International Journal of Contemporary Pediatrics
Nanditha G et al. Int J Contemp Pediatr. 2020 Sep;7(9):1869-1875
http://www.ijpediatrics.com
pISSN 2349-3283 | eISSN 2349-3291

DOI: http://dx.doi.org/10.18203/2349-3291.ijcp20203645

Original Research Article

Health and nutritional status of school children from a rural area of Andhra Pradesh

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Received: 25 June 2020
Accepted: 31 July 2020

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ABSTRACT

Background: Healthy children build a wealthy nation. Good health of children is of paramount importance to the nation's growth. Health and nutritional status of school children is highly variable from one region to another due to different environmental, socioeconomic and cultural factors. Hence health status of school children from each area should be assessed periodically so that relevant health programmes can be applied to prevent common morbidities such as malnutrition, infections and infestations.
Methods: A cross sectional study of 500 rural school children from 5 to 15 years was conducted to assess the nutritional status by anthropometry and health status by clinical examination.
Results: Out of the 500 school children 46.8% girls, 71.4% were 5 to 10 years old, 70.2% studying in 1st to 5th class. 33.4% were stunted. 25.6% and 27% were underweight according to weight and Body mass index criteria respectively. Common health problems among school children in this study were anemia (31%), dental caries (27.2%), upper respiratory infections (13.4%), skin infections and scabies (12.6%), head lice infestation (6.8%), refractive errors (6%) and ear discharge (5.2%).
Conclusions: Though the pattern of nutritional and health problems were same in different studies, the severity of them varied from region to region. Hence periodic screening of school children to identify them and to apply relevant health programmes goes a long way in reducing such morbidities.

Keywords: School children, Nutritional status, Health status, Morbidities

INTRODUCTION

Today's children are tomorrow's citizens. It is of utmost important to ensure the good health of our children as the future of any country depends on the health status of their citizens. School age is a dynamic period where physical, mental and emotional growth of the child occurs so that child can smoothly turn into an adult. It is also a critical period where child is vulnerable to many communicable and non-communicable diseases due to variations in the living conditions, immunity status, socioeconomic, and cultural factors.[1] Poverty, socioeconomic and cultural milieu in a developing country like India has a significant role on the health status of school children. Poor health and nutritional status will affect work capacity as well as cognitive functions.[2] Morbidity among school children adversely affects their normal growth and development and hence it is a major public health concern.[3] It is estimated that every third child has some sign of ill health in the form of infections, dental, visual, hearing, nutritional, skin disorder.[1,2]

Over one fifth of our population comprise of children aged 5-14 years and only about 80% of these children are enrolled in schools, of this 65-80% regularly attend school and are easy to reach.[2] Schools are considered as perfect settings for health promotion among children and school staff by established screening programs which exist in many countries.[4] School health services are an economical and powerful means of raising community health and is an index of national investment in the development of its future manpower. [1,5]

Though many studies exist on health and nutritional status of school children from different parts of the country, their results cannot be generalised, as these problems vary from region to region due to diverse environmental, socioeconomic and cultural background. Hence it is prudent for each region to have their own assessment of health needs of school children so that appropriate health policies can be applied to prevent morbidities in them.

With this background, this study was conducted to evaluate the nutritional and health status of school children in a rural area of Andhra Pradesh and to provide health education to children and teachers at the time of screening.

METHODS

This is a Field-based, descriptive, cross-sectional study of 500 school children aged 5 to 15 years, studying in 1st to 10th class from government primary and high schools located in the villages surrounding Kuppam, Andhra Pradesh from July 2014 to December 2014. The objectives of the study were to assess the health and nutritional status of school children and to provide health education to them and teachers.

Study included all the school children who were present in the class on the day of health screening and excluded those who weren't cooperative for examination and to answer the questionnaire. Convenient sampling technique was used to collect the data. Study materials used were pre-tested semi-structured proforma with general details, health related history, details of personal hygiene and habits, anthropometry and examination findings. Calibrated height and weight measuring scales were used. Ethical clearance was obtained from the Institutional human ethics committee.

