Original Research Article

Assessment of nutrition and its effect on scholastic performance of school going children in rural field practice area of Jhalawar Medical College, Jhalawar, Rajasthan

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ABSTRACT

Background: Health is a universal human need. School going children constitute one-fifth of the total population and are the future of the nation. The health supervision of school going children is necessary and can help identify the magnitude of morbidity and malnourishment in a community. Malnutrition is associated with significant morbidity, mortality and economic costs in developing countries. In most part of our country, the children in rural areas are nutritionally deprived and are prone to illnesses. A child who is undernourished owing to socioeconomic or other reasons is prone to get diseases and often misses classes and therefore may not perform well in the examinations. Objectives of current study were to assess the nutrition of children attending a government school in rural field practice area of Jhalawar Medical College and to study the association of nutritional status with scholastic performance.
Methods: A cross-sectional study was done among children studying in the Government School of Mandawar, Rajasthan. Demographic and socio-economic variables were obtained. Their nutritional status was calculated in terms of weight for height and weight for age and were assessed clinically for presence of any diseases. Attendance and grades were obtained from class teacher to assess the scholastic performance.
Results: Out of 122 students studied, based on the anthropometric measurements, dietary intake and physical examination, nutrition status was found good among 77 (63%) students and poor in 45 (37%) students. Students with good nutritional status are more likely to have good scholastic performance.
Conclusions: Nutrition impacts the attendance and grades of the students.

Keywords: Children, Nutrition, Attendance, Grades, School performance

INTRODUCTION

There are nearly one billion adolescents in the world accounting for 20-25% of total population in the developing countries. This particular group of population is likely to increase rapidly in the next 30 years due to population momentum effect.[1,2] Owing to sudden and special growth taking place in this phase, the nutritional requirements also increase tremendously. Nutrition is concerned primarily with the part played by the body growth, development and maintainance.[3,4] Malnutrition refers to deficiencies, excesses or imbalances in a person's intake of energy and/or nutrients.[5,6] A healthy childhood will lead to an equally healthy adulthood, provided the children are well taken care of in terms of nutrition.[7] In most part of the country, the children in rural areas are nutritionally deprived and are more prone to illnesses. A child who is undernourished owing to

socioeconomic or other reasons is prone to get diseases which are easily communicable.[8] Despite the well-known importance of nutritional health several cultural, social, political, economic and educational factors contribute to malnutrition among children. A child with repeated illness misses classes and therefore may not perform well in the examinations.[9] Schools are the best place to start training the children about the importance of nutrition.[10]

METHODS

A cross-sectional study was designed to enrol all the children studying from class VI to VIII in a government primary school of rural field practice area of the Jhalawar Medical College, Jhalawar situated in the south-eastern part of Rajasthan, India for a duration of two months from 12 October 2020 to 11 December 2020 after obtaining permission from the school authorities and institutional ethics committee to conduct the study. School children in the age group of 12-14 years, present on the day of examination were included in the study.

Sample size

Complete enumeration of study population was considered as a sample size. All study participants were included in our study during study period that fulfil our inclusion exclusion criteria. Finally, 122 study population were selected. Enrolled school children (standard 6-8) present on the examination day were examined.

Procedure

A pre-designed structured questionnaire was used to study the basic socio-demographic details of the school children. After an informed verbal consent from parents and assent from child, height and weight of the student were measured, and BMI was calculated and compared with the WHO child growth standard charts for BMI for age and gender. Height of the children was measured using standardized steel anthropometric rod with parallel bar. Weight was measured with electronic weighing scale. Students were asked to remove their respective footwear and accessories before measuring their weights. Scales were calibrated according to each measurement. A general check-up of all the children who were present on the day of examination was done, and their current morbidity profile were documented. Students were diagnosed with worm infestation on the basis of history given by them. Various other morbidity pattern of children was assessed. Presence of pallor at lower palpebral conjunctiva, nail bed, soft palate, tongue and skin surface was checked and the students were diagnosed for presence of anaemia. The children were asked whether they are experiencing any of the symptoms of anaemia like breathlessness and easy tiredness. Various other diseases were checked for such as skin diseases, dental caries, upper respiratory tract infection, any ear diseases, eye infections were diagnosed from the history and systemic examination. Vision was assessed

using the Snellen's chart. Any illness including associated infectious diseases was treated accordingly in the clinic set up. A dietary survey was conducted by using 24 hours recall method. The dietary guidelines for Indians published by National institute of nutrition (NIN), Hyderabad was used for reference.[11] Dietary intake was recorded in terms of cereals, pulses, all green leafy vegetables, roots and tubers, milk and milk products, fruits, meat and poultry, fats and oils and sugar. The 24 hours dietary recall was taken and the daily nutrient intake was calculated in terms of total energy (calorie) and protein intake and compared with the dietary guidelines given by NIN standard.[12] The school attendance of child in the past 2 months along with the marks of the recent assessment was obtained from school records. Children who were absent on the day of survey were excluded from the study. Attendance was converted into percentages and anything more than 50% attendance is considered as good. Marks were converted into grades and anything more than 50% was considered as good. Mean of both marks obtained and attendance were taken and anything more than 50% was considered good or satisfactory. A total of 154 students were present on the days of our school visits. Among these, there were 32 new comers and they did not have complete details of class test marks and attendance. Therefor these children were excluded, and finally, 122 students were included in the study.

