International Journal of Community Medicine and Public Health
*Chajhlana SPS et al. Int J Community Med Public Health. 2017 Feb;4(2):607-612*
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: http://dx.doi.org/10.18203/2394-6040.ijcmph20170299

**Original Research Article**

# Nutritional deficiencies among school children in urban areas of Hyderabad, Telangana, India

**Sunil Pal Singh Chajhlana*, Ramakrishna Narashimha Mahabhasyam, Maruti Sarma Mannava Varaprasada**

Department of Community Medicine, Kamineni Academy of Medical Sciences and Research Centre, Hyderabad, Telangana, India

**Received:** 19 September 2016
**Revised:** 09 January 2017
**Accepted:** 09 January 2017

***Correspondence:**
Dr. Sunil Pal Singh Chajhlana,
E-mail: drsunil.omc@gmail.com



## ABSTRACT

**Background:** The school age period is nutritionally significant because this is the prime time to build up body stores of nutrients in preparation for rapid growth of adolescence. Malnutrition remains the world's most serious health problem and the single biggest contributor to child mortality, nearly one third of the children in the developing world are either underweight or stunted and more than 30% of the developing world's population suffer from micronutrient deficiencies. However the data available from urban slums of Hyderabad in this age group is very sparse and hence an attempt has been made to study the same. The objectives were to determine the nutritional status of primary school children and study the factors associated with it.
**Methods:** Study population: Primary school children (6 to 11 years). Study area: primary schools in urban slums of Hyderabad. Study design: a cross sectional study. Sample size: 412 children. Sampling methods: Simple random sampling Data collection: By using pre designed and pre tested and pre coded schedule (interview technique, observation, clinical examination). Analysis: By using Microsoft Excel 2007 and Epi Info 3.5.3.
**Results:** The prevalence of underweight was 28.9%, overweight was 9.2% and obesity was 4.4% . Prevalence of stunted height was found among 21.8%. 5.8% children were suffering from Vitamin' A' deficiency, 15.0% were suffering from Vitamin B deficiency, and 15.8% were found to be anemic.
**Conclusions:** The prevalence of underweight, Nutritional deficiencies were found to be significantly higher in children of illiterate parents' and similarly in unskilled worker fathers' and unemployed mothers.

**Keywords:** Anemia, Nutrition, Stunted height, Underweight

## INTRODUCTION

''Health of the children is the wealth of the nation'. The health of children is of fundamental importance in every country. The school children population approximate one –fifth of the total population and forms the future hope of the Nation. The school age period is nutritionally significant because this is the prime time to build up body stores of nutrients in preparation for rapid growth of adolescence.[1] Malnutrition remains the world's most serious health problem and the single biggest contributor to child mortality, nearly one third of the children in the developing world are either underweight or stunted and more than 30% of the developing world's population suffer from micronutrient deficiencies. More broadly, malnutrition in India is in a state of "Silent

Emergency"and there by demand greater priority than ever before, the nutritional state of population therefore critical to the development and well being of the nation.[2]

The prevalence of underweight children in India is highest in the world. Child malnutrition in school going children is responsible for 22% of the county's burden of disease.[3]

Nearly 12 million children, who die each year in developing countries mainly from preventable causes, the deaths of over six million or 55%, are either directly or indirectly attributed to malnutrition. The economic cost of malnutrition is very high**.** Atleast one third of poor countries disease burden is due to malnutrition.[4] However the data available from urban slums of Hyderabad in this age group is very sparse and hence an attempt has been made to study the same.

***Aims and objectives***

- To determine the Nutritional status of primary school children in urban areas of Hyderabad
- To study the factors associated nutritional deficiencies.

## METHODS

***Study population***

Primary school children (6 to 11 years)

***Study area***

Primary schools in urban slums of Hyderabad

***Study design***

A cross sectional study

***Study variables***

Socio-demographic variables **(**age, sex, caste, religion), nutritional status (Height, Weight).

***Sample size***

384 children, ($4PQ/L^2$ where P= Prevalence of malnutrition taken as 50% (Maximum allowable prevalence) Q=1-P, L=Precision (5%).

***Sampling methods***

The list of the schools (8) was obtained from the Office of the District Educational Officer, Ranga Reddy District. By simple random sampling technique, 6 Private schools were selected for the study.

