IMPACT OF MALNUTRITION ON THE ACADEMIC PERFORMANCE OF SCHOOL CHILDREN AT SELECTED SCHOOL, THIRUVALLUR DISTRICT.

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KEYWORDS

Malnutrition, academic performance, school children, impact

ABSTRACT:

Introduction: Malnutrition remains a significant public health challenge, particularly in developing countries, where it adversely affects the growth, health, and academic performance of children. This study aims to assess the impact of malnutrition on the academic performance of school children at selected school, Tiruvallur district.

Methods: The study used a cross-sectional design and selected a sample of 30 students through convenient sampling. Inclusion criteria included children enrolled in the selected school, aged 6 to 12 years, with parental or guardian consent for participation. Exclusion criteria were children with known chronic illnesses that could affect growth or academic performance, students absent during data collection, and those without parental or guardian consent.

Results: Out of the students that were sampled, 26.7% reported mild malnutrition with 50% having a normal BMI. In addition, 16.7% of the students were determined to be moderately malnourished, and another 6.7% were severely malnourished. We found a significant negative correlation between malnutrition and academic performance, r = -0.55, with a moderate negative relationship. This implies that as malnutrition increases academic outcomes decrease as nutritional status has a significant impact on academic performance of students.

Conclusions: The study concluded that a high prevalence of malnutrition among school children with 50% affected, and a moderate negative correlation (r = -0.55) between malnutrition and academic performance. The findings emphasize that addressing malnutrition is essential not only for health but also for improving educational outcomes

1. Introduction

Malnutrition remains a significant public health challenge, particularly in developing countries, where it adversely affects the growth, health, and academic performance of children. The nutritional status of children is intricately linked to their cognitive development and educational outcomes, making it imperative to understand the impact of malnutrition on academic performance.[1]

Research indicates that malnutrition, particularly in its acute form, has a direct correlation with cognitive achievement and educational attainment. [2] Acharya et al. found that children aged 8-11 years in rural South India who experienced acute malnutrition exhibited significantly lower math scores and educational attainment compared to their well-nourished peers. [3] This suggests that immediate nutritional deficiencies can hinder cognitive function, which is crucial for learning and academic success. Similarly, the studies highlighted that child from scheduled caste backgrounds who suffered from malnutrition performed poorly in educational assessments, reinforcing the notion that nutritional status is a critical determinant of academic performance. [4,5]

Moreover, the role of dietary diversity in promoting better nutritional outcomes cannot be overlooked. Kabahenda et al. emphasized that improving dietary diversity through nutrition education can lead to significant enhancements in children's growth and health, thereby positively influencing their academic performance. [6,7] This is particularly relevant in resource-limited settings, where access to a variety of nutritious foods is often restricted. The findings from these studies underscore the necessity of implementing community-based nutritional interventions to address dietary deficiencies and improve educational outcomes.

Parental education, especially maternal education, plays a pivotal role in shaping children's nutritional status. Srivastava et al. noted that higher levels of maternal education are associated with improved nutritional outcomes for children, as educated mothers are more likely to make informed dietary choices for their families. [8,9] This relationship is further supported by research from Abuya et al., which demonstrated that maternal education significantly impacts child nutritional status, thereby influencing their academic performance. [10] The implication is clear: enhancing maternal education could serve as a powerful tool in combating malnutrition and improving educational outcomes for children.

In addition to maternal education, socio-economic factors significantly influence children's nutritional status and academic performance. Ghosh et al. found that household poverty and socio-economic status are critical determinants of child nutrition, with families in lower socio-economic brackets often unable to provide adequate nutrition for their children. [11] This creates a cycle of poverty and poor health, where malnourished children are less likely to perform well academically, perpetuating their socio-economic disadvantage.

Addressing these socio-economic disparities through targeted interventions is essential for breaking this cycle and improving the nutritional status and educational outcomes of children. So the present

study aimed to assess the impact of malnutrition on the academic performance of school children at selected school, Tiruvallur district.

2. Materials and Methods

The research was approved by Institution ethical committee. This study adopted a cross-sectional design to examine the impact of malnutrition on the academic performance of school children aged 6 to 12 years in a government school in Tiruvallur District, Tamil Nadu. A sample of 30 students was selected using convenient sampling to include varying nutritional statuses based on school health records. Parental consent was obtained for each participant.

