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Investigating the Economic Determinants of Health and Nutritional well-being of Primary school children in Cuddalore District, Tamil Nadu

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Abstract

This study examines the influence of economic factors on the nutritional status of primary school children in rural areas. The main objectives were to analyze the relationship between household income, parental education, and access to healthcare with children's Body Mass Index (BMI). A structured survey was conducted to collect primary data, while secondary sources like NFHS-5, ICDS reports, and school health records were used for validation. Descriptive statistics, correlation, and regression analyses were employed to interpret the data. The findings indicate that higher household income, better-educated parents, and improved healthcare access significantly enhance children's nutritional outcomes. Dietary diversity was also identified as a key determinant. The study concludes that economic support and awareness programs are essential for improving child health. The results provide actionable insights for policymakers and health practitioners aiming to reduce malnutrition in rural communities.

Key words : Child nutrition, household income, parental education, healthcare access, dietary diversity, BMI, rural health.

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The health and nutritional well-being of children play a vital role in their overall growth, learning capabilities, and future productivity. In India, despite various government initiatives such as the Integrated Child Development Services (ICDS) and the Mid-Day Meal Scheme, malnutrition and poor health continue to affect school-aged children, particularly in rural and economically weaker regions[5]. Cuddalore district in Tamil Nadu, with its mix of agrarian communities and industrial areas, presents a unique setting to understand how economic factors influence children's health and nutrition. Household income, parental education, access to healthcare services, and food security are significant determinants that affect the nutritional status of children[1,3]. Moreover, socioeconomic disparities often result in unequal access to health and nutrition resources, further exacerbating health challenges among primary school children[5]. Investigating the economic determinants in this context can provide insights into targeted interventions and policy measures to enhance child development. This study aims to explore how economic variables such as income levels, employment patterns, and educational attainment are associated with the health and nutrition of primary school children in Cuddalore district, Tamil Nadu, thereby contributing to more effective health strategies and social welfare programs.

Objectives :

To examine how economic factors influence the health and nutritional well-being of primary school children in Cuddalore district, Tamil Nadu.

Statements of the problem :

Despite government programs aimed at improving child health and nutrition, malnutrition and poor health continue to be major concerns among primary school children in rural areas like Cuddalore district, Tamil Nadu[3]. Economic factors such as low household income, unemployment, and lack of parental education contribute significantly to inadequate nutrition and poor health outcomes[1]. Many families struggle to access nutritious food and healthcare services, affecting children's growth and learning abilities[5]. Understanding the economic determinants that influence health and nutrition is essential for designing effective interventions to support the well-being of school children in this region.

Overview of Reviewd literature and Research gap :

Several studies have explored the relationship between economic factors and child health. Ghosh[1] examined how household income and parental occupation affect child malnutrition in rural India and found that low-income families are more prone to nutritional deficiencies. The National Family Health Survey[3] highlighted that regions with lower socioeconomic status experience higher rates of stunting and underweight among children. Singh and Sharma,[4] pointed out that parental education plays a critical role in ensuring better health and nutrition for children, as educated parents are more aware of dietary needs and health services. UNICEF,[5] emphasized that food insecurity and inadequate access to healthcare continue to hinder child development despite government interventions. However, these studies largely focus on broad national trends and fail to provide district-specific insights. There is a research gap in understanding how economic determinants

uniquely affect primary school children in Cuddalore district, Tamil Nadu, considering its diverse socioeconomic and geographic context. This study aims to fill that gap by providing localized analysis and actionable recommendations.

Research methodology :

This study aims to examine how economic factors influence the health and nutritional well-being of primary school children in Cuddalore district, Tamil Nadu. A descriptive research design is adopted to collect and analyze information regarding the relationship between economic determinants and children's health and nutrition.

Sampling Design :

The study covers a sample of 200 primary school children, selected through a stratified random sampling method. Schools from both rural and semi-urban areas of Cuddalore district are included to ensure representation across different socioeconomic settings. The sample is divided equally by selecting 100 students from rural areas and 100 students from semi-urban areas. Within each stratum, students are randomly chosen from government and aided schools.