All children of both sexes in the age group of 6-11years were covered in these schools.

***Inclusion criteria***

- Children of age group of 6-11 years.
- All those who were present on the day of examination.

***Exclusion criteria***

- Children those who were absent on the day of examination.

***Data collection***

By using pre designed and pre tested and pre coded schedule (interview technique, observation, clinical examination). Permission of the District Educational officer, Ranga Reddy district was obtained before the initiating the study and permission from head of institution was taken. Help of class teacher was taken to record exact date of birth of the student, religion, parent's education and occupation.

***Standards for assessment of nutritional status of school children***

**Anthropometry**: The following parameters have used for the assessment of nutritional status; a) Height; b) Weight; C) Body mass index.

These were measured as follows

***Height***

Height was measured by using stadiometer. Standing height was measured (to 0.5cms) with height measuring rod, without shoes, the child standing erect and looking straight so that the inferior orbital margin and the tragus of the ear fall in a horizontal plane parallel to the ground. This process was repeated thrice and the consistent findings were recorded.

***Weight***

An electronic weighing scale was used to measure the weight in kilograms. The scale was calibrated.zero error was checked, children were without shoes, in shirt and trousers or skirt.The weighing machine was placed on a firm and flat ground. Weight was recorded to the nearest 100 grams. The same balance was used throught the study.

***Body mass index***

The BMI was calculated using anthropometric measurements (height and weight). The index of nutritional status i.e. body mass index and height for age

was expressed in standard deviation units (Z scores) from reference median as recommended by WHO.[5]

***Nutritional deficiency signs***

Nutritional deficiency signs: were provisionally diagnosed on the following criteria.[6]

***Vitamin 'A' deficiency***

The signs and symptoms suggestive of Vitamin A Deficiency: Night blindness, Conjunctival xerosis, bitot's spots, corneal xerosis and keratomalacia.

***Vitamin 'B' deficiency***

The signs suggestive are angular stomatitis, cheilosis, magenta tongue, corneal vascularization, fissuring of tongue, raw tongue, pellagrous dermatosis and malar and supra-orbital pigmentation.

***Vitamin C deficiency***

The sign suggestive are spongy and bleeding gums, petechiae and ecchymosis.

***Vitamin D deficiency***

Signs suggestive are frontal or parietal bossing, knock knees or bow legs, swellings in the joints epiphyseal enlargements and deformities of the thorax (Harrision's sulcus, pigeon chest.)

***Anaemia***

suggested by pale conjunctiva, koilonychia and atrophic lingual papillae.

***Instruments***

Weighing machine, Height measuring rod, snellens chart, Tunning fork, Torch, Tongue depressor, Stethoscope and gloves. Tongue depressor was sterilized using2.45% gluteraldehyde (cidex).

***Data compilation and analysis***

All the data collected was entered and analyzed with MS excel software 2007 and Epi info 3.5.3 Z score by WHO standards were derived by Anthro+ package of WHO for nutrition status classification. All tests were considered significant at $p<0.05$ level.

## RESULTS

Overall 412 children have participated in the study. As the age increases enrollment of students is also increased. Almost equal gender wise distribution was found among male 209 (50.7%) and females 203 (49.3%) In the study population 59.7% Hindus, 13.3% were Muslims and 26.9% were Christians. It was found that 12.1% of Fathers of the school children are illiterate, 87.6% were literate. Most of the mothers of children were literate (80.3%), 19.7% were illiterate. Occupation of the fathers of children was unskilled work (46.6%), followed by skilled work (284%), semiskilled work (25.0%). Mothers of majority of the children were semiskilled (47.3%) followed by Unskilled worker (44.2%) and unemployed (8.5%) (Table 1).

