



PREVALENCE OF ANAEMIA AMONG THE ADOLESCENT ATHLETES OF NATIONAL SPORTS ACADEMY

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ABSTRACT

Anaemia is one of the most important public health problem. Many preschool children, school children, adolescents, pregnant women and lactating women are at high risk of nutritional anaemia. Knowing about the causes of anaemia will be helpful to prevent this health problem. The present cross sectional study was carried out among 140 adolescent athletes in which 71 and 69 were boys and girls respectively, aged 10-15 years of National sports academy, Khuman Lampak, Manipur. All subjects were newly admitted in the national sports academy and belonged to different sports events such as boxing, wrestling, judo, archery, taekwondo and weight lifting. Haemoglobin (Hb) level of each subject was estimated using Sahli's method. The monthly family incomes of all athletes were recorded. Thereafter, the family income has been converted into per-capita monthly income. The results of the analysis revealed that 52.18% of girls had suffered from anaemia whereas only 4.23 % of boys was in the mild grade. While examining the per-capita monthly income of the athletes, it was observed that majority of boys (36.62 % and 35.21%) and girls (42.03% and 36.23%) were in the middle and low income group. The higher prevalence rate of anaemia was found among the adolescent girls as compared to boys. The present study adolescent boys and girls depend on the same hostel diets with more or less similar family economic background of middle and low income mostly. The reason for higher prevalence anaemia among girls would be due to loss of haemoglobin iron from the red blood corpuscles of the blood during menstruation of the girls. Therefore, more care should be given to adolescent girls in particular than boys during this adolescent stage, otherwise higher level of sports performance will not be able to achieve.

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INTRODUCTION

Haemoglobin is an important respiratory pigment of blood and performs an important function of oxygen carrier and it also takes part in carbon dioxide transport. Haemoglobin is produced in red bone marrow and normal synthesis of haemoglobin requires an adequate supply of iron. Vitamin B6 (pyridoxine) also acts as coenzyme in protein metabolism of haemoglobin synthesis. Folic acid and iron deficiencies can cause anaemia. It is able to function only when it is contained in erythrocytes (red blood corpuscles). Iron-deficiency anaemia has remained the top cause of disability in India for the 10 years, according to two Global Burden of Disease (GBD) surveys (Swagata, 2016).

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It is the main cause of anaemia. Iron deficiency in infants and adolescents causes mental retardation and damages the immune system, predisposing children to a wide range of disorder (WHO, 2001). Nutritional anaemia was defined as "a condition in which the haemoglobin content of the blood is lower than the normal as a result of a deficiency of one or more essential nutrients, regardless of the cause of such deficiency" (WHO, 1969). According to WHO (2014), iron is lost when blood is lost during every month menstruation. If the monthly iron intake/ absorption does not replace the iron lost during the period, one can suffer from iron deficiency anaemia. Thus, iron deficiency anaemia (IDA) constitutes the major anemia during adolescent period. Accelerated development, hormonal changes, malnutrition and menstrual periods in girls are main causes of anemia (Halterman *et al.*, 2001).

However, bone marrow disorder, thalassemia, sickle cell anaemia and other diseases are all responsible for the prevalence of anaemia. The symptoms of anaemia are tiredness, weakness, shortness of breath, poor concentration, cold intolerance and heart palpitation. Adolescence refers to the phase of human development which encompasses the transition from childhood to adulthood. The nutritional and the health needs of the adolescents are important because of the growth spurt and the increase in physical activity in them (Kishor, 2006). In girls, adolescence marks the beginning of the menstrual cycle. Adolescents gain 30 per cent of their adult weight and more than 20 per cent of their adult height between 10-19 years, which we call as growth spurt (Lal and Pankaj, 2007). Adolescent girls are at a high risk for anaemia and malnutrition. Inadequate nutrition during adolescence can have serious consequences throughout the reproductive years of life (Nayar *et al.*, 2007). Very often, in India, girls get married and pregnant even before the growth period is over, thus doubling the risk for anaemia (Shobha and Sharada, 2003).

