in a precise order when creating the questionnaire. In order for the respondents to understand. It also will save the responder's time. Furthermore, attempts were made in this study to get true and accurate information by meeting with each respondent in person to gather information.

As the factors influencing nutritional status were found, the children's stunting, wasting, and underweight were used as markers of their nutritional condition, representing dependent variables. The dependent variables in the evaluation of baby and young child feeding assistance systems were exclusive breastfeeding and good or unsatisfactory complementary feeding practices.

Function Of measure Nutrition Status

$$Z - Score = \frac{Observed\ Value - Meadian\ Reference\ Value}{Standard\ Deviation\ of\ reference\ population}$$

Children are termed stunted or chronically undernourished if their height-for-age Z-score is less than minus two standard deviations (-2SD) from the reference population median. Children who are severely stunted fall below minus three standard deviations (-3 SD). Children are considered thin (wasted) or seriously undernourished if their Z-score is less than minus two standard deviations (-2sd) from the reference population median. Children that are severely wasted have a weight-for-age Z-score that is fewer than three standard deviations (-3 SD) below the median of the reference population. If a child's weight-for-age Z-score is less than minus three standard deviations (-3SD) from the median, they are considered as seriously underweight.

Physical aspects considered as independent variables include infant feeding (breastfeeding and supplemental feeding) and morbidity status of babies and young children. Child care practices (daytime caregiver, age of daytime caregiver, location of daytime child care, birth order), household food security, household environment (house type, water source, type of toilet facility), and healthcare access (type of health facility accessed, distance from the health facility, and mode of payment for healthcare services) are socioeconomic factors. Maternal employment, mother's occupation, and total monthly household income, age, mother's weight, mother's age, and father's age are biological influences.

The quantitative data analysis technique was applied in this investigation. In this study, Pearson's chi-square test is used to examine whether independent factors are significantly linked with dependent variables. Second, ordinal regression is a statistical method for forecasting the behavior of ordinal-level dependent variables based on a set of independent factors. An additional odd ratio is utilized to explain the association's behavior.

Results and Discussion

Descriptive Analysis Results

The descriptive summary of the sample data had been shown in the table 3. The percentage of boys were 45.2 where as girls were 54.8. According to the sample data, 19 children are living in rural while 96 children are living in urban areas. Approximately 75% of households reported having fewer than two children, whereas 25% reported having more than two children. According to the findings, 2.6%% of the mothers in the sample have no formal education. 57.4 percent have primary education, the highest level in the sample data. There were very few mothers with a tertiary education level. A similar relationship could be noticed with fathers' education as mothers. However, there were more educated fathers in the sample when compared to the percentage of educated mothers in the sample.

When physical characteristics in the sample are considered, approximately 22 children had low birth weight, which accounts for 19.1 percent of the total. 90 children were born with normal birth weights. It was the highest level, with a rate of 78.3 percent. It accounts for 2.6 percent of the total. When considering the birth order of the children observed in the current sample, the majority of the children have a birth order of 1 or 2. It has a percentage of 79.1%. The birth order of 24 children is larger than 2. Its proportion is 20.9 percent. The results showed the distribution of nutrition status among 115 children under the age of five in the Imaduwa DS Division. Notably, 31.3% of the population has normal nutrition status, while the remaining 20.0%, 25.2%, and 23.5% are underweight, wasting, and stunted, respectively.

Table 3: Descriptive Summary of the Sample Data

Variable	Sub-items	Percentage
Gender	Male	45.2
	Female	54.8
Living Area	Rural	83.5
	Urban	16.5
Number of Family	Five and above	34.8
Members	Less than five	65.2
Number of Children in	Two and above	25.2
the Family	Less than Two	74.8
	No Schooling	2.6
Mother's Education	Primary	57.4
	Secondary	20.9
	High	19.1
	No Schooling	13.0
Father's Education	Primary	54.8
	Secondary	20.0
	High	21.8
Birth Weight	Low	20.0
	Normal	19.4
Birth Order	Less than two	79.1
	Two and above	20.9
	High	32.2
Height at Birth	Low	16.5
	Normal	51.3
	<18.5	11.3
Mother BMI	18.5-24.9	66.1
	25.0-29.9	17.4
	>30	5.2