**Table 1: Socio demographic profile of the study population.**

| Age in years | No (%) |
|---|---|
| 6-7 | 57 (13.8) |
| 7-8 | 74 (18.0) |
| 8-9 | 84 (20.4) |
| 9-10 | 92 (22.3) |
| 10-11 | 105 (25.5) |
| **Sex** | |
| Male | 209 (50.7) |
| Female | 203 (49.3) |
| **Religion** | |
| Hindu | 246 (59.7) |
| Muslim | 55 (13.3) |
| Christian | 111 (26.9) |
| **Father's education** | |
| Illiterate | 51 (12.4) |
| Literate | 361 (87.6) |
| **Mother's education** | |
| Illiterate | 81 (19.7) |
| Literate | 331 (80.3) |
| **Father's occupation** | |
| Unskilled workers | 192 (46.6) |
| Semiskilled workers | 103 (25.0) |
| Skilled worker | 117 (28.4) |
| **Mother's occupation** | |
| Unemployed | 35 (8.5) |
| Unskilled worker | 182 (44.2) |
| Semiskilled | 195 (47.3) |

**Table 2: Nutritional status of the study population.**

| Body mass index | No (%) |
|---|---|
| Normal weight (> -2Zscore) | 237 (57.5) |
| Underweight (< -2Zscore) | 119 (28.9) |
| Overweight (> +1Z score ) | 38 (9.2) |
| Obese (> +2Z score) | 18 (4.4) |
| **Height for Age** | |
| Normal height (> -2 Z score) | 322 (78.2) |
| Stunted height (< -2Zscore) | 90 (21.8) |
| **Nutritional deficiencies** | |
| Vitamin 'A' deficiency | 24 (5.8) |
| Vitamin 'B' deficiency | 62 (15.7) |
| Vitamin 'C' deficiency | 32 (7.8) |
| Vitamin 'D' deficiency | 07 (1.6) |
| Anemia | 65 (15.8) |

The prevalence of underweight was 28.9%, overweight was 9.2% and obesity was 4.4%. Prevalence of stunted height was found among 21.8% of children. In the present study 5.8% children were suffering from Vitamin' A' deficiency, 15.0% were suffering from Vitamin B deficiency, 7.8% were suffering from Vitamin C deficiency, Vitamin D deficiency was found in 1.6% and 15.8% were found to be anaemic (Table 2).

The prevalence of underweight (39.5%), stunted height (58.8%), Vitamin A deficiency (33.3%), Vitamin B deficiency (29.4%), anemia (29.4%), were higher in children of illiterate fathers than children of literate fathers. This was found statistically significant. The prevalence of underweight (29.6%) stunted height (33.3%), Vitamin A deficiency (22.2%), Vitamin B deficiency (23.5%), anemia (23.5%), were statistically significantly higher in children of illiterate mothers than children of literate mothers ($p<0.05$) (Table 3).

The prevalence of underweight (35.9%), stunted height (26.0%), Vitamin A deficiency (7.3%), Vitamin B deficiency (17.7%), anemia (21.4%), were significantly higher in children of unskilled worker fathers than children of skilled worker fathers.

The prevalence of underweight (68.7%), stunted height (31.4%), Vitamin A deficiency (20.0%), Vitamin B deficiency (37.1%), anemia (34.3%), was significantly higher in children of unemployed mothers than children of skilled worker mothers.

**Table 3: Factors affecting the nutritional status.**

| Father's education | Underweight No. (%) | Stunted height No. (%) | Vitamin 'A' deficiency No. (%) | Vitamin 'B' deficiency No. (%) | Anemia No. (%) |
|---|---|---|---|---|---|
| Illiterate (51) | 20 (39.5) | 30 (58.8) | 17 (33.3) | 15 (29.4) | 15 (29.4) |
| Literate (361) | 99 (27.5) | 60 (16.6) | 7 (1.9) | 47 (13.0) | 50 (13.9) |
| Total (412) | 119 (28.8) | 90 (21.8) | 24 (5.8) | 62 (15.0) | 65 (15.8) |
| P value | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 |
| **Mother's education** | | | | | |
| Illiterate (81) | 25 (29.6) | 27 (33.3) | 18 (22.2) | 19 (23.5) | 19 (23.5) |
| Literate (331) | 94 (28.3) | 63 (19.0) | 6 (1.8) | 43(13.0) | 46(13.9) |
| Total (412) | 119 (28.8) | 90 (21.8) | 24 (5.8) | 62(15.0) | 65 (15.8) |
| P value | 0.0001 | 0.0001 | 0.0001 | 0.001 | 0.001 |
| **Father's occupation** | | | | | |
| Unskilled(192) | 69 (35.9) | 50 (26.0) | 14 (7.3) | 34 (17.7) | 41 (21.4) |
| Semiskilled(103) | 24 (23.3) | 24 (23.3) | 10 (9.7) | 25 (24.3) | 21(20.4) |
| Skilled(117) | 26 (22.2) | 16 (13.7) | 0 (0) | 3 (2.6) | 3 (2.6) |
| P value | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 |
| **Mother's occupation** | | | | | |
| Unemployed (35) | 24 (68.7) | 11 (31.4) | 7 (20.0) | 13 (37.1) | 12 (34.3) |
| Unskilled (182) | 59 (32.4) | 52 (28.6) | 11 (6.0) | 26 (14.3) | 26 (14.3) |
| Semiskilled (195) | 36 (18.5) | 27 (13.8) | 6 (3.1) | 23 (11.8) | 27 (13.8) |
| P value | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 |