The prevalence of anaemia is disproportionately high in the developing countries, due to poverty, inadequate diet, worm infections, pregnancy/lactation and poor access to the health services (Kaur *et al.*, 2006). In India, 88% of pregnant and 74% of non-pregnant women have been affected by anaemia (WHO, 2008). The prevalence of anaemia was 44.8% among the rural adolescent girls in Tamil Nadu (Rajaratnam *et al.*, 2000). Among the adolescent girls of Nidoni of Karnataka state aged 13-16 years, 80% of them have suffered from various forms of anaemia such as mild (39.0%), moderate (43.0%) and severe with 7.0% (Shuchitra and Shashikumar, 2014). The prevalence of anaemia was 88% among the adolescent girls of Karnal district of Haryana, in which 21.2% in the mild, 51.2% in the moderate and 15.6% in the severe (Kaur and Kaur, 2015). The scheduled caste boys (64.20%) and girls (55.02%) of Manipur have also suffered from various grades of anaemia (Devi, 2013). The present study aims at studying the prevalence of anaemia among the adolescent boys and girls of National sports academy, Khuman Lampak, Manipur.

MATERIALS AND METHODS

The present cross sectional study was conducted among 140 adolescent athletes (71=boys and 69= girls) aged 10-15 years. Athletes were newly selected for admission in different sports events through competitive physical test in the national sports academy, Khuman Lampak, Manipur.

Estimation of Haemoglobin

Haemoglobin estimation in gramper decilitre of each subject was done by acid Hematin (Sahli's method) using haemoglobin meter (Georgieva, 1989). Mild grade was defined as haemoglobin level of 10.0-11.9 gm/dl, moderate anaemia as haemoglobin level 7.0-10.0 gm/dl and severe anaemia as haemoglobin level less than 7.0 gm/dl according to Lal and Pankaj (2007). The haemoglobin status less than 12g/dl is diagnosed as anaemia.

Per-capita monthly income

Per capita monthly income of the families was computed and classified as High income group (HIG), Middle income group (MIG) and Low income group (LIG) as per norms of Khongsdier (2002).

Statistical methods

Average per-capita and standard deviation of the per-capita income were computed using SPSS version 16.

RESULTS

Table 1 displays the grades of haemoglobin levels of boys and girls. Out of 71 boys estimated for haemoglobin levels, only 03 (4.23 %) is found to suffer from mild form of anaemia whose haemoglobin level is 11 g/dl in each boy. Remaining 68 boys (95.77 %) have revealed haemoglobin concentration above the normal level in the blood ranging between 12 g/dl -17 g/dl. In case of girls, out of the total 69 girls, 34(49.28%) suffer from mild grade anaemia, while only 2 (2.9%) case is in the moderate form of anaemia. No severe form of anaemia is found in both the sexes. The prevalences of anaemia are 4.23% for boys and 52.18% for girls. Therefore, as per haemoglobin levels girls are more affected as compared with boys. Hence, it is observed that 47.82% of girls have no anaemia problem when compare to 95.77 % of boys (Fig.1).

Table 1. Grades of anaemia of boys and girls

Anaemia grades	Classification	Boys		Girls	
		f	p.c	f	p.c
< 7.0	Severe	-	-	-	-
7.0-10.0	Moderate	-	-	02	2.90
10.0-11.9	Mild	03	4.23	34	49.28
>11.9	Normal	68	95.77	33	47.82
	Total	71	100.0	69	100.0