The inclusion criteria for this study were children aged 6 to 12 years who were enrolled in the selected school, with parental or guardian consent provided for participation. Exclusion criteria included children with known chronic illnesses that could impact growth or academic performance, students who were absent during the data collection period, and those without parental or guardian consent.

The tools used for data collection in this study included anthropometric measurement tools, such as a digital weighing scale and a stadiometer or height measuring tape, to obtain each child's Body Mass Index (BMI) as an indicator of nutritional status. Academic performance was assessed using recent exam scores and academic records from the school, providing an objective measure of each student's academic performance. Additionally, a structured questionnaire was administered to parents or guardians to gather background information, including socio-economic status and dietary habits, which could influence both nutrition and academic outcomes.

The data collection procedure for this study involved two main steps: nutritional assessment and academic performance evaluation. First, anthropometric measurements, including height, weight, and BMI, were taken to assess each child's nutritional status. These measurements were conducted in a private setting within the school premises by trained personnel using standardized equipment. Next, academic performance data were collected from recent exam scores available in school records, providing an objective measure of each student's academic standing. Additionally, a brief questionnaire was administered to the parents or guardians to gather supplementary information on socio-economic status and dietary patterns. Parental consent was obtained prior to data collection, and confidentiality of all information was ensured throughout the study.

This study utilized descriptive analysis to calculate the frequency and percentage of demographic variables and malnutrition types—stunting, underweight, and thinness—among children. Inferential

analysis using Pearson's correlation revealed a moderate, significant negative association ($r = -0.55$, $p < 0.05$) between malnutrition and academic performance, indicating that poorer nutritional status correlates with lower academic outcomes.

3. Results

Table 1 shows that the majority of children are between 11-12 years of age, with a slightly higher proportion of females (53.3%) compared to males (46.7%). Most children belong to a middle socio-economic background (50%), and their parents primarily have a secondary level of education (40%). Additionally, most families have more than two members (80%), with a higher prevalence of non-vegetarian diets (56.7%) and rural residence (63.3%).

Table 2 presents anthropometric measurements, revealing that the average height and weight of the children are 133.24 cm and 30.19 kg, respectively, with most children falling within a BMI range of 18.5 to 24.9, indicating a normal weight status. However, as shown in Table 3, malnutrition remains a significant issue, with 50% of the children experiencing some form of malnutrition—ranging from mild to severe. Specifically, 26.7% of children exhibit mild malnutrition, 16.7% moderate, and 6.7% severe malnutrition.

Furthermore, Table 4 highlights a notable correlation between malnutrition and academic performance, with a correlation coefficient (r) of -0.55, indicating a moderate negative relationship. This suggests that malnutrition has a detrimental effect on children's academic outcomes. The p-value of 0.004 further supports the statistical significance of this correlation, emphasizing the importance of addressing nutritional deficiencies to improve both health and educational achievement among school children. Overall, the findings underscore the critical need for nutritional interventions to enhance children's well-being and academic success.

Table 1: Demographic Variables of the school children

Variable	Category	Frequency	Percentage (%)
Age	6-8 years	8	26.7
	9-10 years	10	33.3
	11-12 years	12	40.0
Gender	Male	14	46.7
	Female	16	53.3
Socio-economic Status	Low	10	33.3

	Middle	15	50.0
	High	5	16.7
Parental Education Level	Primary or less	7	23.3
	Secondary	12	40.0
	Tertiary	11	36.7
Family Size	1-2 members	6	20.0
	Above 2 members	24	80.0
Diet	Vegetarian	13	43.3
	Non-Vegetarian	17	56.7
Residence Type	Urban	11	36.7
	Rural	19	63.3

Table 2: Anthropometric Measurements of school children

Measurement	Range	Frequency	Mean Value
Height (cm)	110 - 120 cm	5	133.24
	120 - 130 cm	5	
	130 - 140 cm	9	
	140 - 150 cm	11	
Weight (kg)	18 - 25 kg	9	30.19
	25 - 32 kg	10	
	32 - 39 kg	7	
	39 - 45 kg	4	
BMI	14 - 16	2	19.22
	16 - 18.5	13	
	18.5 - 24.9	15	

