

Effect of Nutrition Education on Anemic Rural Adolescent Girls in Odisha

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ABSTRACT

Adolescence is considered as the nutritionally vulnerable period due to an increased demand for nutrients due to growth spurt. It has a far-reaching implication on their reproductive health in their later years. In Odisha, the prevalence of anemia among adolescent girls in general, has not been well documented. Hence, the present study investigated the prevalence of anemia and effect of nutrition education on anemic adolescent girls in a selected population of Odisha. Adolescent girls (12-17 years) who were studying in schools and colleges and residing in the study area for a minimum of six months were included in this study. Total numbers of 508 adolescent girls (12-17 years) were screened for anemia.

Considering its association with the lack of right knowledge, attitude, and practice (KAP), it could be preventable. The objectives of the study were (1) to assess the Knowledge, Attitude and Practice (KAP) of the adolescent girls about Anemia, (2) To determine the association between the selected demographic variables and the level of KAP among the adolescent girls, (3) to analyse the effectiveness of the planned nutrition education of Anemia programme on knowledge, attitude and practice.

KEYWORDS: Anemia, Adolescent, Knowledge, Attitude, practice, Nutrition education

A one group pretest and post test design is adopted for conducting the study. 508 girl's students from one school and two +2 colleges in Banki were selected as the sample for the study. Information on socio-demographic profile, history of worm infestation, menarche, menstrual problems, personal hygiene and consumption of green leafy vegetables, diet history were collected through the questionnaire. Height and weight were measured along with hemoglobin status. Paired t test was used to know the difference between pretest and post test. ANOVA for Significant difference between the Sources of Information and Gain Score of KAP, Correlation Coefficient between KAP, regression analysis is used to know the relationships between multiple variables of the study. It was observed that Mild anemia was seen among 55 per cent of the subjects, whereas, only 44 per cent of the subjects had moderate anemia and only one percent of the respondents reported severe anemia. The difference in the mean score of the Knowledge, attitude and practice are higher after the post test than the pretest scores. Hence, it is interpreted that the planned nutrition education programme on Anemia

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was very effective in changing the Knowledge, attitude and practice regarding anemia among the rural adolescent girls in a desired direction. There was a tremendous improvement in knowledge, practice and attitude (KAP) regarding anemia and the inclusion of iron, vitamin C rich foods especially green leafy vegetables, blood forming nutrients would raise not only food security but also form a practicable plan to combat anemia.

INTRODUCTION

Anemia, a manifestation of under-nutrition and poor dietary intake of iron is a public health problem, not only among pregnant women, infants and young children but also among adolescents. Anemia in India primary occurs due to iron deficiency and is the most widespread nutritional deficiency disorder in the country today. The prevalence of anemia in girls (Hb <12 g %) and in boys (Hb <13g %) is high as per the reports of NFHS-3 and the National Nutrition Monitoring Bureau Survey. According to NFHS 3 data, over 55 percent of both adolescent boys and girls are anemic. Adolescent girls in particular are more vulnerable to anemia due to rapid growth of the

body and loss of blood during menstruation. In India, the highest prevalence of anemia is reported between the ages 12-13 years, which also coincides with the average age of menarche.

Adolescence is considered as the nutritionally vulnerable period due to an increased demand for nutrients due to growth spurt. It has a far-reaching implication on their reproductive health in their later years. Risk of developing anemia and malnutrition is highest among adolescent girls. Nutrition inadequacy during crucial period of adolescence may have serious health related consequences on adolescence as well as throughout life. It is also accepted as the vulnerable period in the human life cycle for development of anemia. Anemia in adolescent girls contributes to maternal and fetal anemia and death in the future. Adolescent girls are considered as the backbone of not only healthy but also progressive family and thus future builders of healthy community. Prevalence of malnutrition among adolescent girls is high in India particularly among rural population (Joshi et al., 2014). Worldwide estimates of 2016 indicated that 33% of women in their reproductive ages suffered anemia, with the highest prevalence in Asia and Africa (WHO, 2017). World Health Organization (2020) defines Anemia is a medical condition wherein the number of red blood cells or their oxygen carrying capacity is insufficient to meet physiological needs. One out of the six people are adolescents and Iron deficiency Anemia throughout the world was considered the second cause of years lost by adolescents in 2016 (WHO, 2018). Approximately one-third of the world's population is affected by anemia (Chaparro and Suchdev (2019). Shaka and Wondimagegne,(2018) reported Anemia negatively affects physical capability, development, performance, and immunity in adolescents, and it may lead to potentially long-term effects in advanced age groups, especially among women during their childbearing age. It may result in increased rates of pregnancy complications, such as low birth weight, premature births, and neonatal mortality. Inculcating healthy lifestyle and dietary patterns conducive for prevention of anemia is the most cost effective way to real dent in the problem (Halder et al.,2012)