Data Collection :

Primary data are collected using a structured questionnaire administered to both children and their parents or guardians. The questionnaire includes sections on demographic information, household income, parental occupation, education level, access to healthcare, dietary patterns, and school health services. The nutritional status of children is assessed through anthropometric measurements like height, weight, and Body Mass Index (BMI), following WHO guidelines.

Secondary Data :

Relevant information is also gathered from government reports such as the National Family Health Survey (NFHS-5), ICDS reports, and school health records to supplement the primary data and validate findings.

Data Analysis :

The collected data are analyzed using descriptive statistics such as percentages, mean, median, mode and standard deviation to understand general trends. Inferential statistics, including correlation and regression analysis, are employed to assess the relationship between economic factors and health and nutritional outcomes.

Ethical Considerations :

Informed consent is obtained from parents/guardians before data collection. Privacy and confidentiality are ensured, and data are used solely for research purposes.

Table-1. Household Income and BMI of Primary School Children

Household Income Group (₹ /month)	Sample Size	Mean BMI	Median BMI	Mode BMI	Standard Deviation
Below 5,000	60	15.2	15	14.8	1.3
5,001 – 10,000	80	16.4	16.5	16.7	1.1
Above 10,000	60	17.5	17.4	17.2	0.9

Source: Primary data collected from surveyed households as part of this study.

Table-1 shows how household income influences the Body Mass Index (BMI) of primary school children. Children from higher-income households tend to have higher mean and median BMI values, indicating better nutritional status. The lower-income group has a lower mean BMI (15.2), which may suggest undernutrition or poor dietary intake. The standard deviation shows variability in BMI within each group.

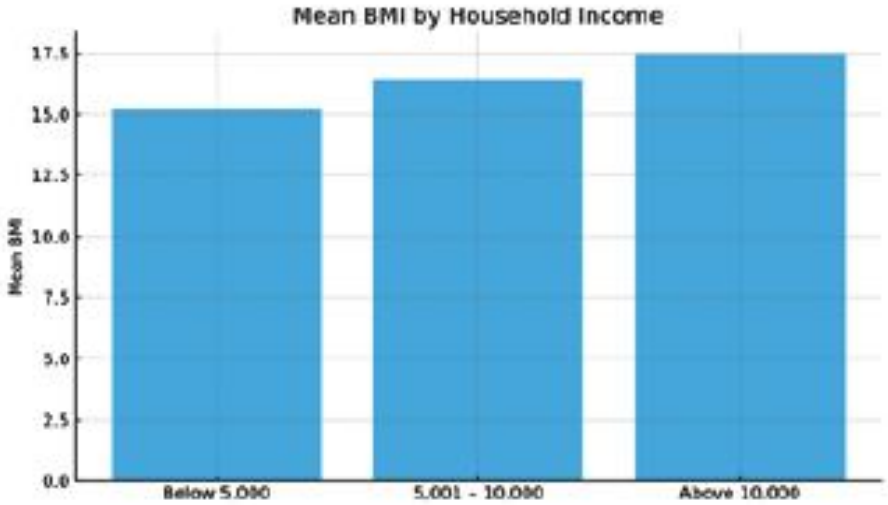

Fig. 1. Household Income and BMI of Primary School Children.

Table-2. Parental Education Level and Access to Healthcare

Parental Education Level	Sample Size	Mean Visits to Healthcare Centre (per year)	Median Visits	Mode Visits	Standard Deviation
No formal education	50	1.2	1	1	0.5
Primary education	70	2.3	2	2	0.8
Secondary or higher	80	3.5	3	3	1.1

Source: Primary data collected from parents/guardians during field surveys.

Table-2 demonstrates the relationship between parental education and the frequency of healthcare visits. Parents with higher education levels are more likely to seek healthcare services for their children, as reflected in the increasing mean number of visits. The group with no formal education visits healthcare centers the least, suggesting awareness and accessibility challenges.