Data collection

There was a weekly ongoing school health screening programme run by community health department provided to school children in and around Kuppam area. School health screening team included a paediatric and community medicine post graduate, interns from ENT and ophthalmology department and a health worker from the community medicine. Paediatric post graduate was trained to collect the history from the class teacher as well as from the student if they were able to provide, and to perform anthropometric measurements and examination of the child concentrating on skin, eyes, ears, teeth and any obvious finding that was noticed. The collected data was entered into the proforma by the same person who performed the examination. Age of child was noted as suggested by the teacher. Anthropometry included height and weight measurement, and the values were compared to revised IAP (Indian academy of Paediatrics) 2015 growth charts which represented Indian children between 5 and 18 years from all zones of India and is recommended by IAP. [6,7]

Height was measured with the help of stadiometer, in standing position, bare foot with heels close to each other and keeping the head in a Frankfurt plane with accuracy up to 0.5 cm. Weight was recorded using standard weighing scale, after adjusting it to zero and recorded to the nearest 500 g.

BMI (body mass index) was calculated and compared to IAP growth chart which has lower BMI adult equivalent 23 and 27 for overweight and obesity, these cut-offs are appropriate to screen Asian children for overweight and obesity who are at increased cardio-metabolic risk at a lower BMI.[7]

Details on personal habits and hygiene were collected from the school children who were able to answer appropriately. After examination of children those who required further investigations and evaluation were referred to our medical college paediatric department. At the end of screening health education session was conducted to all the school children and teaching staff.

Data analysis

The data was entered in a Microsoft excel sheet 2010 version and was analysed using software stata14 version. The descriptive statistics of categorical data were analysed using percentages and frequencies and the Continuous data was analysed using mean and standard deviation wherever applicable. For interferential statistics, chi square and t test were used. $p<0.05$ was taken as statistically significant.

RESULTS

The study population included 500 children aged between 5 to 15 years, of the total 500 children 46.8% were girls and 53.2% were boys. 71.4% were between 5 and 10 years and 28.6% were between 11 to 15 years. 70.2% were studying in class 1 to 5 and 29.8% were in class 6 to 10 (Table 1). 25.6% of the children were underweight (<3 per centile). 74.2% of children had normal weight. Since there were 5 boys and only a girl in 90th percentile (1.2%) and there was no boy and only one girl in 97th percentile, mean, standard deviation and p value could not be calculated. Weight difference between boys and girls were not significant (Table 2).

Table 1: Demographic data.

Variable	N	%
Age (years)		
5 -10	357	71.4
11-15	143	28.6
Gender		
Girls	234	46.8
Boys	266	53.2
Class		
1-5	351	70.2
6-10	149	29.2

Stunting (<3 percentile) was seen in 33.4% of children. 65.2% had normal height. Tall stature (>97 percentile) was seen in 1.4% of children. Height difference between boys and girls was not statistically significant (Table3).

According to BMI (<5 percentile) 27% were underweight. 69.2% had normal BMI. 8.8% and 4.8% of children were overweight (AE23) and obese (AE27), of these boys were more overweight than girls which is statistically significant ($p<0.05$) (Table 4). Lice infestation was seen in 6.8% of children with 11.9% girls and 2.3% boys, which is statistically significant ($p<0.05$). 31% of children had anemia with 34.2% girls and 28.2% boys. Teeth were normal on examination in 72.8% of children though they appeared dirty, while 27.2% had caries. 13.4% had upper respiratory tract infection, 12.6% had scabies and pyoderma. Refractory errors were seen in 6% of children. 5.2% had ear discharge! 2% had chest deformity and 3.6% had Pain abdomen. None of these problems between boys' and girls' children were statistically significant (Table 5). 98.2% of children were daily brushing their teeth either by themselves or with the help of their mothers. 97.2% of children were cleaning their hands before food. 85.4% were having daily bath. 69.6% had clean and cut nails. None of these practices were statistically significant between boys and girls (Table 6).

Table 2: Weight data.

Percentile	Boys (n=266)		Girls (n=234)		Total (n=500)		P value
	N	Mean±SD	N	Mean±SD	N (%)	Mean±SD	
<3	66	21.68±7.86	62	23.69±8.60	128 (25.6)	22.65±8.26	0.16
3	81	21.43±5.59	71	21.38±6.92	152 (30.4)	21.40±6.23	0.95
10	97	24.07±8.18	81	26.08±9.53	178 (35.6)	24.98±8.85	0.13
50	16	33.37±12.27	19	31.21±11.63	35 (7)	32.20±11.80	0.59

Table 3: Height data.

Percentile	Boys (266)		Girls (n=234)		Total (n=500)		P value
	N	Mean±SD	N	Mean±SD	N (%)	Mean±SD	
<3	94	110.45±12.96	73	109.21±11.10	167(33.4)	109.91±12.16	0.51
3	43	126.02±13.29	56	121.85±13.97	99(19.8)	123.66±13.77	0.13
10	85	130.77±16.44	70	127.21±18.73	155(31)	129.16±17.54	0.20
50	31	135.29±13.33	29	137.37±17.96	60(12)	136.3±15.64	0.60
90	9	134.33±12.81	3	132.33±2.51	12(2.4)	133.83±11.01	0.79
97	4	132.25±9.46	3	133.33±2.30	7(1.4)	132.71±6.84	0.85

Table 4: BMI data.