Iron deficiency anemia (IDA) usually develops as a result of low dietary intake, blood loss resulting in loss of iron, problems in iron absorption, and other medical conditions, such as last stage kidney failure and inflammation. IDA cases range from mild to severe. Mild and moderate IDA may be devoid of any signs or symptoms. However, a severe case of IDA, if left untreated, may entail life-threatening consequences (National Heart, Lung, and Blood Institute, 2019).

Poverty is the main cause for iron deficiency anemia apart from other factors. Hence, proper steps should be taken to reduce poverty, promote hygiene and sanitation thereby improving the iron status as well as well-being of the population in general. Efforts should be targeted to reduce poverty, improve access to diversified diets, improve health services and sanitation and promote better care and feeding practices. These are fundamental elements of any programme to improve nutritional well-being in general, but are especially important in the improvement of iron status in particular.

Food based strategies play a vital role in preventing micro nutrient deficiencies. Dietary approach should aim at improving as well as maintaining the iron status. Knowledge on choice of diet that is rich in iron should also be considered along with imparting ways to improve absorption and bio availability. In a nutshell, importance should be given to aspects of food security through dietary strategies and associative factors (Maurice et al., 2007).

Intake of nutritionally adequate diet should be ensured to boost the immune system and maintain optimum health. The major intervention strategies envisaged for prevention and management of anemia are health and nutrition education that would improve iron intake. Food fortification is being increasingly recognized as the most effective, long term approach for nutritional value addition and eradication of micro nutrient deficiencies. Supplementation could be an effective preventive and curative strategy, in contrast to dietary intervention and food fortification.

The occurrences of anemia among adolescents could also be explained by the lack of appropriate knowledge, attitudes, and practice regarding healthy nutrition. Although it could be a preventable problem, most adolescents indulge in unhealthy dietary habits, and they are unaware of IDA and how to prevent it (Jalamb et al., 2017).

Structured educational intervention effectively improves knowledge, attitude, and practice regarding IDA among adolescent females. (Nesrin et al (2021). Nutrition education as an intervention resulted in amazing results of enhancing the knowledge of mothers in terms of use of green leafy vegetables, methods of cooking, processing of greens and willingness to grow kitchen garden.(Sujatha,2016). Nutrition education intervention resulted in significant increase in the mean knowledge scores in the experimental group compared to the control group (Sajjan, 2008). Nutrition education in schools proved effective in improving adolescent knowledge, attitude, and practice to prevent anemia (Angadi and Ranjitha, 2016). Furthermore, nutrition education is a long-

lasting strategy because it builds a good nutritional status (Sharma and Singh, 2017). A community-based intervention study was conducted in India involving 300 adolescent girls aged 13–17 years, who were divided equally into intervention and control groups. The nutrition education program for anemia was conducted only with the intervention group for four months. The results revealed a remarkable positive impact on the status of hemoglobin levels and KAP scores of the intervention group (Kamalaja et al., 2018).

In order to develop evidence based intervention for prevention and control of adolescent anemia in India, an attempt was made to use a nutrition education program as intervention to enhance the nutritional knowledge, attitude, and practice regarding anemia among adolescents' girls belonging to 12 to 17 years. The results might possibly immediate action on the part of stakeholders and policymakers in Odisha to initiate policies and guidelines to reduce IDA among adolescents. Previous studies acknowledged the prevalence of anemia among adolescents. However, there is a lack of studies examining the effectiveness of educational intervention on improving knowledge, attitude, and practice among adolescents in rural Odisha. Hence, Objectives of the study were (1) to assess the Knowledge, Attitude and Practice (KAP) of the adolescent girls about Anemia, (2) To determine the association between the selected demographic variables and the level of KAP among the adolescent girls, (3) to analyse the effectiveness of the planned nutrition education of Anemia programme on knowledge, attitude and practice. It was hypothesized that the implementation of a nutrition education program effectively improves the knowledge, attitude, and practice of anemia among adolescent girl students in Banki.

