

ORIGINAL RESEARCH ARTICLE

Prevalence of Anemia amongst Adolescents in Biratnagar, Morang Dist. Nepal

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ABSTRACT

Adolescence covers 10-19 years of human age and is the transition period of life. In Nepal around 23% populations are in this age group. A retrospective hospital based study was carried out in Biratnagar, Morang District to determine prevalence and distribution of anemia in terms of age and sex among adolescents population. Cyanmethaemoglobin method was used to determine the hemoglobin level. Out of 1047 subjects, 589 adolescent were selectively diagnosed as anemic. The overall prevalence of iron deficiency anemia among adolescent population was 56.3% with the distribution of males and females 26.8% and 29.4% respectively. Among anemic subject the incidence of anemia in male 47.7% and female 52.3%. Sufficiency and deficiency of iron makes the living of adolescents different as it affects their growth requirement and connective performance. Iron reserve in female result better reproductive outcome. In Nepal iron deficiency anemia among male adolescent was not been documented yet and this study reports closer to the female are found anemic which warrant further study.

Key words: Adolescent, Hemoglobin concentration, Anemia.

INTRODUCTION

Anemia is global public health problem affecting both developing and developed countries with major consequences for human health as well as social and economic development. Anemia affects mainly the women in child bearing age group, young children and adolescent girls^[27-30].

Adolescent is a transition from dependent childhood to independent and responsible adulthood. The world health organization (WHO) defined adolescent as the population of 10-19 years of age^[1]. Out of estimated 27 million population^[2] in Nepal 23% are adolescent^[3]. It is the cross road in life when choices and decisions made become crucial for the future of an individual. Adolescent learn and adopt new knowledge and practices more easily and generally these are long lasting with impact on next generation. This is an important aspect with respect to program and impact of nutrition intervention.

Anemia is one of the most prevalent conditions in the world and iron deficiency is the most common cause for it among all the others. A WHO report shows that 52% of the pregnant and around 35-40% of women are anemic in developing

countries due to iron deficiency^[4]. Iron deficiency (ID) is one of the leading nutritional deficiencies in the world, particularly in developing countries^[5,9]. When ID is sufficiently severe, the hemoglobin (Hb) concentration in blood decreases, leading to iron deficiency anemia (IDA) which had negative health consequences, especially in children^[6], adolescents^[7] studies from South-Asian countries^[8-12] indicate that two third of pregnant women suffer from IDA, which is the highest prevalence in the world. In Bangladesh two different surveys have estimated the anemia prevalence among pregnant women to be 50 and 59%^[13, 14]. The situation of Nepal is more severe where 36% age 15-49, 42% pregnant and 40% lactating women are reported anemic^[15]. A few studies carried out among adolescent girls in Nepal reported that prevalence ranges from 42-60%^[16-19]. However, these studies did not include male adolescent population.

Anemia among adolescents, in addition to similar impact to the other age groups is important due to the reasons-It covers large group of population, Iron reserve subsequently helps adolescent girls for better reproductive outcome and deficiency of

iron cause difference in performance as well as education achievement of both sexes .^[20-23]

Therefore, it is important to identify prevalence of anemia among adolescent. This study was conceived and designed with the objective to determine prevalence and distribution of anemia in terms of age, sex, among adolescent population. WHO defines anemia as a condition in which Hb content of blood is lower than normal as a result of deficiency of one or more essential nutrients, regardless of the cause of such deficiencies. Anemia is established if the Hb is below the cutoff point recommended by WHO.^[24]

MATERIALS AND METHODS

This is hospital based retrospective study carried out at the Birat Hospital and Research Centre (BHRC), Biratnagar, Morang District, Nepal. Collection of data was carried out during the period between December 2011 until the end of August 2012. BHRC is a tertiary level hospital situated at Terai region of South Central Nepal in Biratnagar, Morang District, and provides health services to people from different part of Morang District of Nepal and adjoining area of Bihar, India. The study included male and female adolescents (aged 10-19 year) in the present study. Sample sizes of 1047 subjects of both the sexes (Males-611 and female-436) were investigated for estimation of Hb levels by Cyanmethaemoglobin method^[25].

As anemia is classified into three degree according to WHO: mild, moderate and severe. Hb cut-off values of anemia were 10.0-11.9 g/dl (mild), 7.0-9.9 g/dl (moderate) and <7.0g/dl (severe)^[26]. World Health Organization's guideline was used for interpretation and classification of anemia^[27]. Age, Sex and Hb level's of study patients were collected from the hospital records and analyzed for anemia study. All the data were entered in SPSS and analyzed. Mean and standard deviation of anemic population were calculated.

RESULTS

(Table 1) Shows that distribution of male and female patients according to age group among the total anaemic patients populations. The maximum incidence of anemia 103(17.5%), {Males 32 (5.4%), Female 71(12.1%)} belonged to 18 years age group. The overall incidence of anemia was significantly higher in 18 years age 17.5%.

Table1: AGE and SEX distribution of the patient

AGE	SEX		Total
	F	M	
10	6	30	36
%	1.0%	5.1%	6.1%
11	15	21	36
%	2.5%	3.6%	6.1%
12	23	53	76
	3.9%	9.0%	12.9%
13	17	22	39
%	2.9%	3.7%	6.6%
14	26	33	59
%	4.4%	5.6%	10.0%
15	29	35	64
%	4.9%	5.9%	10.9%
16	33	22	55
%	5.6%	3.7%	9.3%
17	35	15	50
%	5.9%	2.5%	8.5%
18	71	32	103
%	12.1%	5.4%	17.5%
19	53	18	71
%	9.0%	3.1%	12.1%
Total	308	281	589
%	52.3%	47.7%	100.0%

Chi-square=72.01 at 9df and p-value is 0.000.