Percentile	Boys (266)		Girls(234)		Total (500)		P value
	N	Mean ±SD	N	Mean±SD	N (%)	Mean±SD	
<5	77	12.13±1.13	58	12.13±1.46	135(27)	12.13±1.28	0.98
5	26	13.53±0.64	18	13.29±1.07	44(8.8)	13.43±0.84	0.35
10	97	14.68±1.22	90	14.60±1.43	187(37.4)	14.64±1.33	0.67
50	29	16.32±1.62	37	16.57±1.92	66(13.2)	16.46±1.79	0.57
AE^23	24	18.00±1.88	20	19.48±2.52	44(8.8)	18.67±2.29	0.03*
AE^27	13	20.52±1.86	11	22.15±2.77	24(4.8)	21.27±2.41	0.10

^Adult equivalent, *p<0.05 significant.

Table 5: Morbidity data.

Morbidity	Boys (n=266) N (%)	Girls (n=234) N (%)	Total (n=500) N (%)	P value
Head Lice				
Absent	260 (97.7)	206 (88.1)	466 (93.2)	0.00*
Present	6 (2.3)	28 (11.9)	34 (6.8)	
Vision				
Normal	255 (95.8)	215 (91.9)	470 (94)	0.06
Abnormal	11 (4.2)	19 (8.2)	30 (6)	
Ear discharge				
Absent	250 (93.9)	224 (95.7)	474 (94.8)	0.38
Present	16 (6.1)	10 (4.3)	26 (5.2)	
Dental caries				
Absent	195 (73.3)	169 (72.2)	364 (72.8)	0.78
present	71 (26.7)	65 (27.8)	136 (27.2)	
Skin problems				
Absent	230 (86.5)	207 (88.5)	437 (87.4)	
Present	36 (13.5)	27 (11.5)	63 (12.6)	0.50
Chest deformity				
Absent	261 (98.2)	233 (99.6)	494 (98.8)	
Present	5 (1.8)	1 (0.4)	6 (1.2)	0.13
Anaemia				
Absent	191 (71.8)	154 (65.8)	345 (69)	
Present	75 (28.2)	80 (34.2)	155 (31)	0.25
Respiratory infection				
Absent	225 (84.5)	208 (88.9)	433 (86.6)	0.15
Present	41 (15.5)	26 (11.1)	67 (13.4)	
Pain abdomen				
Absent	258 (97)	224 (97.7)	482 (96.4)	0.44
Present	8 (3)	10 (4.3)	18 (3.6)	

Table 6: Habits data.

Habits	Boys (n=266) N (%)	Girls (n=234) N (%)	Total (n=550) N (%)	P value
Brushing teeth				
Yes	259 (97.4)	232 (99.2)	491 (98.2)	0.13
No	7 (2.6)	2 (0.8)	9 (1.8)	
Hand wash				
Yes	257 (96.6)	229 (97.9)	486 (97.2)	0.39
No	9 (3.4)	5 (2.1)	14 (2.8)	
Bath				
Yes	224 (84.2)	203 (86.7)	427 (85.4)	0.42
No	42 (15.8)	31 (13.3)	73 (14.6)	
Clean nails				
Yes	184 (69.2)	164 (70.1)	348 (69.6)	0.82
No	82 (30.8)	70 (29.9)	152 (30.4)	

DISCUSSION

Knowledge on health and nutritional status of school children is essential to deliver appropriate health care to the needy children so that they can make use of their school life productively.

This study included school children from 5 to 15 years of age though 71.4% were between 5 to 10 years. Kulkarni, Shaik and Singh et al studied school children from 7 to 16, 6 to 11 and 7-18 years of age respectively.[3,8,5] This variation could be due to lack of both primary and high school in the study area, difference in the school admission age as well as sample selection criteria of the study.

Gender distribution of this study showed 53.2% boys and 46.8% girls respectively, similar to a study Rezaeian, in which boys were 52.1% and girls were 42.9%.[4] In a comparative study by Naseem, 55.2% were boys and 44.8% were girls in urban area and 60.8% boys and 39.2% girls in rural area.[2] A study by Asghar et al had 48.23% boys and 51.77% girls.[1] Studies from urban or rural areas, boys or girls schools, sampling method of the study could cause gender variation apart from the fact that girl child is denied from going to school.