## DISCUSSION

In the present study, prevalence of underweight was 28.9%, Bhoite R et al in their study found the prevalence of underweight was 70%.[7]

Overweight was present in 9.2% and obesity in 4.4% where as study conducted by Dabone C et al showed Overweight/obesity was low (2.3%).[8]

Prevalence of stunted height was found among 21.8% of children. Study conducted by Hasan I et al found the prevalence of stunting was 40.4%.[9]

In the present 5.8% children were suffering from Vitamin' A' deficiency, 15.0% were found to have Vitamin 'B' deficiency, anemia was found in 15.8% of children.

Studies conducted by Chauhan NT et al and Bhoite R et al found the prevalence Vitamin' A' deficiency was 2.9% and 8.12% respectively.[7,10]

Similiar study conducted by Saluja N, Garg S, Chopra H found Vitamin 'B' deficiency in 30.1% of students.[11]

Anathakrishnan S, Pani SP, and Nalini P found riboflavin deficiency in 32.9% of children.[12] Chandna S et al found

Vitamin C deficiency in 18.6% and 15% of students respectively.[13]

Similar study conducted by Srivastava A et al found anemia in 37.5% of children.[14] Hassan et al found anemia in 24.8% of children.[15]

In the present study, prevalence of anemia was highest followed by Vitamin 'B' deficiency in school children ,the cause being either worm infestation or nutritional deficiency and who therefore require Iron Folic acid tablet supplementation.

The prevalence of underweight (39.5%), stunted height (58.8%), Vitamin A deficiency (33.3%), Vitamin B deficiency (29.4%), anemia (29.4%), were significantly higher in children of illiterate fathers than children of literate fathers.

Chandra et al in a survey of nutritional assessment of school children found a significant association was found between underweight/lean BMI of child with literacy status of father.[16] It was found that higher prevalence of Vitamin 'A' deficiency (26.0%),Vitamin 'B' deficiency (57.3%)and anemia (46.6%) was found in children of illiterate fathers. Saluja N et al in their study shows the difference in morbidity with literacy status of parents was found to be statistically significant ($p<.001$) being maximum in children of illiterate parents.[19]

The prevalence of underweight (29.6%) stunted height (33.3%), Vitamin A deficiency (22.2%), Vitamin B deficiency (23.5%), anemia (23.5%), were statistically significantly higher in children of illiterate mothers than children of literate mothers ($p<0.05$).

Babar NF et al in their study found prevalence of malnutrition was 42.3% among children of illiterate mothers as compare to 20% in those of literate mothers.[17]

Joshi HS et al in their study found highly significant association ($p<0.005$) of maternal occupation with child nutrition.[18] Srivastava A et al in their study found risk of malnutrition was significantly higher in children of illiterate mothers.[14]

## CONCLUSION

A total of 412 children from primary participated in the study. The prevalence of underweight was 28.9%, overweight was 9.2% and obesity was 4.4%. Prevalence of stunted height was found among 21.8%. In the present study 5.8% children were suffering from vitamin 'A' deficiency, 15.0% were suffering from Vitamin B deficiency and 15.8% were found to be anemic.

The prevalence of underweight, stunted height, prevalence of Vitamin 'A' deficiency, Vitamin 'B' deficiency and anemia, was found to be significantly higher in children of illiterate parents' and similarly in unskilled worker fathers' and unemployed mothers.