Materials and Methods

According to Polit & Beck (2004), evaluative research is an extremely “applied” form of research and involving in finding out how well a programme, practice or policy is working. Its goal is to assess or evaluate the success of the programme. So a one group pretest and post test design was employed in Govt. Girls High School, Rani Suka Dei (+2) College and Banki College (+2) for conducting the study. In this study, the researcher had done the pilot study by selecting 100 adolescent's girls for planned nutrition education programme to refine and to make the tool of data collection more suitable. Finally, the effect of the planned nutrition education programme on Anemia on dependent variable i.e. the knowledge, practice, attitude and belief was computed by the post test.

The research design is represented as follows:

01 x 02

01 - Pre - survey for the assessment of level of knowledge, practice and attitude towards Anemia.

x - Planned teaching programme on Anemia.

02 - Post survey for the assessment of level of knowledge, practice, and attitude towards Anemia.

The total population of all adolescent girls in the age group of 12 years to 17 years was 1694 studied in school and colleges of Banki Subdivision. Out of 1694, 508 (30 percent) adolescent girls were selected as sample cases for the present study. 508 sample cases that fulfilled the inclusive criteria were selected through purposive sample from this roll.

Data collection was carried out at the college and school premises during working days with due approval from respective headmistress and Principals of the school and colleges. Eventually all eligible students in the class were voluntarily recruited for the study with continuous interaction and motivation through discussion.

A structured questionnaire which sought information on socio-demographic characteristics, anthropometric data, clinical and biochemical assessment, dietary information, menstrual history and history of past illness and diet history and 2nd part of the questionnaire was to assess knowledge, attitude and practice of adolescent girls about nutrition related to anemia was used for collection.

The intervention was divided into four sessions containing, lectures by nutrition experts on “simple definition of anemia, causes, risk of anemia, consequences dietary habits, sources of iron rich foods” etc, e-learning module videos on Anemia Developed by ICMR- NIN under “Poshan Aaviyana”, Government of India. Each session lasted for approximately 45minutes. Power point presentations and videos were used to present the educational material, and brochures were distributed at the end of the session. The adolescent girls were instructed to practice the knowledge as shown in the nutrition education programme. Then, survey was conducted after a gap of 6 months with the same sample cases.

Descriptive statistics (mean and standard deviation) was used to represent the basic distribution of various parameters. Paired t test was used to know the difference between pretest and post test. ANOVA for Significant difference between the Sources of Information and Gain Score of KAP, Correlation Coefficient between KAP, regression analysis is used to know the relationships between multiple variables of the study.

RESULTS AND DISCUSSIONS

Demographic characteristics of the respondents

Age In Years	Frequency (F)	Percentage (%)
12 to 13	130	25.2
14 to 15	280	55.2
16 to 17	98	19.6
Size of family (members)		
2to4	388	76.4
5to-8	85	16.8
10 and above	35	6.8
Type of family		
Nuclear	397	78.2
Joint	111	21.8
Family Income		
Below 3000	285	56.2
3001-5000	176	34.4
Above 5000	47	9.4
Educational Status of the Mothers		
Illiterates	128	25.2
Primary	163	32.2
Middle	128	25.2
High School	67	13.0
Higher Secondary	22	4.4

Table 1 shows the demographic characteristics of respondents. More than half of (55.2 percent) of the respondents were in the age group of 14 to 15 years; and their (56.2percent) monthly income was less than Rs.3000/-. More than seventy-five percent (78.2%) of the respondents were belonged to nuclear family and having two to four members in their family. Only Four percent of the respondents completed high secondary school education and thirteen percent of the respondents completed high school education. Since the educational level of the mothers were very low, the awareness level of the girls and the mothers about the nutrition knowledge about iron deficiency diseases, nutritive values of vegetables and fruits, iron, vitamin C, folate, vitamin B₁₂ rich sources of food will be low. Thus, it is suggested that the girls belong to low socio-economic and educational status should be sensitized on nutrition education of anemia.

Percentage of iron deficiency anemia among adolescent girls

Table-2

Hb Level (g/dl)	Grades of Anemia	Mean Value	Frequency (f)	Percentage (%)
10-12g/dl	Mild	11.7g/dl	280	55
7-10g/dl	Moderate		223	44
8g/dl	Severe		005	01

Table -2 indicates among the 508 respondents' blood test, the mean hemoglobin level was 11.7g/dl. The laboratory results revealed that 55% had mild anemia, 44% had moderate anemia, and only 1percent of them had severe anemia (Table-2)