Table 3: Prevalence of Malnutrition

Category	BMI Range	Frequency	Percentage (%)
Normal	18.5 - 24.9	15	50.0
Mild Malnutrition	17.0 - 18.4	8	26.7
Moderate Malnutrition	16.0 - 16.9	5	16.7
Severe Malnutrition	Less than 16	2	6.7

Table 4: Correlation of malnutrition with the academic performance

S.No	Correlation	Measure	Value
1.	Malnutrition with Academic performance	Correlation Coefficient (r)	-0.55
		p-value	0.004

4. Discussion

The findings of the study indicate a significant prevalence of malnutrition among school children in Thiruvallur District, with 50% of the children experiencing varying degrees of malnutrition—26.7% with mild, 16.7% with moderate, and 6.7% with severe malnutrition. This prevalence is alarming and underscores the urgent need for targeted nutritional interventions. The anthropometric measurements reveal an average height of 133.24 cm and an average weight of 30.19 kg, with most children exhibiting a normal Body Mass Index (BMI). However, despite the normal BMI readings, the high rates of malnutrition indicate that BMI alone may not fully capture the nutritional status of children, as it does not account for micronutrient deficiencies or the overall quality of the diet. [12]

The moderate negative correlation (r = -0.55) between malnutrition and academic performance suggests that poor nutritional status adversely affects academic success. This finding aligns with existing literature that highlights the detrimental effects of malnutrition on cognitive development and educational outcomes. For instance, Kirolos et al. conducted a systematic review that found a consistent association between childhood malnutrition and impairments in neurodevelopment, cognitive function, and academic performance. [13] The cognitive deficits resulting from malnutrition can hinder children's ability to concentrate, process information, and perform academically, ultimately affecting their long-term educational trajectories.

Moreover, the impact of malnutrition on academic performance is not merely a reflection of physical health but also encompasses psychological and social dimensions. Malnourished children often experience increased absenteeism and lower engagement in school activities, which can further exacerbate academic challenges. A study by Lew et al. emphasized that malnutrition is linked to poorer clinical outcomes, including reduced participation in educational settings, which can lead to a cycle of underachievement and continued nutritional deficiencies. [14,15] This cycle is particularly concerning in low-resource settings, where educational opportunities may already be limited.

The findings also highlight the importance of addressing not only the immediate nutritional needs of children but also the broader socio-economic factors that contribute to malnutrition. Improving access

to nutritious foods, enhancing maternal education, and providing health education can collectively contribute to better nutritional outcomes and, consequently, improved academic performance.

5. Conclusion

The study concluded that a high prevalence of malnutrition among school children with 50% affected, and a moderate negative correlation (r = -0.55) between malnutrition and academic performance. The findings emphasize that addressing malnutrition is essential not only for health but also for improving educational outcomes. Malnourished children face disadvantages that impact their cognitive development and future opportunities. Targeted interventions, such as enhancing maternal education, promoting dietary diversity, and implementing community-based nutritional programs, are vital. Collaboration among policymakers, educators, and health professionals is crucial to meet children's nutritional needs, supporting their academic success and long-term potential.

Recommendations

To address malnutrition, implement nutrition education for caregivers, strengthen school meal programs, and conduct regular health screenings. Community awareness and supplementation initiatives can help tackle nutrient deficiencies, while partnerships with healthcare providers can support severely malnourished children. These measures aim to improve growth, health, and academic performance among affected children.

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Conflicts of Interest

No

Refrences

1. Müller, O., & Krawinkel, M. (2005). Malnutrition and health in developing countries. *CMAJ: Canadian Medical Association Journal*, 173(3), 279–286. https://doi.org/10.1503/cmaj.050342
2. Zerga, A. A., Tadesse, S. E., Ayele, F. Y., & Ayele, S. Z. (2022). Impact of malnutrition on the academic performance of school children in Ethiopia: A systematic review and meta-analysis. *SAGE Open Medicine*, 10, 20503121221122398. https://doi.org/10.1177/20503121221122398
3. Acharya, Y., Luke, N., Haro, M., Rose, W., Russell, P., Oommen, A., & Minz, S. (2019). Nutritional status, cognitive achievement, and educational attainment of children aged 8-11 in rural South India. *PLOS ONE*, 14(10), e0223001. https://doi.org/10.1371/journal.pone.0223001
4. Rawat, R., & Unisa, S. (2021). Association between nutritional status of scheduled caste children and their educational performance in rural Barabanki district, Uttar Pradesh, India. *Clinical Epidemiology and Global Health*, 12, 100849. https://doi.org/10.1016/j.cegh.2021.100849