Growth patterns differ among different populations of the world as nutritional, environmental, genetic factors and timing of puberty seem to play a major role not only in the attainment of final height but also in the characteristics of the growth curve.[7] Weight, height and BMI in this study was compared to the country specific IAP growth charts,.

25.6% and 33.4% of studied school children were underweight and stunted respectively. A Study by Shaikh showed 29.3% and 21.5% of rural children and 22.2%, and 16% of urban children respectively were underweight and stunted as per WHO growth standards.[8] Study by Semwal J, had wasting in 52.6% and stunting in 21.4% of children as per ICMR growth standards.[9] A study by Shivaprakash NC, showed prevalence of underweight and stunting in about 30.3% and 27.9% respectively as per NCHS and ICMR growth standards.[10] A review article by Rahaman reported prevalence of 11.1%, 9.25% and 12.3% for underweight, stunting and wasting respectively from rural Kashmir.[11]

Difference in reported underweight and stunting by various studies are probably due to different standards used for comparison. Many studies used BMI to calculate underweight. [1,3,12,13]

Unlike above studies, in our study stunting was more common than underweight. This could be due to 74.2% of children were pre adolescents without growth spurt and probably had long standing subclinical morbidities which could have affected height more than weight.

In the present study 27% of children were underweight as per BMI, is comparable to a study by Patel which had 29.44% according to international obesity task force adult cut off values.[13] Higher prevalence of underweight 43.32% ,31.25 respectively was reported from Kulkarni et al studies which used WHO Standards for BMI.[3,12]

Our Study had 8.8% overweight and 4.8% obese children which is higher than studies by Patel, Kulkarni, and Talukdar (0.78%, 3.65%, 0,5% obesity respectively).[3,12,13]

Variation is due to different BMI standards used to compare. According to IAP BMI Standard, lower BMI adult equivalent 23 and 27 represent overweight and obesity respectively unlike in WHO growth curves 25 and 30 represent overweight and obesity, Though, children in our study are over represented, it is appropriate to use these cut-offs for screening children who are at increased risk of developing obesity later in life.[7]

Common health problems among school children in this study are anemia (31%), dental caries (27.2%), upper respiratory infections (13.4%) skin infections and scabies (12.6%), head lice infestation (6.8%), refractive errors (6%) and ear discharge (5.2%). Head lice infestation was more common in girls and was statistically significant ($p<0.05$)

In this study 31% of children were anemic, with 34.2% girls and 28.2% boys, similar to a study by Patel in which 30.99% of children were anemic with 24.86% boys and 38.04% girls,[13] A study by Asghar had higher prevalence 38.23% of anemia, with boys 32.92%, and girls 43.18%.[1] Some studies with lower prevalence than our study are, by Singh 6.8% of children with anemia had 37.7% girls and 23.2% boys, in a Ugandan study by Acham 24.1% of children with anemia had 26,3% girls and 21.5% boys.[5,14] Studies by Kulkarni, Shivaprakash had 15.8% and 25.4% anemic children respectively.[3, 10]

Most of these studies have diagnosed anemia by clinical methods than by laboratory method. Some places may have prophylactic Iron supplementation programme in place resulting in low prevalence.[3]

Dental caries in our study was seen in 27.2% of children which is similar to studies by Patel (25.19%), Shivaprakash (28.3%) and Singh (24.7%). Prevalence of caries was higher in studies by Gupta (44.3%), Asghar (37.05%).[15,1] Difference in the prevalence of dental caries could be related to low fluoride content of water apart from poor dental hygiene.

Upper respiratory infection in our study was seen in 13.4% of children similar to a study by Kulkarni (14.30%).[3] Higher prevalence of 23.4%, 35.7%, and 36.39% respectively was reported from studies by Gupta, Singh, and. Patel.[5,13,15] This could be due to presence of more young children in the study as well as studies could have been conducted in winter season.

In our study skin problems were skin infections and scabies in 12.6%.of children, where as other studies had lower prevalence 4.5%, 5.29% and 8.86% respectively by Singh, Patel, Kulkarni.[3,5,13] Skin condition is a very generalised term and the exact morbidity included under this varies in different studies and hence comparison is difficult.

Refractory errors in our study were seen in 6% of children where as various other studies showed 10.41%, 11.4%, and 8.80% 10.2%. and 10.4% respectively by Naseem, Singh, Gupta, Patel, and Kulkarni.[2,3,5,13,15] Our study did not have optometrist in the school health team whereas in some studies they were included.