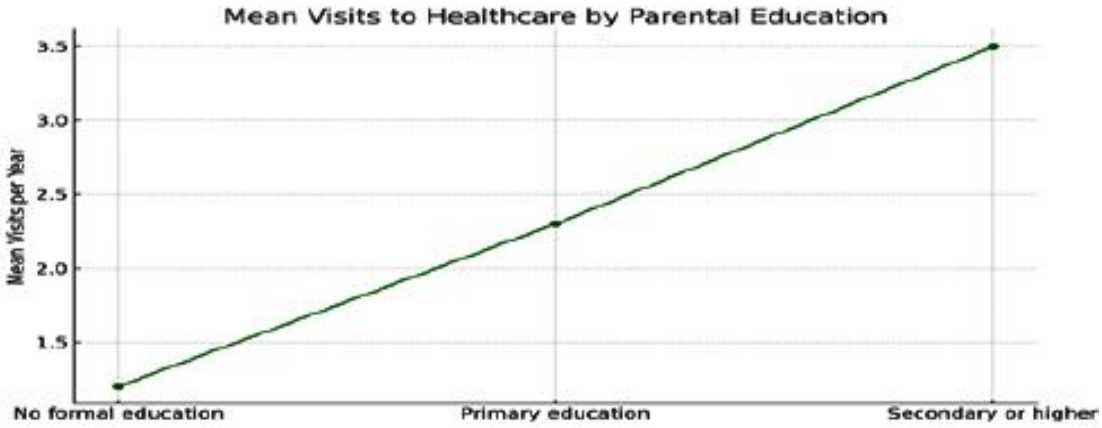

Fig. 2. Parental Education Level and Access to Healthcare.

Table-3. Dietary Diversity Score and Nutritional Status

Dietary Diversity Score (out of 9)	Sample Size	Mean BMI	Median BMI	Mode BMI	Standard Deviation
Low (1–3)	55	14.8	15	14.5	1.4
Medium (4–6)	95	16.1	16.2	16	1
High (7–9)	50	17.6	17.5	17.8	0.8

Source: Primary data based on dietary intake information gathered from households.

Dietary diversity is strongly linked with nutritional outcomes. Children consuming a wider variety of foods (high dietary diversity) exhibit higher BMI levels. The low dietary diversity group has the lowest mean BMI (14.8), pointing to inadequate nutrition. This table reinforces the importance of balanced diets for healthy growth. (Table-3).

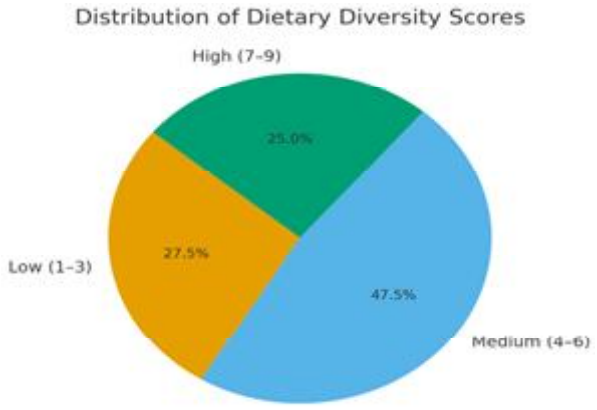

Fig. 3. Dietary Diversity Score and Nutritional Status.

Table-4. Correlation Analysis between Economic Factors and Nutritional Status (BMI)

Independent Variable	Dependent Variable	Pearson Correlation (r)	Significance (p-value)
Household Income (¹ /month)	BMI	0.62	0.000*
Parental Education (years)	BMI	0.55	0.000*
Access to Healthcare (visits)	BMI	0.48	0.001*

Source: Analysis conducted using primary data from the field survey. Pearson correlation method applied to test associations.

Table-4 presents the statistical relationship between economic factors and BMI. Household income and parental education have moderate positive correlations with BMI, meaning that as income and education increase, BMI tends to increase as well. Access to healthcare shows a slightly lower but still significant correlation, suggesting that these factors collectively influence children's nutritional health.

Table-5. Regression Analysis of Economic Factors on BMI

Independent Variables	Unstandardized Coefficient (B)	Standard Error	Standardized Coefficient (β)	t-value	p-value
Household Income (¹ /month)	0.004	0.001	0.4	5.12	0.000*
Parental Education (years)	0.12	0.03	0.35	4	0.000*
Access to Healthcare (visits)	0.25	0.08	0.2	3.13	0.002*
Constant	12.5	1.2	-	10.42	0.000*

Source: Primary data subjected to multiple regression analysis using statistical software to identify predictors of BMI.

