



International Journal of Engineering, Science and Humanities

An international peer reviewed, refereed, open-access journal
Impact Factor 8.3 www.ijesh.com ISSN: 2250-3552

Evaluation Of Nutritional Status And Mid-Day Meal Programme Among School-Going Children

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Abstract

School age is a critical period for growth, cognitive development, socialization and formation of lifelong dietary practices. Nutritional deficits during this stage may lead to thinness, stunting, micronutrient deficiency, reduced attention in class and lower school participation. The Mid-Day Meal Programme, now implemented as PM POSHAN in India, is one of the largest school-based nutrition interventions and aims to reduce classroom hunger while improving school participation and nutritional status. A descriptive cross-sectional study design was used among 150 school going children from classes I to VIII. Data were collected through a socio-demographic questionnaire, anthropometric assessment, dietary assessment, mid-day meal utilization schedule and hygiene checklist. Anthropometric measurements were interpreted using standard age- and sex-appropriate indicators, including BMI-for-age and height-for-age. The study found that 72.7% of children had normal BMI-for-age, while 16.0% were thin and 5.3% were severely thin. Regular mid-day meal consumption was reported by 68.0% of children. Regular consumers showed a higher proportion of normal nutritional status compared with irregular consumers. Most children reported satisfaction with taste, quantity and regularity of meals, although variation in menu diversity, hygiene monitoring and nutrition education emerged as areas requiring improvement.

Keywords: School health; Nutritional status; Mid-Day Meal Programme

I. INTRODUCTION

School-going children represent a major population group in public health because the school environment brings together growth, learning, social behaviour and health service delivery. Adequate nutrition during the school years supports physical growth, immunity, attention span, memory and regular participation in education. The World Health Organization provides growth references for children and adolescents aged 5-19 years, including BMI-for-age and height-for-age indicators, which are commonly used to classify thinness, overweight, obesity and stunting. These indicators make nutritional assessment more objective because they compare the child with



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age- and sex-specific reference standards rather than relying only on crude weight or height. In India, child nutrition remains a public health priority because malnutrition appears in multiple forms: undernutrition, micronutrient deficiency, stunting, thinness and, in some settings, emerging overweight. UNICEF emphasizes that nutrition programmes must prevent malnutrition across the life course and strengthen early detection where prevention fails.² Although preschool nutrition receives substantial attention, school-age nutrition is equally important because children continue to grow, experience increasing academic demands and often begin to make independent food choices. Schools therefore become important platforms for nutrition assessment, health education and meal delivery.

School health is not limited to disease prevention. It includes nutrition, sanitation, mental well-being, physical activity, health education and a safe learning environment. A child who attends school hungry or with chronic nutritional deficiency may be physically present but unable to concentrate properly. Nutritional status is therefore directly linked with educational achievement and classroom participation. Public health nutrition recognizes that school-based interventions can reach large numbers of children at a relatively low delivery cost because schools already have administrative systems, teachers, attendance registers and community linkages.

Child nutrition in the school setting is shaped by the household food environment, parental literacy, socio-economic condition, food prices, cultural food practices, sanitation, infections and the quality of public nutrition programmes. Thus, evaluation of school children requires a broader view than measuring weight and height only. It requires observation of dietary diversity, meal frequency, participation in school meals, hygiene practices and student perception of the food provided.

II. LITERATURE REVIEW

Concept of Nutritional Status

Nutritional status is the measurable outcome of dietary intake, nutrient absorption, metabolism, health status and environmental conditions. In children, it is not a fixed condition but a dynamic state affected by growth velocity, infection, physical activity and food availability. A child may receive enough calories but lack micronutrients, or may have adequate weight but poor linear growth. Therefore, nutritional status requires multiple indicators and contextual interpretation.

Growth and Development Among School-Going Children

School age includes continued somatic growth and early adolescent changes in older children. Although growth is slower than infancy, it is steady and can be influenced by diet, infection and physical activity. Height-for-age indicates chronic nutritional history, while BMI-for-age indicates body mass in relation to age and sex. The WHO 2007 growth reference for 5-19 years complements earlier child growth standards and supports interpretation across school-age and adolescent years.



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Common Nutritional Problems Among School Children

Common nutritional problems include thinness, stunting, underweight, anaemia, vitamin A deficiency, iodine deficiency, poor dietary diversity and, increasingly, overweight. Thinness may indicate recent or continuing insufficiency of energy intake. Stunting usually reflects long-term deprivation or recurrent infection. Anaemia may reduce concentration and stamina. Overweight, although less common in some government school settings, can emerge where packaged snacks, sweetened beverages and low physical activity are common.

