Study on Awareness on Iron Deficiency Anemia Among Urban Adolescent Girls of New Delhi

By

Yashika Kapoor

Dissertation submitted for the partial fulfillment of the

MBA Hospital and Health Management

Academic year, 2016-2018

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INSTITUTE OF HEALTH
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Public Health

and has successfully completed her Project on

"Awareness on Iron Deficiency Anemia Among Adolescent Girls in Slums of New Delhi"

Date- 1st Feb,2018 – 1st May,2018

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She comes across as a committed, sincere & diligent person who has a strong drive & zeal for learning

We wish her all the best for future endeavors

Project Supervisor

IQVIA Consulting & Information Services India Pvt. Ltd. New Delhi

Principal Public Health

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CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled""***A STUDY ON AWARENESS ON IRON DEFICIENCY ANEMIA AMONG URBAN ADOLESCENT GIRLS OF NEW DELHI***" and submitted by **Dr. Yashika Kapoor**Enrollment No. IIHMR-U/01/2016-18/0516 under the supervision of**Dr.Seema Mehta**for award of MBA in Hospital and Health Management of the University carried out during the period from **February'18 to May'18**embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other institute or other similar institution of higher learning .

Yashika

Signature

Acknowledgements

For a management student, the power of knowledge is accessible unless an element of practical observation and performance is not added. I started off my training with a vision in my mind so as to be able to learn about the practical aspects of Public Health Information and Consulting Services in a detailed manner.

I consider myself fortunate for being provided an opportunity to pursue my dissertation from *IQVIA CONSULTING AND INFORMATION SERVICES INDIA PRIVATE LIMITED, New Delhi.* It is a great pleasure to express my sincere gratitude to **Mr. Lokesh Sharma (Senior Principal)** for providing me this opportunity to undergo training in this highly esteemed organization.

I wish to express my sincere gratitude to **Mr. Ram Gopal Shukla** (Consultant-Public Health) for his supervision, advice and guidance. He was a continuous source of ideas which inspired and enriched my growth as a student, a researcher. I am indebted to him, for his faith in me and providing the right direction whenever I needed the most.

I would also like to thank my managers, **Mr. Kapil Sharma** (Project Manager) and **Mr. Sahil Mahajan** (Project Manager) for their guidance and interest in my work and their time.

I would also like to thank my mentor **Dr. Seema Mehta** (Associate Professor, IIHMR Jaipur), for her able guidance and support, constant help and motivation at every step of completion of this report.

I am thankful to all the members of *IQVIA CONSULTING AND INFORMATION SERVICES INDIA PRIVATE LIMITED* who helped me in one way or the other to carry out my work successfully and to learn about the deeper insight of public health and those who were a part of my project without whose unconditional cooperation my study would not have been completed successfully.

Lastly, I would like to express my gratitude to my family and friends for being a constant source of inspiration for me.

TABLE OF CONTENTS

ABBREVIATIONS

S. No.	Abbreviations	Meaning
1.	WHO	World Health Organisation
2.	IDA	Iron Deficiency Anaemia
3.	NGOs	Non- governmental Organisations
4.	NABH	National Accreditation Board for Hospitals and Health care
5.	HIV	Human Immunodeficiency Virus
6.	UNICEF	United Nations International Children's Emergency Fund
7.	IPI	Intestinal Parasitic Infection
8.	WIFS	Weekly Iron- folic acid Supplementation

ABSTRACT

Title: Awareness about Iron Deficiency Anemia among urban Adolescent girls of New Delhi

Background: Anemia in adolescent girls is now recognized to be a public health problem along with anemia in other population groups such as young children and pregnant women. According to WHO, about 62% of urban adolescent girls from the lower socio-economic group are estimated to be anemic. "WHO estimates the number of anemic people worldwide to be a staggering two billion with 1 approximately 50% of all anemia attributable to iron deficiency. Iron deficiency and iron deficiency anemia (IDA) in adolescence is a major public health problem. Therefore, this study was aimed to determine the awareness of iron deficiency anemia among urban adolescent girls of New Delhi .

Objectives:

The study assesses the awareness about Iron Deficiency Anemia among urban adolescent girls in New Delhi and to investigate any significant association between demographic characteristics and awareness about Iron Deficiency Anemia among urban adolescent girls of New Delhi .