In our study, ear discharge was seen in 5.2% of children, similar to a study by Singh (4.3%), lower than by Patel (2.8%) and higher by Asghar (10%) respectively.[1,5,13] Pain abdomen was seen in 3.6% of children in our study and 0.59% in Patel study.

In this study, habits and cleanliness of the children were assessed by the questionnaire as well by examination. 98.2% of children brushed their teeth, 97.2% of children washed their hands before meals, and 85.2% took bath daily. Nails were clean and cut in 69.4%. In a study by Semwal 82.6% of children were bathing daily, 61.1% were brushing their teeth daily.[9,10] There are a limited number of studies on personal habits of school children.

Limitations of this study include smaller sample size which may not truly represent the prevalence of the problem. Children from private schools were not included in the study hence there is no uniform representation of all children in the community. Post graduate trainees were posted on rotation hence there is a possibility of interpersonal variation in data collection.

CONCLUSION

Severity of health and nutritional status of school children are variable from region to region though common childhood morbidity pattern is the same. Periodic health assessment of children goes a long way in reducing the morbidities by applying appropriate public health interventions.

ACKNOWLEDGEMENTS

We sincerely thank all the school children and teaching staff who were involved in the study.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Asghar SA, Gupta P, Srivastava MR, Srivastava JP, Zaidi ZH. Health status of primary school children: Study from a rural health block of Lucknow. Int J Community Med Public Health . 2017;4:2498-501.
2. Naseem A, Rao NG. Comprehensive study of health problems in school children of Hyderabad, India. Int J Contemp Pediatr. 2016;3:801-5.
3. Kulkarni MM, Varun N, Rathi P, Eshwari K, Ashok K, Kamath VG. Health status of school children in rural area of coastal Karnataka. Med J DY Patil Univ. 2016;9:31-5.
4. Rezaeian S, Ahmadzadeh J, Esmailnasab N, Veisani Y, Shayan M, Moradi N. Assessment of health and nutritional status in children based on school screening programs. Health Scope. 2014;3(1):14462-66.
5. Singh JP, Singh AK. Study on health status of urban school children (7-18 years): a school based cross sectional study. Njcm. 2017; 8:442-46.
6. Agarwal R, Sankhyan N, Jain V. Growth. In: Paul VK, Bagga A, eds. Ghai essential paediatrics. 9th ed. New Delhi: CBS publishers; 2016:28-29.
7. Khadilkar VV, Khadilkar AV. Revised Indian Academy of Pediatrics 2015 growth charts for height, weight and body mass index for 5-18-year-old Indian children. Indian J Endocr Metab. 2015;19:470-6.
8. Shaikh MK, Kamble N, Bhawnani D, Bele S, Rao SR. Assessment of nutritional status among school children of Karimnagar, Telangana, India. Int J Res Med Sci. 2016;4:4611-7.
9. Semwal J, Srivastava AK, Gupta S, Kishore S, Chandra R Nutritional status of school children in Rural areas of Dehra Dun District. Indian J Prev Soc Med. 2006;37:76-81.
10. Shivaprakash N C, Joseph RB. Nutritional Status of Rural School-Going Children (6-12 Years) of Mandya District, Karnataka. Int J Sci Stud. 2014;2(2):39-43.
11. Nazibar RS, Das S, Dash SK, Giri B, Kazi MA. Nutritional status of primary school children in different parts of India: A Review. Int J Cur Res Rev. 2019;11(7):1-4.
12. Talukdar K, Baruah R. Health status of primary school children:A community based cross sectional study in rural areas of Kamrup district, Assam. J Evol Med Dent Sci. 2015;4:2093-100.
13. Patel N, Gunjana G, Patel S, Thanvi R, Sathvara P, Joshi R. Nutrition and health status of school children in urban area of Ahmedabad, India: Comparison with Indian Council of Medical Research and body mass index standards. J Nat SciBiol Med. 2015;6(2):372 -7.
14. Acham H, Kikafunda J, Tylleskar T, Malde M. Nutritinal and health status of primary school children in rural Uganda. Afr J Food Agr Nutr Dev. 2012;12:5862-80.

15. Gupta SK, Sharma S, Bazroy J, Purty AJ. Health status of school children of coastal areas of rural Tamil Nadu (India). IJCRIMPH. 2012;4:2139-49.

Cite this article as: Nanditha G, Iyer CR, Chandrashekar MA, Kancherla P, Golluri R, Janakiraman. Health and nutritional status of school children from a rural area of Andhra Pradesh. Int J Contemp Pediatr 2020;7:1869-75.