Level of knowledge, attitude, and practice regarding anemia

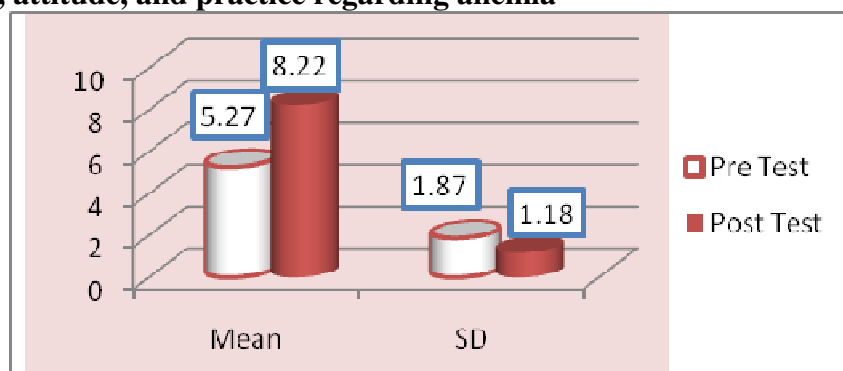


Fig-1: Mean and SD of Knowledge of the Respondents on Anemia

Fig: 1 presents the mean score on knowledge on anemia of the respondents is 5.27 with standard deviation of 1.87 before the planned nutrition education programme. After the planned teaching programme the mean score is 8.22 with standard deviation of 1.18.

The above analysis underlines the fact that the planned teaching programme on anemia was very effective in increasing the knowledge of the girls about anemia practices and menstrual hygiene.

Based on this finding, we can assume that adolescent girls have learnt good hygienic practices and developed a good confidence in managing the event of anemia.

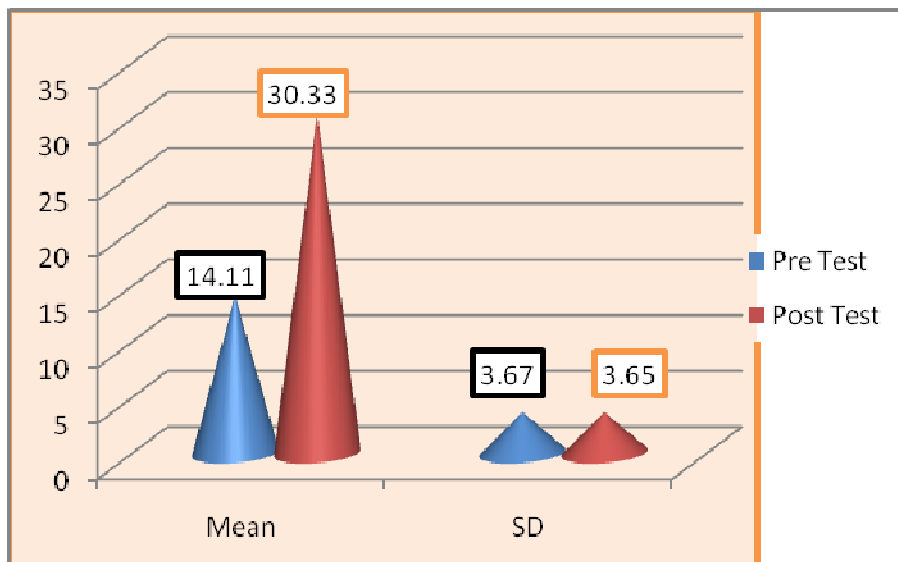


Fig-2: Mean and SD of Attitude on Anemia of the Respondents

Fig-2: shows the mean score of attitude towards anemia of the respondents is 14.11 with standard deviation of 3.67 before the planned nutrition education programme and after the planned nutrition education programme the mean score is 30.33 with standard deviation of 3.65. The above analysis indicates that there was a positive change in the attitudes of the girls towards the anemia after the introduction of planned nutrition education programme on practices regarding anemia. Girls were consciously choosing their food and make correction in their dietary habits.