Statistical analysis

Data were entered in Microsoft Excel and data analysis was done using statistical package for social sciences (SPSS trial version 25.0). 'p' value less than 0.05 was considered to be statistically significant. Pearson's Chi-square tests and Fisher's exact test were applicable to study the association between nutritional status and scholastic performance.

RESULTS

The age range of child was between 11 to 15 years. Of all the 122 children in the school, 68 (55.73%) were girls and 54 (44.26%) were boys. The range of age was maximum between 10-14 years (58.4%). Most of the children belonged to Hindu religion. According to WHO growth standards, 77 (63%) children have good nutritional status and 45 (37%) are moderately underweight (weight-for-age <-2SD) (Table 3, Figure 1).
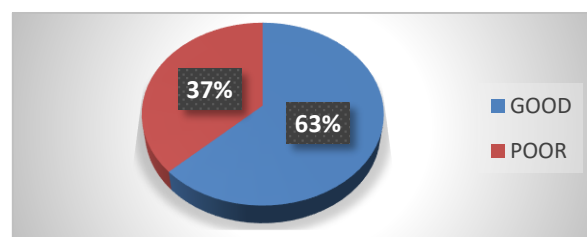
Figure 1: Nutritional profile of school children (WHO BMI charts).

**Table 1: Morbidity pattern of school going children.**

Medical conditions	Girls (n=68) N (%)	Boys (n=54) N (%)	Total (n=122) N (%)
Anaemia	36 (52.9)	24 (35.2)	60 (49.1)
Worm infestation	35 (51.4)	35 (64.8)	70 (57.3)
Upper respiratory infections	28 (41.1)	21 (38.8)	49 (40.1)
Dental caries	18 (26.4)	19 (35.1)	37 (30.3)
Skin infections	14 (20.5)	18 (33.3)	32 (26.2)
Eye infections	15 (22.05)	16 (29.6)	31 (25.4)
Discharging ears	11 (16.1)	12 (22.2)	23 (18.8)
Refractive errors	14 (20.5)	11 (20.3)	25 (20.4)

Table 2: Anaemic status of students by signs and symptoms (n=60).

Clinical signs	N	%
Pallor in conjunctiva	60	100
Pale nails	53	88.3
Spoon shaped nails	39	65
Tiredness	51	85
Breathlessness	31	51.6
Giddiness	4	6.6

A general check-up of all the children who were present on the day of examination was done to assess the morbidity pattern. Anaemia was diagnosed by clinically examining the children for presence of any pallor in the lower palpebral conjunctiva, nail beds, skin, mucous membranes, spoon shaped nails. In the children if the above signs were observed they were further asked about the symptoms like feeling of tiredness, breathlessness or giddiness. As shown in the (Table 2), pallor in conjunctiva was seen in 60 students, pale nails and spoon shaped nails was observed among 53 (88.3%) and 39 (65%) students respectively. Tiredness, feeling breathlessness and giddiness was experienced 51 (85%), 31 (51.6%) and 4 (6.6%) by the students respectively. Prevalence of various other diseases were such as skin diseases, dental caries, upper respiratory tract infection, any ear diseases, eye infections. Worm infestation was found to be the commonest among all of the morbidity patterns assessed followed by anaemia which accounts for 60 (49.1%), followed by upper respiratory tract infections and these are closely followed by dental caries (30.3%),

skin infections (26.2%), eye infections (25.4%), refractive errors (20.4%) and discharging ears (18.8%). Dietary assessment was done by 24 hour recall method. Vegetarian predominated with 89% followed by 19% children who were non-vegetarian. 58% students skip the first meal of the day on daily basis and out which 29% of children skipped breakfast 3-4 times/week. The foods which were consumed on the daily basis included mainly cereals, pulses, fats and oils and sugar. Consumption of pulses was among 81% of the children. 58% consumed milk and milk products which was mostly provided to them through mid-day meals.
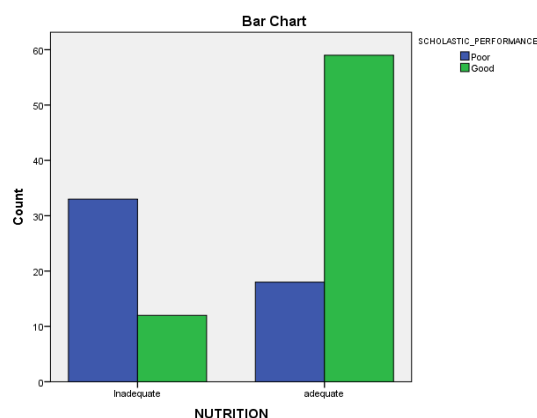
Figure 2: Association of nutritional status with scholastic performance of school children.