Assessment of Nutritional Status

Nutritional assessment in school children can include anthropometry, clinical examination, dietary assessment, biochemical tests and functional indicators. In public health field studies, anthropometry and dietary assessment are often most feasible. Height, weight and BMI can be measured using portable instruments. Dietary assessment can be conducted through food-frequency questions, meal pattern forms and recall of school meal consumption.

Anthropometric Indicators of Nutritional Status

Anthropometry is a practical tool because it is inexpensive, non-invasive and suitable for school settings. BMI-for-age is used to classify severe thinness, thinness, normal status, overweight and obesity. Height-for-age indicates stunting. Weight-for-age is useful mainly for younger school children and should be interpreted with care in older children because it does not distinguish height from body mass. The present study uses BMI-for-age, height-for-age and weight-for-age to provide a comprehensive profile.

III. RESEARCH METHODOLOGY

Research Approach

A quantitative research approach was adopted because the study measured nutritional status, dietary habits and programme utilization using structured tools and numerical analysis. Quantitative assessment allowed comparison across groups and testing of associations between mid-day meal utilization and nutritional status.

Research Design

A descriptive cross-sectional study design was used. The design was appropriate because data on anthropometric status, dietary habits and mid-day meal utilization were collected at one point in time from selected school-going children. The design enabled estimation of prevalence of thinness, normal nutritional status and other categories.

Study Setting

The study was conducted in a selected school covered under the Mid-Day Meal Programme / PM POSHAN Scheme. The school had classes from I to VIII and provided a cooked meal during school hours. The setting was suitable because it enabled direct assessment of children and observation of meal practices.



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Study Population

The study population comprised school-going children enrolled in classes I to VIII in the selected school.

Target Population

The target population included school-going children receiving school-based nutrition support under the Mid-Day Meal Programme.

Accessible Population

The accessible population included children present during the period of data collection and meeting the inclusion criteria.

Sample Size

A sample size of 150 children was selected for the study. This size was considered adequate for descriptive analysis and preliminary association testing within the selected school setting.

Sampling Technique

A stratified proportionate sampling technique was used to include children from primary and upper primary classes. Within each class, eligible children were selected by simple random sampling from attendance registers.

Inclusion Criteria

Children enrolled in classes I to VIII, present during data collection, willing to participate through assent and having parental consent were included.

Exclusion Criteria

Children absent during data collection, children with acute illness at the time of measurement, children with physical conditions preventing reliable height or weight measurement and children without consent were excluded.

Data Collection Procedure

Permission was obtained from the school authority. Parents were informed and consent was obtained. Children were briefed and assent was taken. Socio-demographic and dietary information was collected, anthropometric measurements were recorded and mid-day meal practices were observed using the checklist.

Ethical Considerations

Ethical principles of voluntary participation, informed consent, assent, confidentiality and non-maleficence were followed. No invasive procedure was used. Children identified as severely thin or requiring attention were recommended for referral through school health services.

Plan for Data Analysis

Data were entered and analysed using descriptive and inferential statistics. Frequencies and percentages were used for categorical variables. Mean and standard deviation were used for



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continuous variables. Chi-square test was applied for association between categorical variables. A p value less than 0.05 was considered statistically significant.

Limitations of Methodology

The cross-sectional design cannot establish causality. Dietary data may be affected by recall bias. Anthropometric classification depends on accurate age and measurement. The study was limited to a selected school and findings may not be generalized to all schools without caution.

IV. DATA ANALYSIS AND INTERPRETATION

The analysis is organized according to socio-demographic profile, dietary habits, mid-day meal utilization, anthropometric status, satisfaction, hygiene observations and hypothesis testing. Frequencies, percentages and chi-square tests were used to describe and interpret the findings.

Table 1: Distribution of children according to age group

Age group	Frequency	Percentage
6-8 years	48	32.0
9-11 years	62	41.3
12-14 years	40	26.7
Total	150	100.0

Interpretation: The majority of children were in the 9-11 year age group, indicating that the sample mainly represented middle primary and upper primary classes. Inclusion of all age groups helped compare utilization across school levels.