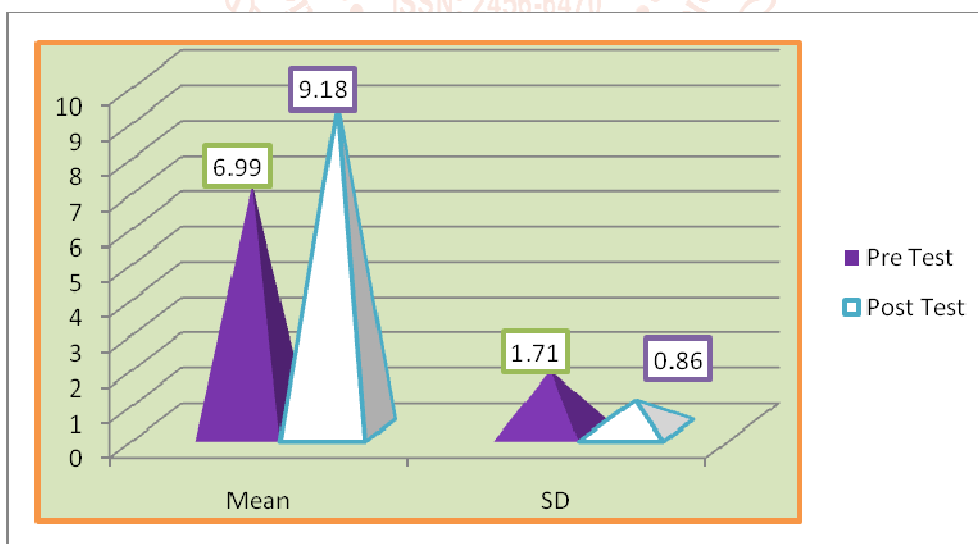


Fig-3: Mean and SD of Practice on Anemia of the Respondents

The data in fig-3 indicates that the mean score of practice on anemia of the respondents is 6.99 with SD of 1.71 before the planned nutrition education programme and after the planned nutrition education programme the mean score is 9.18 with SD of 0.86. This analysis shows that proper anemia practices among adolescent girls have increased after the introduction of planned nutrition education programme on anemia-such as , its causes, risk, consequences, dos and don'ts, iron rich food sources, role of vitamin C, blood forming nutrients etc. Based on this finding, it is concluded that the planned nutrition education programme on anemia was very effective and hence, it is suggested that similar type of planned educational programme on nutrition should be introduced in educational institutes where poor students are studying.

Table-6: Paired t test for significant difference between Pre-test and Post-test and KAP of the Respondents on Anemia

KAP	Pre test		Post test		t value	P value
	Mean	SD	Mean	SD		
Knowledge	5.27	1.87	8.22	1.18	53.05	0.000**
Attitude	14.11	3.67	30.33	3.65	89.59	0.000**
Practice	6.99	1.71	9.18	0.86	37.26	0.000**
Overall Score	26.37	4.50	47.73	4.13	107.56	0.000**

Note: ** denotes significance at 0.05 percent level

The above table shows that P value is less than the table value; the null hypothesis is rejected at 0.05 level of significance. Hence it is concluded that there is a significant difference between the pretest and post test and KAP gained on anemia.

It is also seen that the mean scores of the Knowledge, attitude and practice are higher after the post test than the pre test scores. Hence, it is interpreted that the planned nutrition education programme on anemia was very effective in changing the Knowledge, attitude and Practice of school girls in a desired direction regarding anemia. Prior studies demonstrated that implementing a structured and comprehensive educational program is an effective strategy for improving knowledge, attitude, and practice among adolescents. For Example to study Anemia in Pre-school and school children in Mumbai-viz-a-viz nutrition intervention programme showed significant score from before and after the intervention. (Thar, 2010). Moreover, studies on prevalence of Iron deficiency anemia among adolescent girls and impacts of nutrition education programme in changing the dietary behaviour showed suggested school based intervention provides the most effective in bringing the change in their knowledge, attitude and behaviour. (Bashir. R, 2013). Therefore, results of the present investigation added to prior evidence that supports the implementation of educational programs among adolescent girls. It also emphasized that educational institutes are an ideal place Educational institutions are effective and efficient medium to impart nutrition education programmes as it reaches considerable number of adolescents at a time and provides an excellent learning atmosphere.

Finally, results of the investigation support the idea that although students in different countries have different cultural backgrounds and learning experiences, they are still in need for nutrition education as a strategy to enhance their knowledge, attitudes, and practice.

This study provides valuable information about the benefits of educational intervention as a practical solution. It is essential to establish policies and make

decisions to take care of rural adolescent's girls by adopting effective educational programs. Besides, it is crucial to add routine hemoglobin and ferrous checkups to health promotion programs in schools and to commit schools to a specific diet or certain healthy food choices. They must be provided with regular training to enhance their educational capabilities.

CONCLUSION

The present study highlights that prevalence of anemia among school girls is a major public health problem in Banki Subdivision of Cuttack District. Efforts are needed to prevent it by approaches, which are feasible and cost-effective. If these girls enter pregnancy with iron reserves, iron supplements provided during pregnancy will be more efficient at improving the iron status of the mother and of the fetus. As a result, the risk of maternal anemia at delivery and of anemia in early infancy will be reduced and intergenerational lifecycle of malnutrition can be effectively broken. More efforts are required to increase adolescents' awareness regarding this to boost their current and future health status.

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