

Study of anemia in adolescents female and effect information, education and communication in rural area of central Kathmandu Valley

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ABSTRACT

Adolescence is a period of rapid change and opportunities. It is a coming up of age as children grow into young adults. It constitutes 10-19 yrs of age. In Nepal 23% of the population are adolescents. A cross-sectional community based study was carried out in 3 schools in Jhaukhel (Bhaktapur) to determine the prevalence of anemia and the effect of IEC in female adolescents. Does IEC effect improve anemia rapidly. Two hundred four female school children were screened for Hemoglobin estimation by Simple Random Sampling method. Physical examination and nutritional assessment was also done. Hemoglobin estimation was done by Cynomethemoglobin method in their respective schools. Anemia was diagnosed according to WHO guidelines. IEC was given to all adolescents girls thrice in 1 month and again the effect of IEC was studied by estimating hemoglobin. Out of 204, 72 (35.3%) had anemia. Forty (34.2%) had anemia in the age group of 13-15yrs, followed by 19 in age group 10-12 yrs and mild anemia was found in the age group 16-19 yrs. The adolescents girls whose parents were farmers and labourers were more anemic than others. Twelve (44.4%) maximum anemic girls were observed in those whose parental income was between NPRs 12000-16000. Out of 204 girls only 157 attained menarche. All girls 52 (33.1%) who attained menarche upto 13 yrs had more anemia than others of above 13 yrs of age group. The mean age at menarche was 13.05 yrs. The subjects exhibited increase in Hb significantly P value 0.000. Mean Hb before IEC was 12.26 (SD 1.43) and after IEC it was 12.81 (SD \pm 1.05). The Mean increase in percentage after IEC was 4.48 (SD \pm 9.68) in females. The Range was 20 to 41.18%. The Coefficient of relationship (Karl Pearson coefficient of correlation) between two Hb levels before and after giving IEC was 0.719, which is statistically significant with positive correlation ($p=.000$) and $r^2=0.516$. It is represented as scattered diagram.

Keywords: Anaemia, adolescent girls, IEC

INTRODUCTION

According to the WHO adolescents constitute the age of 10-19 years. The planning commission of Nepal estimates that 23% of the populations are adolescents.¹ Adolescence is a period of rapid growth, weight gain, and blood volume expansion. It is also the period of opportunities and change. Due to the rapid growth adolescents are especially vulnerable to anemia. The overall nutrition requirement of the body increases during this period. Adolescence is not simply an extended childhood, but it is a non-homogenous group of growing individuals reaching adulthood. This is a period of life when not only physical but psychological and behavioral changes take place in the individual. This is probably the most critical and vulnerable phase of human development to prepare generation of citizens to take over the responsibility. During adolescent period, the risk of anemia among boys and girls appears to be more due to growth spurt, and in girls after achieving their menarche and their reproductive life.² Anemia is of a big concern nowadays because it has a wide implication in relation to socio-economic development of the population affected

in general and adolescents in particular. This is more relevant in rural areas of developing countries where hard physical labor continues to be the most important sources of livelihood in Nepal.

MATERIALS AND METHODS

A cross-sectional community based intervention was conducted in Jhaukhel village in Bhaktapur District of Kathmandu valley. Jhaukhel is located in central part of Kathmandu valley. The study period was from July 2011 to August 2012. The study population was all school going adolescents girls in Jhaukhel and 204 adolescents girls participated in the study from 3 schools (1 private and 2 government). Simple random sampling technique was applied.

METHODS OF DATA COLLECTION AND ANALYSIS:

Blood sample for Hemoglobin estimation was taken in respective schools and Hemoglobin estimation was done in a room provided by the school authority. The Hemoglobin test was estimated by Cynametheamoglobin method.

With each participant written voluntary consent was taken before drawing blood sample. The results were disclosed to the entire participant in their respective schools and appropriate IEC advice was given. WHO guideline was used for grading of anemia. A pre-tested, pre-coded questionnaire schedule was used for the study purpose. School children were examined and interviewed in their respective schools in Jhaukhel. Socio-demographic information of the adolescents and their family and menstrual history was collected in pre tested proforma. All school children were given health information, education and communication before the procedure and at every three weeks thrice about anemia and dietary habit. The effect of IEC was observed after 3 months by estimation of Hemoglobin concentration again by same Cynamethemoglobin method using same standard calorimeter. Data thus generated was collected, compiled and analyzed by using SPSS 16.

RESULTS

Out of 204 subjects, 72 (35.3%) had anemia and 132 (64.7%) had no anemia. Anemia in the age group of 13-15 yrs was almost double the age group of 10-12 yrs. As shown in Table-1 the adolescents girls whose parents were farmers and labourers were more anemic than others group. Among child of fathers who had farmer as occupation 39 girls (43.3%) were anemic. Similarly amongst fathers as labours 18 girls (42.9%) were anemic. Amongst child of mothers who had farmer as occupation 19 girls (39.6%) were anemic, similarly amongst mothers as labourers 7 girls (43.85%) were anemic. Children whose mothers were teachers anemia did not exists as in 4 girls.

