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Prevalence of anaemia among urban and rural adolescents

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Abstract
Background: Anaemia is one of the most universally prevalent diseases in the world today. Iron deficiency anaemia is the most common micronutrient deficiency. A WHO study shows that in developing countries 52% of pregnant women and about 35% to 40% of non-pregnant women suffer from iron deficiency anaemia. Compared to the vast amount of work done on pregnant women and young children, there are relatively few studies on the prevalence of anaemia in adolescent girls. The exact figures for world-wide prevalence of anaemia among adolescent girls are not known, but are estimated to be quite high. A decrease in the prevalence of anaemia during pregnancy could be achieved through improvement in the status of adolescent girls. The present study was undertaken to determine the prevalence of anaemia in adolescent girls studying in urban and rural schools of Pune city.
Material and Methods: Non-probability convenient sampling method was used to select the samples from urban (150) and rural schools (150). Haemoglobin estimation was done by using Sahli's method and structured questionnaire was used to assess dietary habits and menstrual history after taking informed consent. Analysis was done in terms of Mild (9.5 – 10.5 gm %), Moderate (8 – 9.4 gm %), severe (6.5 – 7.9 gm %) and very severe anaemia (< 6.5 gm %).
Results: 56% of the adolescent girls from urban schools were suffering from anaemia. 63% of adolescent girls from rural schools were suffering from anaemia. The mean haemoglobin level among rural and urban adolescent were 10.53 gm% & 10.44% respectively.
Conclusion: The overall prevalence of anaemia among adolescent girls from urban and rural schools was 59.5%. It is seen that anaemia affects the overall nutritional status of adolescent females.

Keywords: Prevalence, anaemia, adolescent girls, urban and rural schools

1. Introduction
Anaemia is the global public health problem affecting both developing and developed countries with major consequences for human health as well as social and economic development. It occurs in all stage of the life cycle, but is more prevalent in pregnant women and in young children. In 2002, iron deficiency anaemia (IDA) was considered to be among the most important factors to the global burden of diseases – WHO. World health organization has given a report on worldwide prevalence of anaemia in school going children's globally is 49%, Asian region is 65.5% and 52% in India.

Anaemia is an indicator of both poor nutrition and poor health. In India it is widely prevalent and affects both the sex and all the age groups. In India, pre adolescent and adolescent girls constitutes a sizable segment of the population, constitute a vulnerable group on account of the practice of an early marriage and potential exposure to greater risk for morbidity and mortality. Adolescent is a crucial development period, girls are on marginal diet, iron deficiency may be a routine consequences of growth and development.

1.1 Objectives
1. To assess the prevalence of anaemia among urban and rural adolescents.
2. To compare the prevalence of anaemia among urban and rural adolescents
3. To associate the findings with selected demographic variables.

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2. Material and methods

The study was conducted in the selected urban and rural schools of Pune city from August 2010 to March 2011 on 300 samples after taking approval from institutional ethical committee. The research approach was quantitative and exploratory survey design was adopted to collect the data. Non-probability convenient sampling method was used to select the samples from urban (150) and rural schools (150). Research tool was found valid and reliable after the process of doing validity (From various experts from nursing, medicine, research field) and reliability of hemoglobinometer. Haemoglobin estimation was done by using Sahli's method and structured questionnaire was used to assess dietary habits and menstrual history after taking informed consent. Analysis was done in terms of Mild (9.5 – 10.5 gm %), Moderate (8 – 9.4 gm %), severe (6.5 – 7.9 gm %) and very severe anaemia (< 6.5 gm %). Comparison between and urban and rural adolescent girls was done by using z-test and association with selected demographic variables was done by using chi-square test.

3. Results

3.1 Demographic analysis

53.4% adolescent's girls from urban school and 58.0% of adolescent girls from rural schools were 14 years of age. The family income of the 43.3% of adolescent girls from urban and 48.7% of girls from rural school was Rs. 5000 to 10,000 /month. Majority (75%) were non vegetarian. 58.7% adolescent from urban schools & 50.7% of adolescent girls from rural schools were consuming eggs in their diet. 74% of adolescent girls from urban schools and 64% from rural schools were consuming vegetarian food daily. Majority (92%) of them from both the schools were having homemade food. 70.6% of adolescent girls from urban schools and 42.7% from rural schools were had the habit of skipping their meals. 44.7% of the adolescent girls from urban schools and 51.3% from rural schools started their menstruation at the age of 12 years. 59.4% adolescents girls from urban area were using 3 pads and 72% adolescent girls from rural area were using 02 pads during menstrual cycle.