Methodology:

A cross sectional study was conducted in the slum pockets of West Delhi district of New Delhi and a sample of 150 urban adolescent girls were taken under study through convenient sampling technique. A semi- structured questionnaire was formulated and Primary data was collected through personal interview of adolescent girls in the age group of 10-19 years .

Results:

Around 47% i.e. 71 out of 150 adolescent girls were of age group of 16-19 years. Study status of girls is not up to the mark as only 38% i.e. 57 out of 150 girls go to school and 47% did not go to school. Only 37% of the adolescent girls had heard about anemia and 63% did not even heard about anemia. Only 27 % of those 56 adolescent girls that were aware about anemia strongly agreed that anemia is a serious issue among the adolescent girls. Demographic Characteristics were analyzed to identify any significant association with awareness about anemia and it was found that study status and marital status shows significant association with awareness about anemia in adolescent girls as p- value was found to be less than 0.05 .

Conclusion:

It was observed that knowledge among adolescent girls about Iron Deficiency Anemia is poor as few have only heard about anemia. This is mainly because of very less number of girls going to school. There was a significant association found between study status and awareness about anemia. Therefore, health education through a school based intervention can be provided to educate about the importance of nutrition for preventing nutritional anemia, to introduce with the

food varieties (sources of iron) and to teach the causes and consequences of iron deficiency anemia .

Key Words: WHO, IDA, Adolescent girls

DISSERTATION- *AWARENESS OF IRON DEFICIENCY ANAEMIA AMONG ADOLESCENT GIRLS IN NEW DELHI*

INTRODUCTION

Adolescence has been defined by the World Health Organization as the period of life spanning the ages between 10 to 19 years . This is the determinative period of life when the maximum amount of physical, psychological, and behavioral changes take place. India is experiencing demographic transition and the current decade is observing the largest increase in the population of adolescents as they represent a significant segment of India .

Anemia affects over 800 million women worldwide. In India, it is classified as a major public health problem as it is estimated that 52% of nonpregnant women of reproductive age are anemic. Although the primary cause of anemia is iron-deficiency it is seldom present in isolation More frequently it coexists with a number of other causes, such as malaria, parasitic infection, nutritional deficiencies, and haemoglobinopathies . The importance of iron-deficiency as cause of anemia varies by region. While as low as 50% of anemia in sub-Saharan Africa may be attributable to iron-deficiency (due to high prevalence of HIV, hookworm, malaria, and other infectious diseases) the proportion of anemia caused by iron-deficiency increases to over 70% among premenopausal women in India.

According to the World Health Organization's 2009 Global health risks report, iron-deficiency anemia accounted for 400,000 deaths and 1.5% of the global Disability Adjusted Life Years in 2004 . This cost is disproportional born by developing nations as 60% of the morbidity and 95% of the mortality related to iron-deficiency are derived from the poorest nations of the world . South Asia and sub-Saharan Africa bear about 70% of the global mortality burden attributable to iron-deficiency anemia .

Iron-deficiency also has important consequences for the future generations, as iron-deficiency anemia increases the risk for preterm labor, low birth weight, infant mortality and predicts iron-deficiency in infants after 4 months of age . Anemia of which iron-deficiency is the major contributor, accounts for 3.7% and 12.8% of maternal deaths during pregnancy and childbirth in Africa and Asia, respectively . It also leads to cognitive deficits and reduced intellectual performance among school children . In communities where iron-deficiency is highly prevalent, successful iron supplementation results in the disappearance of anemia as a public health problem except where malaria and HIV or hookworm infection rates are high .

The World Health Organization defines iron-deficiency anemia as a condition whereby either individual hemoglobin levels are two standard deviations below the distribution mean, or more than 5% of a given population has hemoglobin levels that are two standard deviations below the distribution mean, in an otherwise normal population of individuals from the same gender and age, living at the same altitude . Significant public health implications are more commonly associated with moderate to severe anemia, defined as hemoglobin level below 10 g/dL . A focus on subpopulations experiencing moderate to severe anemia helps to better define the problem of iron-deficiency anemia in terms of functional consequences rather than

normative indicator distributions, thus potentially improving the impact of advocacy efforts and reducing the tendency towards false positive epidemics of anemia . In India, a focus on moderate to severe forms of anemia is particularly appropriate given the high prevalence of anemia and the public health significance of moderate and severe anemia .