Anemic girls were observed in those whose parental income was between NPRs 12000-16000. Twelve (44.4%) respectively as shown in Table-2. In 6 (31.6%)

Table-1: Parents occupation and distribution of anemia

Father's occupation	n=204	
	Anemia	No anemia
Businessman	8 (32.0%)	17 (68.0%)
Farmer	39 (43.3%)	51 (56.7%)
Govt service	2 (10.5%)	17 (89.5%)
Labour	18 (42.9%)	24 (57.1%)
Teacher	5 (17.9%)	23 (82.1%)
Total	72 (35.3%)	132 (64.7%)
Mother's occupation		
Business	4 (25.0%)	12 (75.0%)
Farmer	19 (39.6%)	29 (60.4%)
Govt service	0 (0.0%)	3 (100%)
House wife	42 (35.9%)	75 (64.1%)
Labour	7 (43.85)	9 (56.2%)
Teacher	0 (0.0%)	4 (100%)
Total	72 (35.3%)	132 (64.7%)

Table-2: Economic status of family and anemia in subjects

Family monthly income(NPR)	n=204	
	Anemia	No anemia
< 8000	14 (34.1%)	27 (65.9%)
8000-12000	40 (34.2%)	77 (65.8%)
12000-16000	12 (44.4%)	15 (55.6%)
> 16000	6 (31.6%)	13 (68.4%)
Total	72 (35.3%)	132 (64.7%)

Table-3: Practice of washing hands before eating, cooking and after defecation and status of anemia in adolescents

Washing hands before eating, cooking and defecation.	n=204	
	Anemia	No anemia
No	4 (80.0%)	1 (20.0%)
Yes	68 (34.2%)	131 (65.8%)
Total	72 (35.3%)	132 (64.7%)

female subjects having parental income >16000 were anemic. Table-3 reveals less percentage of anemia in girls who used to practice washing hands before and eating, cooking and defecation i.e 68 (34.2%) as compared to those who did not wash their hands 4 (80%) respectively. Table-4 depicts all girls who walked barefoot 28 (59.6%) had anemia whereas those who did not walk barefoot only 44 (28%) had anemia which shows statistical significance (P value=0.000). Out of 204 girls only 157 attained menarche. All girls who had menarche upto 13 yrs 42 (35.0%) were more anemic than others. The mean age at menarche was 13.05 yrs. 25 (46.3%) of girls who had irregular menstruation were also more anemic than those who had regular menstruation 27 (26.2%). Excess menstrual flow was observed in 22 (51.2%), who were also anemic than those who had normal 27 (26.0%) or scanty (30.0%) menstrual flow.

Table-4: Barefoot practice at work place and home and its relation with anemia in study subjects

Walking barefoot at work place and home	n=204	
	Anemia	No anemia
No	44 (28.0%)	113 (72.0%)
Yes	28 (59.6%)	19 (40.4%)
Total	72 (35.3%)	132 (64.7%)

Table-5: Hb level before and after IEC

Sex	Hb	n	Minimum	Maximum	Mean	Std Deviation
Female	Hb	204	9.00	16.00	12.26	±1.43
	Hb1	204	10.00	15.00	12.81	±1.05

Hb—Before IEC Hb1--- After IEC

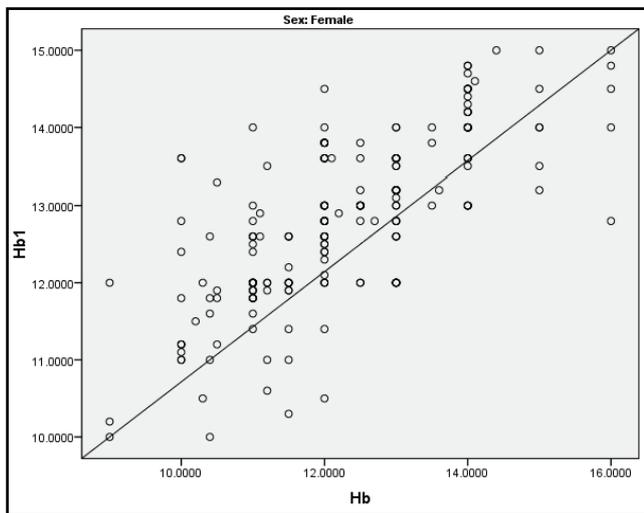


Fig. 1. Scatter diagram showing correlation between initial and after Hb in after IEC intervention

The subjects exhibited increase in Hb significantly (P value 0.000). Mean Hb before IEC was 12.26 ($SD \pm 1.43$) and after IEC it was 12.81 ($SD \pm 1.05$) as shown in Table-5. The Mean increase in percentage after IEC was 4.48 $SD \pm 9.68$. The Coefficient of relationship (Karl Pearson coefficient of correlation) between two Hb levels before and after giving IEC was 0.719, which is statistically significant with positive correlation ($p=.000$) and $r^2=0.516$. It is represented as scattered diagram.