Source: Sample Survey, 2023

In addition to that, children between the age of 0 months to 12 months,14.82 children don't have nutrition problems, 23.81 children are underweight, 42.86 percent of children are wasting children, and 19.05 percent of children are stunted children. Children who are aged between 13 months and 23 months, 4 children don't have nutrition problems. Their percentage is 26.67 percent, with no children in the underweight group, 33.33 percent (5 children) of children are wasting children, and 40 percent of children are stunted children. According to the age group 25 months to 36 months, 37.5 percent of children don't have nutrition problems, 18.75 percent of children in the underweight group, 18.75 percent of children in the wasting group, and 25 percent of children are in the stunting group. 37 – 48 months age category, 35.29 percent of children don't have nutrition problems. 29.41 percent of children in the underweight group, and 17.65 percent of children in the wasting and stunting nutrition status group. 49 months to 59 age group, 36.95 children are healthy, 21.74 percent of children are underweight, 19.57 children are wasting and 21.74 children are stunting. The most underweight children are in the age group of 36 months to 47 months. Its percentage is 29.41 percent. The most

wasting children are in the age group of 0 months to 12 months. Its percentage is 42.86 percent. The most stunting children are in the age group of 13 months to 24 months and the percentage is 40 percent.

Further, descriptive statistics results showed that the children in families with monthly income below 25000 rupees were recorded as 25 percent in normal nutrition status, 37.5 percent in underweight nutrition status, 12.5 percent in wasted nutrition status, and 25 percent in stunting nutrition status. For children in families with monthly income between 25000 to 50000 rupees, 31.9 percent are in normal nutrition status, 15.9 percent are in underweight nutrition status, 24.6 percent are in the wasted nutrition status, and 27.5 percent are in stunting nutrition status. Children are in families with monthly income between 50000 to 75000 rupees, 33.3 percent are in normal nutrition status, 25 percent are in underweight nutrition status. 20.8 percent are in the wasted nutrition status, and 20.8 percent are in stunting nutrition status. Of the children in families with monthly income between 75000 to 100000 rupees, 40 percent are in normal nutrition status, 20 percent are in underweight nutrition status, 30 percent are in the wasted nutrition status, and 10 percent are in stunting nutrition status. Children those who are in families with monthly income above 10000, 25 per cent are in underweight nutrition status, and 75 per cent are in the wasted nutrition status.

Chi-Square Test Results

Pearson's chi-square test is performed in this study to determine whether independent variables significantly correlated with the dependent variables.

Table 4: Results of Chi-Square Test

Variable	P value	Decision
Gender	0.657	No association
Birth Order	0.037	Related
Smoking Status	0.568	No association
Place Of Origin	0.39	No association
Family Members	0.881	No association
Number of children	0.258	No association
Place of Delivery	0.001	Related
Attention before childbirth	0.189	No association
Exclusive breastfeeding	0.022	Related
Age at complementary foods	0.041	Related
History of Infection	0.024	Related
The chives give an injection	0.231	No association
Used Family Planning	0.311	No association
father age	0.633	No association
Birth Type	0.729	No association
Mother Health Status	0.041	Related
Age	0.262	No association
Mother's age at first birth	0.976	No association
Mother's age at marriage	0.288	No association

Parents Marital Status	0.011	Related
mother Occupation	0.005	Related
Father Education Level	0.132	No association
Mother education Level	0.114	No association
Father Occupation	0.948	No association

Source: Sample Survey, 2023

Finding any relationships between independent factors and dependent variables is crucial in the first place. It desired to be carried out before determining the model. Additionally, the independent variables that we incorporate into our final model must be related to the dependent variable. Only categorical independent variables are present in this study. Therefore, we want to use the Chi-square test to examine the relationship between categorical independent factors and the dependent variable. Results are shown with the nutrition status and the association with the selected variables covering social, biological, physical and economics (Table 4).

After considering the P values of those probability values, birth order, Place of Delivery, Exclusive breastfeeding, Age at complementary foods, History of Infection, Mother's Health Status at childbirth, Parents' Marital Status of the mother's Occupation was less than 0.05, significance level and we can reject the null hypothesis.