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Despite increased national and international awareness and recent governmental intervention programs, the prevalence of anemia among Indian women has remained higher than 45% since 1990, and anemia trends remain strongly correlated with iron-deficiency . A 2007 Indian government "12 by 12 initiative", aimed at ensuring that all Indian adolescents have 12 g/dL hemoglobin by 2012, listed the main causes of anemia in India as low dietary intake, poor availability of iron, chronic blood loss due to hookworm infestation, and malaria .

Anemia is currently one of the most common and intractable nutritional problems globally. It is a global public health problem that affects both developing and developed countries with major consequences for human health as well as social and economic development . WHO estimates the number of anemic people worldwide to be a staggering two billion with 1 approximately 50% of all anemia attributable to iron deficiency. Iron deficiency anemia occurs at all stages of the life cycle, but is more prevalent in pregnant women and young children. Adolescents, particularly girls, are vulnerable to iron deficiency . The World Health Report (2002) identified iron deficiency among the 10 most serious risks in countries with high infant mortality coupled with high adult mortality and reported that measures to address iron deficiency anemia are among the most cost effective public health interventions .

In most populations anemia is mostly due to iron deficiency and is in fact the late stage of a relatively long process of deterioration in iron stores. UNICEF/UNU/ WHO / MI report directs that there are approximately 2.5 cases of iron deficiency for each case of anemia . The functional consequences are recognized to occur prior to onset of clinical stage of iron deficiency . Many more adolescents are in fact suffering from iron deficiency (ID) with its opposing effects on health and physical stamina, than are frankly anemic. Iron deficiency and iron deficiency anemia (IDA) in adolescence is a major public health problem. Studies show that the incidence of anemia in adolescents tends to rise with age and corresponds with the highest acceleration of growth during adolescence. The highest prevalence is between the ages of 12-15 years when requirements are at peak. More than 50% girls in this age group have been reported to be anemic .

Adolescents (age 10-19 years) are at high risk of iron deficiency anemia due to:

a) Accelerated increase in requirements for iron

b) Low dietary intake by adolescents and bio-availability of iron

c) Adolescent pregnancy

d) Frequent infectious diseases and parasitic infections

Anemia in adolescent girls is now recognized to be a public health problem along with anemia in other population groups such as young children and pregnant women. According to WHO, about 62% of urban adolescent girls from the lower socio-economic group are estimated to be anemic .

Therefore, this study was aimed to determine the awareness of iron deficiency anemia among urban adolescent girls of New Delhi.

RESEARCH QUESTION

1. What is the level of awareness of iron deficiency anemia adolescent girls of New Delhi?
2. Is there any significant association between demographic characteristics and awareness about Iron Deficiency Anemia among urban adolescent girls ?

OBJECTIVES

1. To assess the awareness level about iron deficiency anemia among urban adolescent girls.
2. To investigate the association between demographic characteristics and awareness about iron deficiency anemia in urban adolescent girls.

LITERATURE REVIEW

A thorough literature review reveal focusing on prior researches related to the topic of the study which gives a strong foundation on to base knowledge thus the survey of literature is one of the vital parts of any research endeavor .

According to Melkam Tesfaye, Tilhun Yemane, et al. Department of Clinical Laboratory, Bonga Hospital, Bonga, [2]Department of Medical Laboratory Science and Pathology, College of Health Sciences, Jimma University, Jimma, Ethiopia, Anemia is a condition characterized by reduction in the number of red blood cells and/or hemoglobin (Hb) concentration Anemia is a global public health problem affecting both developing and developed countries and has major consequences for human health as well as social and economic development. It affects 24.8% of the world population . The burden of anemia varies with a person's age, sex, altitude, and pregnancy. Causes of anemia in developing countries are multi-factorial, which include nutritional (iron, folate, and vitamin B_{12}) deficiencies, infections (such as malaria and intestinal parasitic infection [IPI]), and chronic illness . Iron deficiency anemia is a condition in which anemia occurs due to lack of available iron to support normal red cell production . The prevalence of iron deficiency and subsequent anemia increases at the start of adolescence. In girls, this is caused by increased requirements of nutrition for growth, exacerbated a few years later by the onset of menstruation, but subsides for boys . The physical and physiological changes that occur in adolescents place a great demand on their nutritional requirements and make them more vulnerable to nutritional deficiencies. Adolescents are at high risk of iron deficiency and anemia . This is due to rapid pubertal growth with sharp increase in lean body mass, blood volume, and red cell mass, which increases iron requirements for myoglobin in muscles and Hb in the blood . Iron requirement increases two- to three folds from a preadolescent level of ~0.7–0.9 mg iron/day to as much as 1.37–1.88 mg iron/day in adolescent boys and 1.40–3.27 mg iron/day in adolescent girls .