3.2 Prevalence of anaemia in urban and rural adolescent girls

56% of the adolescent girls from urban schools were suffering from anaemia. 26% were suffering from moderate anaemia, 25.3% were suffering from mild anaemia and 4.7% were suffering from severe anaemia.

63% of adolescent girls from rural schools were suffering from anaemia. Out of which, 33.3% were suffering from mild anaemia, 24.7% were suffering from moderate anaemia and 4.7 were from severe anaemia.
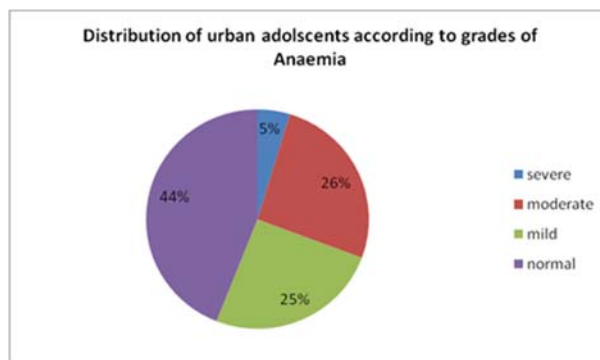

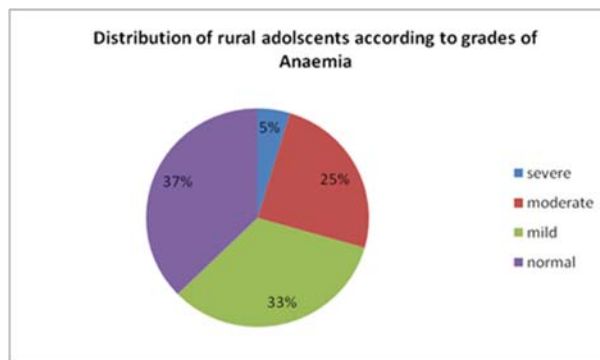**Fig 1:** Urban school adolescents girls suffering from anaemia

Fig 2: Rural schools adolescent girls suffering from anaemia

3.3 Comparison of prevalence of anaemia between urban and rural adolescent

Table 1: Comparison of anaemia among urban and rural adolescent girls

Statistical parameters	Rural	Urban	Z Cal. Value	Z Table Value	p cal. value	Result
Mean	10.528	10.438	0.47	1.64	0.68	No. Significant difference
S.D	1.45	1.21				

Above table depicts that the mean haemoglobin level among rural and urban adolescent were 10.53 gm% & 10.44% respectively, which is almost same. $Z_{Cal.\ (0.47)} < Z_{tab.(1.64)}$ & $p_{cal.(0.68)} > 0.05$, which also indicates there is no significant difference in haemoglobin level among urban and rural adolescents.

3.4 Association with demographic variables

Significant association was observed between prevalence of anaemia among urban and rural adolescent girls with selected demographic variables (age, family income, diet, skipping of meal, skipping pattern of meal) as chi-square calculated value was greater than table value for all variables and p calculated values were less than 0.05.

4. Discussion

Nutritional anaemia is prevalent all over the world, with an estimated one billion people being iron deficient. Studies on prevalence of anaemia in adolescent girls are relatively few, especially in the developing world. However, this is the group that deserves particular attention. Adolescence is a period of rapid growth, weight gain and blood volume expansion. The overall iron requirement increases from a preadolescent level of approximately 0.7 - 0.9 mg iron per day to as much as 2.2 mg iron per day or perhaps more in heavily menstruating young women. A much larger amount of iron is actually needed to meet the growth requirements of adolescence and even a marginal iron deficiency during this period of growth can precipitate overt anaemia. Malnutrition, chronic infections and worm infestations also contribute to a high prevalence of anaemia.