(Table 2) Shows that 589 subject were diagnosed as anemic patients out of a total population of 1047 including both male and female in our study. The total percentage of anemic patients were 56.3%. Comparatively among those 281(26.8%) and 308(29.4%) were males and females respectively. The mean age and standard deviation of the anaemic population is 14.11±2.751 and 16.00±2.578 male and females respectively. ($P_{value} < 0.001$ significant)

Table 2: Distribution of patient according to anemic patients

SEX	Anemic	Non-anemic	Total
F	308	128	436
%	29.4%	12.2%	41.6%
M	281	330	611
%	26.8%	31.5%	58.4%
Total	589	458	1047
%	56.3%	43.7%	100.0%

Chi-square=62.83 at 1df and p-value is 0.000.

(Table 3) Shows the incidence of anemia among adolescents male and female were found 47.7% and 52.3% respectively ($p_{value} = 0.032$ significant). Status of anemia based on Hb levels, severe anemia was seen in 5.8%, (males=1.7% and female=4.1%) moderate was present in 24.5% (males=10.75% and females=13.8%) and

mild was present in 69.7% (males=35.3% and females=34.4%). ($P_{\text{value}}=0.032$ significant) In our study status of anemia based on Hb levels severe anemia was seen 5.8%. It is cleared that highest incidence of anemia was found in 18 year age group.

Table no.3: Grading of anaemic of patient by sex

Anaemic	SEX		Total
	F	M	
Mild	203	208	411
	34.4%	35.3%	69.7%
Moderate	81	63	144
	13.8%	10.7%	24.5%
severe	24	10	34
	4.1%	1.7%	5.8%
Total	240	206	589
	52.3%	47.7%	100.0%

Chi-square=6.05 at 2 df and p-value is 0.032.

Table 2 and 3 Shows that more female population has lower hemoglobin level than that of male adolescent population.

DISCUSSION

Our study is one of the Hospitals based and retrospective study which indicates that anemia should be considered as a major health problem in Morang District of Nepal. The study population comprised of total 1047 adolescents. There were 611(58.4%) males and 436(41.6%) females. The overall prevalence of anemia among adolescents was 56.3 % (589/1047). Prevalence of anemia was significantly higher ($P_{\text{value}}=0.000$) among of female 29.4 % (308/1047) with compared to the males 26.8% (281/1047).

Further studies of our anaemic subjects 589. There were 308(52.3%) females and 281(47.7%) males. In our study the incidence of anemia was significantly higher ($P_{\text{value}}=0.032$) amongst females 52.3% was compare to the male 47.7% which is more than in a study done in India 2004 showed the prevalence among adolescents-7.7% and 23.9% males and females respectively^[34].

In females, the higher prevalence of anemia observed reflect the adverse effect of lower dietary iron intake with menstrual blood loss, which imposes extra demand for iron. In the recent study conducted in semi urban Nepal, the prevalence of anemia in adolescent girls aged 11-18 years was found to be about 68.8%^[35] In a government school same study from middle socioeconomic group of North East Delhi reported a prevalence of anemia is 45%^[36]. Similarly studies on prevalence of anemia from different states of rural India, reported a prevalence of anemia from 46% to 98%^[37-39]. The WHO proposed a scheme for classification of public

health severity of anemia^[40] and it was considered as mild if prevalence 1-9%, moderate if it is 10-39% or severe problem if it is >40%. Accordingly the present study showed that anemia of severity among the studied adolescents was considered a health problem. .

Nutritional anemia is common all over and there are around one million iron deficient people in the world^[5]. There are very few studies on the prevalence of anemia among adolescent in comparison to other groups like women and children in the world and it is the case in Nepal too. Study among male adolescent is virtually non-existence in Nepal. Because of its impact on cognitive physical growth and development as well as other protective and promotive health reasons. Study on the status of anemia among the males is also important. It is important due to not only sizeable population that is equal to married women of reproductive age group but also because investing in this age group is cost effective and lasting impact to the next generation. Therefore it becomes imperative to give immediate attention to adolescents to address their nutritional need.

In other country in South Asian region the anemia prevalence in pregnant women is reportedly higher. One national estimate in India is 87% with a prevalence of severe anemia as high as 15%^[28] from the plains of Nepal prevalence of 73% with 7% being severely anemic has been reported^[29]. In Sri Lanka, 65% of pregnant women were anemic^[30]. According to the WHO classification, if 5-25% of the population having anemia or abnormal Hb, the degree of anemia of the population is graded as mild^[31]. The World Health organization has proposed that if the prevalence of anemia in a region is between 5% and 20% appropriate interventions based on food diversification, food fortification, iron supplementation and controlling infectious disease should be considered^[31]. A high prevalence of iron deficiency anemia was found among adolescents when prevalence of iron deficiency anemia becomes >20.0% in a population, WHO classifies it is public health problem.

In a study of adolescent girls prevalence of anemia was found to be 59.8%^[32]. In the study of pregnant and lactating women by K.N Agrawal *et al* it was found that 84% pregnant and 92.2% lactating women were anemic with severe anemia is 9.2% and 7.3% respectively^[33].

Periodic deworming and oral iron supplementation are primary courses for

prevention and cure of anemia on immediate measures. In the Nepali context strategies to reach large section of the women, children and adolescent population are only possible through community based health workers like female community health volunteers. The most appropriate strategies would be integrated community and school based approach to reach adolescent population for prevalence and control of iron deficiency anemia in Nepal.

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