Interventions to reduce the burden of anemia and iron deficiency anemia should address the causatives . Cost-effective anemia prevention and control strategies are well-documented and have the power for their intended objectives in different countries. Knowledge of the degree and causes of anemia in adolescence is important, as this is a window of opportunity for school-based interventions to improve adolescent health . There is a scarcity of data on anemia in adolescents living in developing countries in the complex ecologic context of poverty,

parasitism, and malnutrition. At all levels, the negative effects of anemia during adolescence justify public health action; unfortunately, because initiatives to prevent anemia commonly target infants, young children, and pregnant and lactating women, and not necessarily adolescents, the needs of adolescents may remain unmet and the consequences of anemia in adolescents continue . But limited data are available on the prevalence of anemia, iron deficiency, and associated factors among adolescents in Ethiopia, particularly in Bonga Town .

According to Kumar B. Shill, Palash karnakar, et al. Iron-deficiency anaemia (IDA) is a common health problem in rural women and young children of Bangladesh . The university students usually take food from residential halls, and the food value of their diets is not always balanced . This cross-sectional study was conducted to estimate the prevalence of iron-deficiency anaemia among the university students of Noakhali region, Bangladesh . Haemoglobin level of 300 randomly-selected students was measured calorimetrically, using Sahl's haemoglobinometer during October to December 2011 . Statistical analysis was done by using SPSS software for Windows (version 16) (SPSS Inc., Chicago, IL, USA) . In the study, 55.3% students were found anaemic, of whom 36.7% were male, and 63.3% were female . Students aged 20-22 years were more anaemic (43.4%) than other age-groups . Majority (51.3%) of male students showed their haemoglobin level in the range of 13-15 g/dL, followed by 26.0% and 21.3% with 10-12 g/dL and 16-18 g/dL respectively . Although 50.5% anaemic and 51.1% non-anaemic female students showed normal BMI—lower percentage than anaemic (60.7%) and non-anaemic (71.9%) male students, the underweight students were found more anaemic than the overweight and obese subjects . Regular breakfast-taking habit showed significant (p=0.035, 95% CI 0.5-1.0) influence on IDA compared to non-regular breakfast takers . Consumption of meat, fish, poultry, eggs, or peanut butter regularly; junk food; multivitamins; and iron/iron-rich food showed insignificant (p=0.097, 95% CI 0.5-1.1; p=0.053, 95% CI 1.1-2.3; p=0.148, 95% CI 0.6-1.2; and p=0.487, 95% CI 0.7-1.4 respectively) role in provoking IDA . In the case of non-anaemic subjects , all the above parameters were significant, except the junk food consumption (p=0.342, 95% CI 0.5-1.2). Our study revealed that majority of university students, especially female , were anaemic that might be aggravated by food habit and lack of awareness . The results suggest that anaemia can be prevented by providing proper knowledge on the healthful diet, improved lifestyle, and harmful effect of anaemia to the students .

Sanjeev M Chaudhary and Vasant R Dhage conducted a similar study to estimate the prevalence of anemia among adolescent females and to study the socio-demographic factors associated with anemia . A cross-sectional survey was conducted in an urban area under Urban Health Training Center, Department of Preventive and Social Medicine, Government Medical College and Hospital, Nagpur . A total of 296 adolescent females (10–19 years old) were included in this study. The study took place from October 2002 to March 2003 (6

months). Statistical analyses were done using percentage, standard error of proportion, Chi-square test, and Student ‘s ‘t’ test . The prevalence of anemia was found to be 35.1%. A significant association of anemia was found with socio-economic status and literacy status of parents . Mean height and weight of subjects with anemia was significantly less than subjects without anemia. A high prevalence of anemia among adolescent females was found, which was higher in the lower socio-economic strata and among those whose parents were less educated. It was seen that anemia affects the overall nutritional status of adolescent females .