Table 2: Distribution of children according to gender



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Gender	Frequency	Percentage
Male	78	52.0
Female	72	48.0
Total	150	100.0

Distribution of Children by Gender (n=150)

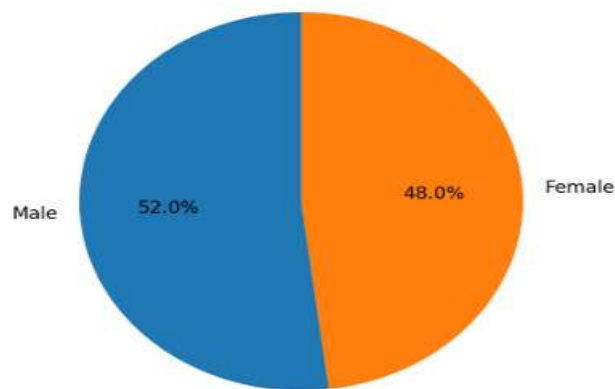


Figure 1: Distribution of children by gender

Interpretation: The gender distribution was almost balanced, with a slightly higher proportion of boys. This improves comparability of nutritional status across sex groups.

Table 3: Distribution of children according to class

Class group	Frequency	Percentage
Classes I-III	45	30.0
Classes IV-V	48	32.0
Classes VI-VIII	57	38.0
Total	150	100.0



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Interpretation: Children from both primary and upper primary classes were included. Upper primary children formed the largest class group, which is useful because meal norms differ between primary and upper primary levels.

Table 4: Family and socio-economic profile of children

Variable	Category	Frequency	Percentage
Type of family	Nuclear	84	56.0
Type of family	Joint	66	44.0
Mother education	Up to primary	54	36.0

V. RESULTS AND DISCUSSION

Summary of Key Results

The study included 150 school-going children from classes I to VIII. Most children belonged to the 9-11 year age group and the sample had nearly equal representation of boys and girls. Regular mid-day meal consumption was reported by 68.0% of children. BMI-for-age assessment showed that 72.7% were normal, 16.0% were thin, 5.3% were severely thin and 6.0% were overweight. Height-for-age assessment showed stunting among 17.3% of children.

Discussion Characteristics on Socio-Demographic Characteristics

The socio-demographic profile suggested that many children came from lower and lower-middle socio-economic households. This is important because school meals may be particularly valuable for children whose households face food insecurity or limited dietary diversity. Mother education was significantly associated with nutritional status, which may reflect better feeding practices, hygiene awareness and health-seeking behaviour among families with higher maternal literacy.

Discussion on Dietary Habits of School Children

Daily breakfast was reported by most children, but fruit intake was low and packaged snack consumption was common. This pattern indicates that school meal programmes cannot work in isolation. A child who consumes a mid-day meal but regularly skips breakfast or consumes low-nutrient snacks may still be at risk. Nutrition education for children and parents should emphasize



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breakfast, pulses, vegetables, fruits, safe water and reduced consumption of unhealthy packaged snacks.

Discussion on Nutritional Status of Schoolgoing Children

The prevalence of thinness and stunting in the study indicates that undernutrition remains relevant among school-age children. Stunting reflects long-term deprivation and may not respond quickly to short-term interventions. Thinness may reflect current dietary inadequacy or illness. Regular school meals, deworming, iron-folic acid supplementation, health check-ups and household food security measures are required together to improve child growth.

Discussion on Mid-Day Meal Programme Utilization

Regular consumption by 68.0% of children shows that the programme is accepted by a majority. However, irregular consumption among nearly one-fourth and rare consumption among 8.0% of children requires attention. Reasons may include taste preference, menu repetition, peer influence, bringing food from home or concern about cleanliness. Programme success depends not only on cooking and serving food but also on ensuring that children willingly consume it.

Discussion On Quality and Acceptability of Midday Meal

Children were more satisfied with quantity than menu variety. This suggests that meals may be adequate in amount but require better diversity. Incorporating seasonal vegetables, pulses, local grains, fortified ingredients and culturally acceptable recipes can improve acceptability. Teachers and school management committees should collect periodic feedback from students, especially younger children who may hesitate to complain.

VI. CONCLUSION

The study concluded that most school-going children had normal BMI-for-age, but thinness, severe thinness and stunting were present in a meaningful proportion. The Mid-Day Meal Programme was regularly consumed by more than two-thirds of children and was significantly associated with nutritional status. The programme was generally acceptable, particularly in relation to quantity, but menu variety and hygiene monitoring required improvement. Nutritional status was also influenced by maternal education, daily breakfast and vegetable consumption. Therefore, school nutrition programmes should be strengthened through integrated action involving school meals, nutrition education, growth monitoring and household counselling.

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