***Recommendations***

Teachers should be trained to identify the common symptoms of nutritional deficiencies and other common morbidities in school children and take necessary measures for the same.

A regular health check up should be organized by school authority in coordination of teachers and parents. Health education should be given to the children and parents about nutritional deficiencies and infections

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

## REFERENCES

1. Kumari S, Jain R. Assesment of school childen from rural Bihar. Ind J Nutr Dietct. 2005;42:326-334.
2. National nutritional policy, 1993, Government of India. Department of Women & child development. Ministry of Human resource development, New Delhi.
3. National nutrition monitoring bureau report on diet and nutrition status of adolescence, NIN, India 2002.
4. Disease control priorities project; working paper no 51. March 2003.
5. WHO Working group-Use and interpretation of anthropometric indicators of nutitional status. Bulletin of WHO. 1986;64:924-41.
6. Jellife DB. The assessment of the nutritional status of the community [by] Derrick B. Jelliffe. (With special reference to field surveys in developing regions of the world) Published 1966 by World Health Organization in Geneva . Written in English.
7. Bhoite R, Iyer U. Magnitude of Malnutrition and Iron Deficiency Anemia among Rural School Children: An Appraisal. Asian J Exp Biol Sci. 2011;2(2):354-61.
8. Daboné C, Delisle HF, Receveur O. Poor nutritional status of schoolchildren in urban and peri-urban areas of Ouagadougou. Nutrition J. 2011;10:34.
9. Hasan I, Zulkifle M, Ansari AH. Prevalence of stunting among school children ofGovernment Urdu Higher Primary Schools in AzadNagar and its surrounding area, Bangalore. Int J Med Med Sci. 2011;3(10):304-10.
10. Chauhan NT, Atul VT, Iqbal MK, Niti JT. Prevalence Of Clinical Vitamin A Deficiency Among Primary School Children In Urban Slums Of Ahmedabad: A Cross Sectional Study. J Clinical and Diagnostic Research. 2011;5:1627-30.
11. Saluja N, Garg S, Chopra H, Bajpai S, Pandey S. Socio-Demographic Factors Affecting Morbidity In

Primary School Children In Urban Area Of Meerut. Internet J Epidemiol. 2011;9(2).
12. Anathakrishnan S, Pani SP, Nalini P. A comprehensive study of morbidity in school age children. Ind Paediatr. 2001;38:1009-17.
13. Chandna S, Sehgal S. Prevalence of Deficiency Diseases Among School Children. Health arid Population- Perspectives and Issues. 1994;17(1&2):108-13.
14. Srivastava A, Mahmood SE, Srivastava PM, Shrotriya VP, Kumar B. Nutritional status of school-age children - A scenario of urban slums in India. Archives of Public Health. 2012;70:8.
15. Hassan MA, Khalique N. Health Status and Anthropometric Profile of School Going Children (5-15 years) in Aligarh City. Souvenir; 29th Annual Conference of IAPSM and 9th Annual Conference of Maharashtra Chapter of IAPSM. 2002:125.
16. Pravin CKR, Uma MP, Sadashivappa T, Prabhakara GN. Nutrition Assessment Survey of School Children of Dharwad and Haliyal Taluks, Karnataka State India. Kathmandu University J Sci Eng Tech. 2006;2(1):1-6.
17. Babar NF, Muzaffar R, Khan MA, Imdad S. Impact of Socioeconomic Factors on Nutritional Status In Primary School Children. J Ayub Med Coll Abbottabad. 2010;22(4).
18. Joshi HS, Gupta R, Joshi MC, Vipul M. Determinants of nutritional status of school children - a cross sectional study in the western region of Nepal. NJIRM. 2011;2(1).
19. Saluja N, Garg S, Chopra H. Prevalence of Morbidity And Morbidity Pattern In School Children (5-11 Yrs) in urban area of Meerut. Internet J Epidemiol. 2011;9(2).

**Cite this article as:** Chajhlana SPS, Mahabhasyam RN, Varaprasada MSM. Nutritional deficiencies among school children in urban areas of Hyderabad, Telangana, India. Int J Community Med Public Health 2017;4:607-12.