Majority of non-vegetarians ate eggs twice a week. Intakes of all the nutrients were converted into calories and proteins and compared with the recommended daily allowance (RDA) of ICMR-NIN chart. The scholastic performance of students was graded; 68 students obtained Grade "A" with girls constituting 67%; and 18%, 71%, and 11% students securing grades "B," "C," and "D," respectively. Grades "A" and "B" were taken as good academic performance, and grades "C" and "D" were taken to be poor performance. Academically, 71 (58.2%) had good grades and 51 (41.8%) performed poorly out of which 14% were boys. On applying Pearson's Chi square test, there was significant association of nutrition with the scholastic performance of the school children ($p<0.001$) as shown in (Table 1). It was found that students with good nutritional status had more chances of having better scholastic performance as compared to students with poor nutrition (Table 3, Figure 2) where OR represents odds ratio and CI represents confidence interval.

Table 3: Association of nutrition on scholastic performance among children.

Nutrition (WHO child growth standards)	Scholastic performance		OR	95% CI	P value
	Good	Poor			
Good (weight-for-height >2SD)	33 (73.3)	12 (26.7)	0.468	1.344-4.248	<0.001
Moderately underweight (weight-for-age <2SD)	18 (23.4)	59 (76.6)	0.986	2.563-5.436	

DISCUSSION

In the present study, we assessed the nutritional status and its association with the scholastic performance in the school going students in rural settings. Despite increase in India's GDP since 2013, still more than one third of world's malnourished children live here. India is facing this challenge as women also do suffer from malnutrition which is the major cause of having babies who suffer from the same problem starting from birth. In India, central and state government health ministries implemented many schemes which mainly targets on nutritional component as well as focusses on the health status of the children. As compared to the better fed peers, person having any sort of nutritional deficiencies are more likely to contract infectious diseases such as tuberculosis, pneumonia, which lead to higher mortality too. The national rural health mission (NRHM) was created in 2005 with the goal to improve the availability of and access to quality health care to people residing especially in rural areas to the vulnerable groups which includes the school going children, incorporating the school health program as a part of it. In the present study we found the commonly prevailing health disorders which included worm infestation (42%), upper respiratory tract infection (36.39%), anaemia (30.99%) dental caries (25.19%) and refractory errors (10.2%). Similar study was done by Patel et al[13] on school children in urban area of Ahmedabad. They did detail physical health assessment of children studying in class 1-8 (age; 5-13 years) and found worm infestation, the commonest morbidity found in most children (42%) followed closely by upper respiratory tract infection (36.39%) and anaemia (30.99%). Other diseases encountered were dental caries, refractory error, skin disorders, ear discharge, lower respiratory tract infections and abdominal pain.

In our study we assessed the children clinically for presence any disease conditions. Any diseases which were diagnosed including associated infectious diseases was treated accordingly in the nearby PHC. The students who were diagnosed with minor ailments like upper respiratory tract infection, anaemia and worm infestation, conjunctivitis was given the treatment. The prevalence of anaemia was among 60 (49.1%) of school going children. The high prevalence of anaemia among the children surveyed could be related to the inadequate diet, poor socio-economic status, and lack of parent's education. In our study nutrition is poor among 37% school going children. This may be due to the fact that most children belonged to poor socioeconomic status and could not afford a balanced diet. The milk and lunch under the mid-day meal program was the only source of proteins for most of them. Possible reason for the dearth in nutrition in the students is lack of awareness among parents also, about the knowledge and practices and presence of any disease condition. Furthermore, the teachers cannot check for the proper nutrition for all the children.

Similar study was done by Rashmi et al in Bengaluru urban district where they assessed the relation between school performance and anthropometrical measurements in the private school settings which showed that there is a positive correlation between anthropometry and school performance.[9] This study too has found significant association of nutrition with scholastic performance. A study was done by Sakhti et al in Anekal Taluk district of Karnataka found that nutritional status was good among 56.8% of school going children and correlated nutritional status with school performance but found no significant association between the two.[12] The present study found anthropometric parameters good among 77 (63%) children but found no significant association between nutrition and school performance.

Limitations

This study included students from class 6-8 which is a small study population-based study hence less scope for generalization of the results. Another limitation is as the study represents a relatively large cohort of children in the government school, the children of the affluent class has not been evaluated. Still this study gives a fact about minimally studied south zone of Rajasthan and throws light on burning issue faced by school children in their lives.

CONCLUSION

Government aided schools are still lagging behind in terms of nutritional requirement as per the standard ICMR protocols. This clearly warrants the need for conducting large scale studies which can identify various lacunae of the programs running under different central and state ministries. Health education should be given to all school going children about proper food intake. They should also be taught about identifying various health related problems or to inform when there is something wrong in them. They should also be taught about ways to improve their personal hygiene and practising good sanitary measures. Behaviour changes and teaching the students important messages of life in the very childhood goes a long way in shaping the life and health of the individual even as an adult. Health education is the key which is given not only to the students but also to the parents and teachers as well.

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