RESEARCH METHODOLOGY

STUDY DESIGN

Descriptive Cross-sectional study

STUDY AREA

Slums of West Delhi district

DURATION OF STUDY

3 Months (February 2018- April 2018)

SAMPLE SIZE

150 adolescent girls

SAMPLING TECHNIQUE

Convenient sampling technique

SAMPLE SELECTION

The target population under the study focus was all adolescent girls in the age group of 10-19 years those who are residing in the slums of New Delhi. Adolescence has been defined by the World Health Organization as the period of life spanning the ages between 10 to 19 years.

TYPE OF DATA COLLECTED

Primary data was collected through personal interview of study population of adolescent girls in the age group of 10-19 years

Secondary data used for the study is corporation health action plan, UNICEF booklets, and websites.

DATA COLLECTION TOOL

A Semi-Structured questionnaire for personal interview of adolescent girls. The questionnaire has sections about various aspects like demographic, social factors of the beneficiaries, their knowledge and awareness regarding the study topic.

DATA ANAYSIS PROCEDURE

MS Excel and SPSS was used for analysis. Various methods of descriptive statistics were used to analyze data

RESULTS

A. Demographic Characteristics taken for the study sample of 150 adolescent girls:

1. Age

Graph 1 represents the age group of adolescent girls taken for the study

Out of a sample of 150 adolescent girls,

- Around 47% i.e. 71 out of 150 adolescent girls belong to age group of 16-19 years.
- Around 40 % i.e. 60 out of adolescent girls belong to age group of 13-15 years.
- Around 13 % i.e. 19 out of adolescent girls belong to age group of 10-12 years.

2. Marital Status

Graph 2 explains about the marital status of the adolescent girls taken for the study

Out of a sample of 150 adolescent girls,

- Around 76% i.e. 115 out of 150 adolescent girls were unmarried and,
- Around 23 % i.e. 35 out of adolescent girls belong were married.

3. Study Status

Graph 3 explains about the number of adolescent girls who were going to school, who did not get a chance to go to school, and those who were dropped out in between the school tenure.

Out of a sample of 150 adolescent girls,

- Only 38% adolescent girls were going to the school regularly
- 47 % adolescent girls were not going to school regularly
- 15% dropped out of school due to some unforeseen reasons.

4. Mother's Occupation

Graph 4 represents the work status of mothers of adolescent girls.

- Only 10% mothers of adolescent girls were housewife and rest of the mothers were working.

B. **Awareness about Iron Deficiency Anemia among adolescent girls**

5. Awareness about Anemia

Graph 5 represents the awareness regarding Anemia among number of adolescent girls taken into study.

Out of a sample of 150 adolescent girls,

- Only 37% i.e. 56 out of 150 adolescent girls had heard about anemia whereas, 63% of them had not even heard about anemia.

6. Requirement of Iron after Menarche

Graph 6 represents the awareness concerning the requirement of iron after reaching the stage of menarche.

Out of a sample of 150 adolescent girls,

- Only 32% adolescent girls think that girls require more iron after they reach at the stage of menstruation.
- Around 48% of adolescent girls were totally unware of such situation.

7. Cooking in iron utensils increases iron content

Graph 7 graph represents the number of adolescent girls who think cooking in iron utensils increases iron content.

Out of a sample of 150 girls,

- Around 74% of adolescent girls were aware that cooking in iron utensils increases iron content.
- Only 10% of adolescent girls were unware of this.

8. Perception of anemia as a serious issue

Graph 8 represents perception of adolescent girls about Anemia as serious issue

From the above findings, there were 56 adolescent girls who were aware about anemia.

Out of those 56 adolescent girls, when asked about the perception of anemia as a serious issue,

- 43 out of the 56 adolescent girls who were aware about anemia also agreed with the Anemia as a serious issue whereas, 13 girls were neutral about their perception and none of them disagreed with the same.