5. Rashmi, M. R., Shweta, B. M., Fathima, F. N., Agrawal, T., Shah, M., & Sequeira, R. (2015). Prevalence of malnutrition and relationship with scholastic performance among primary and secondary school children in two select private schools in Bangalore rural district (India). *Indian Journal of Community Medicine*, 40(2), 97–102. https://doi.org/10.4103/0970-0218.153871
6. Alqahtani, Y., Assiri, O. A. A., Al-Shahrani, N. S. S., Alyazidi, N. S. S., & Alshahrani, M. S. H. (2020). Relationship between nutritional habits and school performance among primary school students in Asser Region. *Journal of Family Medicine and Primary Care*, 9(4), 1986–1990. https://doi.org/10.4103/jfmpc.jfmpc_885_19
7. Kabahenda, M., Andress, E., Nickols, S., Kabonesa, C., & Mullis, R. (2013). Promoting dietary diversity to improve child growth in less-resourced rural settings in Uganda. *Journal of Human Nutrition and Dietetics*, 27(s2), 143–151. https://doi.org/10.1111/jhn.12056
8. Rezaeizadeh, G., Mansournia, M. A., Keshtkar, A., Farahani, Z., Zarepour, F., Sharafkhah, M., Kelishadi, R., & Poustchi, H. (2024). Maternal education and its influence on child growth and nutritional status during the first two years of life: A systematic review and meta-analysis. *EClinicalMedicine*, 71, 102574. https://doi.org/10.1016/j.eclinm.2024.102574
9. Srivastava, A., Mahmood, S. E., Srivastava, P. K., Shrotriya, V. P., & Kumar, B. (2012). Nutritional status of school-age children: A scenario of urban slums in India. *Archives of Public Health*, 70(1), 8. https://doi.org/10.1186/0778-7367-70-8
10. Abuya, B., Ciera, J., & Kimani-Murage, E. (2012). Effect of mother's education on child's nutritional status in the slums of Nairobi. *BMC Pediatrics*, 12(1), 80. https://doi.org/10.1186/1471-2431-12-80
11. Ghosh, P. K., Das, P., Goswam, D. R., Islam, A., Chowdhury, S., Mollah, M. M. H., & Chowdhury, F. (2021). Maternal characteristics mediating the impact of household poverty on the nutritional status of children under 5 years of age in Bangladesh. *Food and Nutrition Bulletin*, 42(3), 389–398. https://doi.org/10.1177/0379572121999016
12. Kirolos, A., Goyheneix, M., Eliasz, M. K., Chisala, M., Lissauer, S., Gladstone, M., & Kerac, M. (2022). Neurodevelopmental, cognitive, behavioural, and mental health impairments following childhood malnutrition: A systematic review. *BMJ Global Health*, 7(7), e009330. https://doi.org/10.1136/bmjgh-2022-009330
13. Maasberg, S., Knappe-Drzikova, B., Vonderbeck, D., Jann, H., Weylandt, K., Grieser, C., & Pape, U. (2015). Malnutrition predicts clinical outcome in patients with neuroendocrine neoplasia. *Neuroendocrinology*, 104(1), 11–25. https://doi.org/10.1159/000442983
14. Lew, C. C. H., Yandell, R., Fraser, R., Chua, A., Chong, M. F. F., & Miller, M. (2016). Association between malnutrition and clinical outcomes in the intensive care unit: A systematic review. *Journal of Parenteral and Enteral Nutrition*, 41(5), 744–758. https://doi.org/10.1177/0148607115625638
15. Amoadu, M., Abraham, S. A., Adams, A. K., Akoto-Buabeng, W., Obeng, P., & Hagan, J. E. Jr. (2024). Risk factors of malnutrition among in-school children and adolescents in developing countries: A scoping review. *Children*, 11(4), 476. https://doi.org/10.3390/children11040476