In a few studies in developed nations, the prevalence of anaemia in adolescent girls was 10.5%, 5.9%, and 4% in England, USA and Norway, respectively. In Kuwaiti, Peruvian, Indonesian, and Bangladeshi adolescent girls, the

prevalence of anaemia is noticed to be around 25-30%. This was in sharp contrast to our study where the prevalence of anaemia was 59.5%. Though very different from data from the developed countries, our figures correspond to the few studies from the Indian subcontinent. Kapoor and Aneja, in a school based study in Delhi, found the prevalence of anemia among adolescent girls of lower socio-economic group to be 56%. Sharma and Sharma from Rajasthan, found almost all adolescent pregnant women to be suffering from moderate to severe anaemia. The high prevalence of anaemia in the subcontinent can be related to a similar kind of diet consumed in these areas. Age and menarcheal status did not affect the prevalence of anemia in this study. However, Dallman, *et al.* found the prevalence to be highest in 15 to 17 year old girls, who were menstruating. Our findings suggest that dietary factors superimposed on physical growth spurt may be playing a larger role in causation of anaemia than menstrual losses. However, a detailed dietary survey is required to address these issues. Study finding was also supported by the study conducted by Beral KP *et al.* in Nepal. The study was conducted on 308 samples from urban and rural area of Morang district. The overall prevalence of iron deficiency anaemia was 65.6% among adolescent girls.

5. Conclusion and Recommendation
The overall prevalence of anaemia among adolescent girls from urban and rural schools was 59.5%. It is seen that anaemia affects the overall nutritional status of adolescent females. A significant association of anaemia with socio-economic status and parents' educational status suggests a need to develop strategies for intensive adult education and to improve the socio-economic status of the population through poverty alleviation programs. Emphasizes is needed for corrective measures of anaemia and iron deficiency in girls before they enter into adolescent age group. There is need for regular supply of iron and folic acid tablets to increase the compliance regarding consuming tablets among adolescent girls. Improve nutritional status of adolescent girls through counselling and health education.

6. References
1. Park K. Preventive and social medicine, 20th edition, Jabalpur, Banarsidas publication, 2009.
2. World Health Organization, world health statistics, available from: (http://www.int/healthstatisticianfo/co.in)
3. Apte SV *et al.* Iron losses in Indian women, Indian journal of Medical research. 2009; 51(5):953-956.
4. Patil SN. Health problems among adolescent girls in rural area of Ratnagiri district of Maharashtra, India, Journal of Clinical and diagnostic research. 2009; 3(5):1784-1790.
5. Vidya R. Handbook of human physiology, 1st edition, Jaypee publication, 2002, 40-44.
6. Baral KP. A study to assess the prevalence of anaemia among adolescents in Nepal of Morang District, Nepal Medical College Journal. 2009; 11(3):179-182.
7. Fang WH. A study to assess the prevalence and associated risk factors of anaemia in children and adolescents with intellectual disabilities, Journal of rehabilitation. 2010; 31(1):25-32.
8. Akramipour R. A study to assess the prevalence of iron deficiency anaemia among adolescent school girls from Kermanshah, Saudi Medical Journal. 2008; 13(6):352-355.
9. Ray S. Socio demographic conditions & morbidity status of urban slum dwellers in Pune city, International Journal of Multidisciplinary Research and Development. 2016; 3(6):65-68.
10. Arlappa N. A study to assess the prevalence of anaemia among pre-school children of West Bengal, Annals of Human Biology. 2010; 37(2):231-242.
11. Basu S. A study to assess the prevalence of anaemia in adolescent's girls in Chandigarh, Indian Journal of Paediatrics. 2004; 42(17):593-597.
12. Gawarika R. A study to assess the prevalence of anaemia in adolescents girls belonging to different community group, Calcutta, Indian journal of Community Medicine. 2006; 31(4):67-68.
13. Beal VA. Iron Nutrition from Infancy to adolescents, Americal Journal of Public Health. 1999; 68(2):666-678.
14. Lomark. The research process in nursing, 2nd edition, Blackwell science, 2005, 98-97.
15. Kumar AR. Influence of Family's vegetable cultivation on Prevalence of anaemia among adolescent girls, Indian Journal for practising doctors. 2008; 25(3):256-59.
16. Dallman PR, Siimes MA, Stekel A. Iron deficiency in infancy and childhood. Am J Clin Nutr 1980; 33:86-118.
17. Kapoor G, Aneja S. Nutritional disorders in adolescent girls. Indian Pediatr. 1992; 29:969-973.
18. Sharma V, Sharma A. Health profile of pregnant adolescent among selected tribal population in Rajasthan, India. J Adolesc Health. 1992; 13:696-699.