Ordinal Regression Results

An odds ratio (OR) computes the correlation between a variable and the probability that an event will occur. Identifying risk variables by analyzing the association between exposure to a risk factor and a medical result is a typical way to analyze odds ratios. The Odds Ratio is the probability of slipping into a higher/lower category on the dependent variable with a unit change in the independent variable. OR>1 indicates that the odds of being in a higher category rise with each unit increases in the predictor. With each unit rise in the predictor, the odds of being in a higher group decrease.

Table 5: Results of Ordinal Regression

Variable	Estimate	Odd Ratio
Child Age	-0.018	0.9823
[History of infection=0]	0.972	2.6437
[History of infection =1]	0[a]	
[Age at which Complementary foods=0]	-0.008	0.9923
[Age at which Complementary foods =1]	0[a]	
[Exclusive Breastfeed=0]	-1.211	0.2978
[Exclusive Breastfeed=1]	0[a]	
[Types of Delivery=0]	1.737	5.6796

[types of Delivery=1]	0[a]	
[Status of Toilet=0]	-21.593	0.0000
[Status of Toilet=1]	-21.050	0.0000
[Status of Toilet=2]	-21.567	0.0000
[Status of Toilet=3]	0[a]	
[Parents Marital Status=0]	-1.371	0.2539
[Parents Marital Status=1]	-1.845	0.1580
[Parents Marital Status=2]	0[a]	
[Mother Health Status at Child Birth=0]	-0.475	0.6220
[Mother Health Status at Child Birth=1]	0[a]	
[Birth Order=0]	-1.174	0.3091
[Birth Order=1]	0[a]	
[Family Income=0]	-1.122	0.3256
[Family Income=1]	-0.451	0.6370
[Family Income=2]	0[a]	
[mother Occupation=0]	-1.391	0.2489
[mother Occupation=1]	-0.598	0.5499
[mother Occupation=2]	-0.345	0.7084
[mother Occupation=3]	-0.539	0.5835
[mother Occupation=4]	0[a]	

Source: Sample Survey, 2023

The results of ordinal regression are shown in Table 5. The nutritional status of children compared to the age of children; the nutritional status of children is 0.982 times lower than older children. When children do not have an infection, the probability of good nutritional status of children increases by 2.644 times.

The nutritional status of children was 0.9923 times lower as the feeding age increased compared to the age at which complementary feeding was given to children. Compared to breastfeeding for children, when not breastfeeding, the nutritional status decreases by 0.298 times. When comparing the place of birth, children born in public hospitals are 5.68 times more likely to have better nutritional status. As toilet conditions worsen, the likelihood of improved nutritional status decreases. As toilet conditions worsen, the likelihood of improved nutrition status Decreases. When parents' marital status is failed, children's nutritional status decreases. Compared to the mother's condition at delivery, the nutritional status of children of mothers with good maternal health increases by

0.622. Compared to the birth order of children, the nutritional status of children born after the second child is 0.309 times lower. As family income decreases, the likelihood of improved nutrition status Decreases. When mothers do jobs, children's nutritional status decreases accordingly.

Conclusion and Recommendations

The current study aimed to provide data on the nutritional health of children under the age of five, as well as individual variables. Despite several limitations, this study concentrated on children and biological, household, socio-economic factors associated with childhood malnutrition (stunting, wasting, and underweight) in a specific area. This study found that infection history, sanitation facilities, family income, mother's health status, birth order, and place of delivery are all key factors in children's nutrition status. As a recommendation of this study, it is important to strengthen maternal healthcare services in the region, ensuring that mothers receive adequate prenatal and postnatal care, as well as provide access to family planning resources and educate mothers on the importance of spacing pregnancies for the well-being of both mothers and children. Launching community-based health education programs to promote awareness about the need for hygiene, sanitation, and infection prevention. Furthermore, exploring alternatives for community-based income-generating projects that might economically empower families is also advised in order to improve children's nutrition.

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Conflicts of Interest

The authors declare that they have no competing interests.

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