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Hb-- Pre IEC Hb level.

Hb1-- Post IEC Hb level.

DISCUSSION

Adolescence (10-19 yrs of age) is a period of rapid transition in life from “childhood” to “adulthood”. This phase of life is full of opportunities and healthy adolescents are a great asset for contributing to nation’s development. However adolescents are also exposed to risk of infection and are vulnerable group at the same time. Adolescence is generally perceived to be a healthy period of life because over all morbidity is relatively low in this age group. This is, however deceptive, since adolescents face many challenges in their life and several of these challenges relate to their health. Many nutritional surveys have identified adolescents group to be at increased risk for anemia all the time. The overall nutritional requirement increases during this period and if not met properly, it will result in anemia. Anemia though global in occurrence is more of a concern in the developing countries because of its high prevalence in

these regions. In spite of its high prevalence in children, studies on prevalence in adolescents specially in boys are relatively less from developing countries. Adolescent is a period of rapid growth, weight gain and blood volume expansion and with inadequate and improper dietary habits, one is vulnerable to all kinds of nutritional morbidities. Malnutrition and worm infestation further aggravate the problem especially in rural area.

The WHO proposed a scheme for classification of public health severity of anemia and anemia was considered as: no public health problem if prevalence is below 4.9%, mild if prevalence is 5-19.9%, moderate if it is 20-39.9%, its severe problem if it is more than 40%. Accordingly the present study showed that 35.3 % anemia as moderate among the studied subjects and was considered a health problem in this area. The prevalence of anemia in the adolescents of central Kathmandu was 35.3%. Studies done in other parts of Nepal showed higher prevalence than our study, Shah *et al*³ 68.8%, Baral *et al*⁴ 65.6%, Tiwari *et al*⁵ 60.5%, Sinha *et al*⁶ 56.3% as in Kathmandu awareness is relatively better.

Similarly studies done in our neighbouring country India shows higher prevalence of anemia amongst adolescent girls. A study conducted by Chaturvedi *et al*⁷ in rural Rajasthan India amongst adolescent girls recorded 73.3% prevalence of anemia. In this study anemia was detected more in the age group of 13-15 yrs. However it was followed by less in the age group of 16-19 yrs. Similar study done by Baral *et al*⁴ showed higher prevalence in the age group 10-14 yrs and improvement with the increase in age. In this study all adolescents whose parents occupation were farmers and labourers had high anemia prevalence rate as compared to others like teachers and government service. The reason behind this is high income status leading to high purchasing power for iron rich diet food articles. Singh⁸ observed in her study that fathers who were professionals had least prevalence of anemia in their adolescent daughters. Rawat *et al*⁹ observed anemia in 44% of adolescent girls whose fathers were labourers. In this study maximum anemia was observed in those whose parental income was between Rs. 12001-16000. Similar findings reported by Basu *et al*¹⁰ shows anemia prevalence of 34.2% from lower income group, however grading of the income was not mentioned. Jondhale *et al*¹¹ reported a prevalence of anemia in 14% adolescent girls where the household income was more than IRs 5000 per month and in 26% where the household income was less than IRs 5000 per month. The findings are similar to our study. All adolescents who walked barefoot at home and workplace & those who did not wash

their hands before eating, cooking & after defecation were more anemic than others. Jhaukhel is a rural part of Kathmandu valley and there is plenty of land for agriculture purpose. Open field defecation is also practiced here, so helminthic infestation is common in this part. So Hookworm infestation may be the reason behind this for higher prevalence of anemia. Out of 204 total girls only 157 attained menarche and those who attained below 13 yrs and had irregular menstruation were more anemic than those above 13 yrs and had regular menstruation. Agarwal *et al*¹² documented that the prevalence of anemia was 46.6% in premenarcheal girls as compared to 48.4% in post menarcheal girls in the urban slum of North East Delhi. The reason behind this is irregular menses. In early adolescence girls, it was lack of use of sanitary napkins, infection and lastly faulty information. Irregular menstrual flow will lead to blood loss which further leads to anemia. Excess menstrual flow was observed in 43 girls and 22 (51.2%) girls had anemia than other girls who had scanty or normal flow. Those having excess flow were confirmed by asking them verbally how many pads used per day and passage of clots. Those having scanty flow also reported that they all had dysmenorrhoea and ammenorrhoea. Hemoglobin was examined before and after giving IEC for 3 times in each group at intervals of 1 month. The Mean Hb before IEC was 12.26gm/dl and after IEC Hb 12.81gm/dl. The girls exhibited increase in Hemoglobin significantly. The increase in range was -20 to 41.18%. The Mean increase in percentage was 4.48. Scatter diagram shows statistically positive correlation Fig 1. IEC was appreciated by females in social life.

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