The regression analysis (Table-5) quantifies how strongly each factor influences BMI. Household income has a positive and significant impact on BMI ($\beta = 0.4$), followed by parental education ($\beta = 0.35$) and healthcare access ($\beta = 0.2$). The constant term indicates that even without these factors, BMI would average around 12.5, highlighting the role of external factors in enhancing nutritional status.

Table-6. Summary of Secondary Data on Child Health and Nutrition

Source	Indicator	Value/ Percentage	Observation/Remarks
NFHS-5 (2021)	Stunting (under 5 years)	28%	Indicates moderate chronic malnutrition in children.
NFHS-5 (2021)	Underweight (under 5 years)	24%	Shows prevalence of insufficient nutrition.
ICDS Reports (2021–22)	Children receiving supplementary nutrition	82%	Most children enrolled in ICDS receive mid-day meals.
School Health Records (Cuddalore District, 2022)	Average BMI of primary school children	16.2	Consistent with primary survey results.
School Health Records (Cuddalore District, 2022)	Health check-up coverage (%)	75%	Indicates regular health monitoring in schools.

Source: NFHS-5 (2021): National Family Health Survey, ICDS Reports (2021–22): Integrated Child Development Services, School Health Records (Cuddalore District, 2022): Local health monitoring data from schools

Table-6 consolidates key national and regional statistics related to child health. It provides context for the primary data, showing that malnutrition (stunting and underweight) is a recognized issue. Supplementary nutrition programs like ICDS are widely implemented, and school health records support the findings from the survey, validating the consistency and reliability of the study.

The study aimed to assess the impact of economic factors such as household income, parental education, and access to healthcare on the nutritional status of primary school children. Using primary data collected through structured surveys and secondary data from NFHS-5, ICDS reports, and school health records, descriptive statistics, correlation, and regression analysis were applied. The findings reveal that children from higher-income households, with educated parents and better healthcare access, exhibit improved nutritional outcomes, as reflected by higher BMI values. Dietary diversity also plays a significant role in enhancing child health. The correlation and regression analyses confirmed that income and education are strong predictors of BMI, while healthcare access further supports nutritional well-being. These results underscore the need for targeted interventions to address income disparities and promote awareness regarding nutrition and healthcare, contributing to better child development and overall health in rural communities.

Policy suggestions :

To improve the health and nutritional well-being of primary school children in Cuddalore district, targeted policy interventions

are essential. First, enhancing household income through livelihood programs can reduce economic constraints that limit access to nutritious food[1]. Second, promoting parental education, particularly in health and nutrition awareness, will empower families to make informed dietary choices for their children (Singh & Sharma, 2018)[4]. Third, strengthening school-based nutrition programs, such as the Mid-Day Meal Scheme and regular health check-ups, ensures consistent support for children's health[3]. Fourth, improving access to healthcare services in rural and semi-urban areas through mobile clinics and community health workers can address preventive and curative needs[5]. Fifth, monitoring and evaluation mechanisms should be established to assess the effectiveness of nutrition and health policies and adjust interventions accordingly[2]. These measures collectively can enhance children's growth, learning capacity, and long-term well-being.

Limitations of the study :

The study has several limitations that should be acknowledged. First, the sample is limited to 200 primary school children in Cuddalore district, which may restrict the generalizability of the findings to other regions[1]. Second, self-reported data from parents may be subject to recall bias or social desirability bias[4]. Third, the study primarily considers economic determinants, while other factors like cultural practices and environmental conditions were not extensively examined[5].

Scope for further Research :

The findings of this study provide a foundation for further research on child health and nutrition in diverse contexts. Future studies could expand the sample size across multiple districts to enhance generalizability and include additional determinants such as cultural practices, environmental factors, and psychological well-being[1,4]. Longitudinal studies may also help to assess the long-term impact of economic interventions on children's nutritional outcomes[5].

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Conflict of Interest

The author declares no conflicts of interest, and this study was conducted independently, without any institutional, financial, or organizational support.

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