Malnutrition is one of the largest public health problems in developing countries. India contributes 1/3rd of total malnourished children in the world, with prevalence as high as 29.4%. Chronic malnutrition experienced during early life inhibits growth, retards mental development; reduce motivation and energy level, causing reduction in educational attainments. The purpose of this study was to assess the association of malnutrition with scholastic performance among 8–12 year children in 2 selected private schools in Meerut. This cross sectional study was done among 8–12 year school going children, with sample size of 384, taking the prevalence as 50%, precision as 10%. The private schools were selected randomly from the list of urban schools in Meerut. Malnutrition was assessed using anthropometric measurements and records from school were used to analyze scholastic performance. A total of 483 children across 2 private schools were evaluated wherein 29% of children were found to be malnourished. A significant association between malnutrition and scholastic performance was observed. In conclusion, nutrition have significant impact on the scholastic performance, with all programs running in government schools there is a need for a program in private schools as well.

Key words: 8-12 year school children, Malnutrition, Private schools, Scholastic performance, Urban Meerut

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meal’. But mid-day meal is provided only in the government schools but not in private schools. There is dearth of studies focusing on the nutritional status of children in private schools and also those trying to assess the relationship between malnutrition and academic performance.

Thus this study was an attempt to estimate the nutritional status of children attending private schools and also assess the relationship between malnutrition and academic performance. By doing so, we intend to provide evidence for the policy makers to focus on nutrition of school children; irrespective of the type of school they belong to.

The present study was thus carried with the aim and objectives of:-

1. To assess the nutritional status in school going children of 8–12 years of age in private schools of urban Meerut.
2. To assess the association of malnutrition with scholastic performance among selected school going children.

Material and methods

Selection of study population and schools

Present study was done in 2 randomly selected private schools of urban Meerut. The schools with similar fee structure of ₹1500/- to ₹2500/- were selected to avoid selection bias. The sample size was calculated to be 384 by taking the prevalence of malnutrition as 50%, and relative precision as 10%, with 95 % confidence interval. To avoid the selection bias, all children aged 8-12 years who were present in school on the day of visit and present with complete information, were included in the study. Total 483 students gave the complete information, were included in the study.

Data collection

Complete information was received with the help of school teacher and parents which was followed by detailed examination of child. The information was obtained on pre designed and pre tested questionnaire, which was being prepared with the help of teachers and parents. Height and weight of children was obtained by using height measuring scale and electronic weighing scale with minimum error of 100 gm. The values for height, weight and BMI was transformed to Z scores by using WHO charts.

The health indicators used on the basis of Z score were

a. Under weight: children with weight for age Z score below < 2 SD from the median of the reference population were considered to be under weight for their age.

b. Stunting: Stunting is an indicator of linear growth retardation relatively uncommon in the first few months of life. However it becomes more common as children get older. Children with height-for-age z-scores below −2 SD from the median of the reference population are considered short for their age or stunted.

c. Thinness: Children with BMI-for-age z-scores below −2 SD from the median of the reference population were considered thin, while those with Z scores above 2 SD from the median of the reference population were considered obese.

Assessment of academic performance

The scholastic performance was assessed by obtaining compiled report card from the class teacher. The overall percentage was divided into Good (percentage >70%, CBSE grade A1, A2 and B1) and Poor (percentage ≤ 70%, CBSE grade < B2).

Analysis

The collected data was compiled and analyzed using EPI info software version 3.7.2 and relevant statistical test were used. A p value < 0.05 was considered statistically significant.

Results

Study was done on all children of age 8 to 12 years present in the selected schools. A total of 483 students, who were present on the day of examination and gave the complete information were included in the study.

Among all 483 children, 29% (141) were found to be underweight with Z score < 2SD, Stunting (Z score < 2SD) was present in 12% of the study subjects and BMI with Z score < 2 SD was found among 22% (105) of the children and 2% (12) children. (Table 1)

Of the total 483 students, 124 (26%) had poor scholastic performance (Score ≤ 70%) and rest of the students 359 (74%) had score > 70%.

The Z scores of weight, height and BMI were compared with the academic performance in the school, it was found poor scholastic performance was found to be significantly associated with under-weight, stunting and BMI (p < 0.05). (Table 2)

Of the total 141 underweight children, 48 children (34%) had poor scholastic performance (Score ≤ 70%), while among 342 normal weight children, 76 children (22%) had poor scholastic performance, the difference was found to be statistically significant (p < 0.05).
Of the 60 stunted children, 28 (47%) children were found to be having poor scholastic performance, while among normal height children, 96 (23%) were having poor scholastic performance. This difference was found to be statistically significant (p < 0.05).

Among children having BMI < 2SD (105), 37 (36%) children had poor scholastic performance, while children with BMI in normal range (366), 83 (23%) had poor scholastic performance and this difference was found to be statistically significant.

On clinical examination of all 483 children, clinical pallor was found to be present in 55% children with maximum proportion among the girls (61%)

**Discussion**

The present study was a cross sectional study done to find the prevalence of malnutrition among private school children and also to assess the relationship between nutritional status and academic performance. Study revealed a high prevalence of malnutrition among children attending private schools and a significant relationship between several indicators of nutritional status and academic performance of students.

In our study 29% children were found to be underweight, using WHO 2007 standards. These results are comparable to the Clinical, anthropometry and biochemistry (CAB Uttar Pradesh, 2014)\(^7\), Rashmi et al (2014)\(^4\) and Singh et al (2014)\(^8\) which reported prevalence as 27.2%, 20% and 28.9% respectively. While study by Bhoite et al\(^9\) reported higher prevalence of under-weight as 64% among school going children.

Stunting was present in 60 children, giving prevalence of 12%. The results are comparable to study by Rashmi et al (2014)\(^4\) and Singh et al\(^8\) which reported prevalence of 7% and 21.8%, while a higher prevalence was reported by Clinical, anthropometry and biochemistry (CAB Uttar Pradesh, 2014)\(^7\) and Hasan et al (2013)\(^10\) as 62% and 40.4%.

In the present study the BMI < 2 SD was found to be 22% which was comparable to the study by Clinical, anthropometry and biochemistry (CAB Uttar Pradesh, 2014)\(^7\), which reported prevalence as 13.9%. While the study by Rashmi et al (2014)\(^4\) reported prevalence 34%.

Weight for age, height for age and BMI for age were compared with academic performance it was found to be statistically significant (p < 0.05) and the results were comparable to findings by Rashmi et al (2014)\(^4\).
Conclusion

This study revealed that prevalence of malnutrition (29%) was very high and it showed a significant relationship with scholastic performance. Children in Indian family have been stated to be taken care of by God or by the recipes of household knowledge of their parents and grand-parents and leave the child on mercy of fate. Especially in today’s competitive world, where there is no scope for an average child, poor academic performances due to malnutrition can debarred a child from a bright and beautiful future.

Recommendations

The present study recommends that efforts should be made to reduce the prevalence of malnutrition among school children. For this regular health check-ups should be done at schools with the help of school authorities and hospitals. All teachers and parents should be given health and nutritional education sessions by the health experts to enforce healthy eating habits among children. Parents to be informed about the health status of the children by class teachers during parent teacher meetings and appropriate measures should be taken to improve the lunch pack. None the less even government policy should be made also at private schools to start a Nutrition Supplementation Programme.

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Conflict of interest: None

References