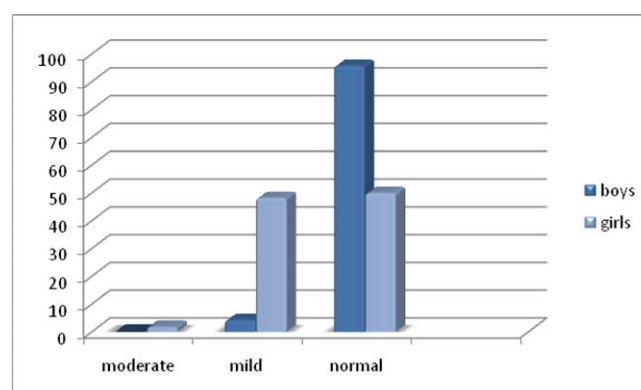


Fig. 1. Grades of anaemia of boys and girls

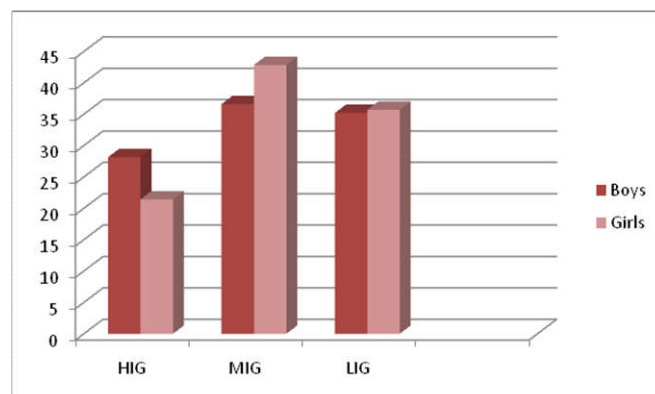


Fig. 2. Per-capita income of boys and girls

Table 2 indicates the per-capita monthly income of boys and girls. Distribution of various income groups have indicated that out of 71 boys, majority of boys belong to middle (36.62 %) and low income group (35.21%) with more or less same percentages.

Table 2. Per-capita monthly income of boys and girls

Income group	Boys (n=71)			Girls (n=56)		
	Income range	f	p. c	Income range	f	p. c
High income	>3900	20	28.17	>5030	15	21.74
Middle income	3900-2320	26	36.62	5030-2250	29	42.03
Low income	<2320	25	35.21	<2250	25	36.23
Total		71	100.0		69	100

Remaining 28.17 %of boys are in the high income group. Among boys, the per-capita income ranges from Rs 6,36.36/- to Rs 7,550/- with standard deviation of Rs 1,668.35/-, which indicates that the players belong to various family income groups. In case of girls, out of 69 girls, 29 girls (42.03%) belong to middle income group, while another 25 girls (36.23%) are in the low income group. Only 15 girls (21.74 %) are found in the high income group. Among girls, the per-capita income ranges from Rs 8, 57.40/-to 14,000.0/-with standard deviation of Rs 2,592.51/- (Fig 2).

DISCUSSION

Various grades of haemoglobin levels of adolescent athlete boys and girls have revealed that the prevalence of anaemia among girls is much higher than boys. Of the total sample of girls, 52.18% of girls have suffered from anaemia mostly in the mild form whereas only 4.23% of boys are found in the mild case. In both sexes, many of them are from the middle and low income families. After a few days admission in the hostel, they are provided same diet of the hostel. However, maximum numbers of boys have no anaemia, but 50% of the other group have been affected by anaemia. Therefore, some factors other than income and diet might be causing anaemia for adolescent girls in particular. In arural based study among adolescent girls of Karnataka state, 80.0% girls have suffered from various forms of anaemia such as mild (39.0%), moderate (43.0%) and severe with 7.0% (Shuchitra and Shashikumar, 2014). Anaemia among adolescent girls of Hariyana was also found to be 88.0% having with 21.2% in the mild, 51.2% in the moderate and 15.6% in the severe grade (Kaur and Kaur, 2015). Therefore the present higher rate of anaemia among adolescent girls of sports athletes as compared to boys is in conformity with other earlier findings. As reported by WHO (2014), when blood is lost during menstruation of women, iron is lost. If the lost iron can not be compensated by intake of iron or by absorption, one can suffer from iron deficiency anaemia. Therefore, the present problem of anaemia, which is more among the adolescent girls of sports academy would be due to menstrual lost during their periods.

Conclusion

Haemoglobin, which plays important vital functions for carrying oxygen to various parts of the body and also removes carbon dioxide, is an important chemical substance of our blood. Lack of haemoglobin lower than the cut off level in the blood may give obstacles in the cognitive performance, physical growth, immune system, energy sources for muscles and work performance of the adolescent athletes. Therefore, proper care should be taken up by providing iron containing foods such as sheep liver, egg yolks, lentils, cow pea, amaranth, lotus stem, mint, wheat, rice flakes, etc. If the diet is deficient in iron, iron supplements should be provided for them. Moreover, health and environmental hygiene are essence of healthy life to avoid from parasitic infection.

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