9. Awareness regarding sources of iron

Graph 9 represents the frequency of awareness concerning iron content in different foods.

- Adolescent girls with knowledge about IDA, 70.9% knew that different foods like carrots, spinach are the rich sources of iron and only 30% did not know food contained iron.

This seems that majority of the girl's population are aware about food supplements that contain iron, but still there are many who do not see any benefits of taking iron supplements which could be due to their high cost, the lack of education and counseling given by elders in the community and health practitioners.

10. Prone to anemia

Graph 10 represents the awareness about adolescent girls being more prone to anemia.

From the above findings, there were 56 adolescent girls who were aware about anemia.

Out of those 56 adolescent girls,

- 34 out of the 56 adolescent girls were aware that adolescent girls are more prone to Anemia
- 4 out of 56 adolescent girls do not think that they are more prone to anemia whereas, 18 out of 56 adolescent girls were totally unware of it.

II. Association between Demographic Characteristics and awareness about Iron Deficiency Anemia in adolescent girls

Table 1

Awareness about anaemia w.r.t. Study Status					
			Awareness about Anaemia		Total
			No	Yes	
Study Status	Drop out	Count	16	7	23
		% of Total	10.7%	4.7%	15.3%
	No	Count	65	5	70
		% of Total	43.3%	3.3%	46.7%
	Yes	Count	7	50	57
		% of Total	4.7%	33.3%	38.0%
Total		Count	88	62	150
		% of Total	58.7%	41.3%	100.0%

From the above table, it seems that adolescent girls who had heard about anemia depends on the study status as,

- Out of those 57 adolescent girls that go to school regularly, 50 adolescent girls were aware about anemia.
- Out of those 70 adolescent girls that do not get chance to go school, only 5 girls were aware about anemia.

Therefore, the above finding reflects that education is the key factor that affects the awareness about Iron Deficiency Anemia.

Table 2

Awareness about Anaemia in Different Age Category					
			Awareness about Anaemia		Total
			No	Yes	
Age Category	10-12 years	Count	13	6	19
		% of Total	8.7%	4.0%	12.7%
	13-15 years	Count	32	28	60
		% of Total	21.3%	18.7%	40.0%
	16-19 years	Count	42	29	71
		% of Total	28.0%	19.3%	47.3%
Total		Count	87	63	150
		% of Total	58.0%	42.0%	100.0%

From the above table, it is evident that age group has an influence over adolescent girls were about anemia as,

- Out of adolescent girls belonging to age category 13-15 years, 28 adolescent girls were those who had heard about anemia.
- Out of 71 adolescent girls belonging to age category 16-19 years, 29 adolescent girls had heard about anemia.
- None of the girls belonging to age category of 10-12 years had heard about anemia.

Table 3

Awareness about Anemia w.r.t. Mother's Occupation					
			Awareness about Anemia		Total
			No	Yes	
Mother Occupation	Employed	Count	85	49	134
		% of Total	56.7%	32.7%	89.3%
	Housewife	Count	8	8	16
		% of Total	5.3%	5.3%	10.7%
Total		Count	93	57	150
		% of Total	62.0%	38.0%	100.0%

The above table represents the relationship between Mother's Occupation and Awareness about Anemia.

- There were 134 mother of adolescent girls who were employed and out of those 134employed mother of adolescent girls, 85 were unaware about Anemia and 49 adolescent girls were aware about Anemia.
- Out of 150 adolescent girls' mother, 16 mothers of adolescent girls were housewife. Out of those 16, 8 girls were aware about anemia and 8 were unaware about Anemia.

Table 4

Awareness about Anemia w.r.t. Marital Status of Adolescent Girls					
			Awareness about Anemia		Total
			No	Yes	
Marital Status	Unmarried	Count	66	49	115
		% of Total	44%	32.7%	76.7%
	Married	Count	28	7	35
		% of Total	18.7%	4.7%	23.3%
Total		Count	94	56	150
		% of Total	62.7%	37.3%	100.0%

The above table represents the relationship between Marital Status and Awareness about Anemia.

- Out of 115 adolescent girls those were unmarried, 66 adolescent girls were unaware about anemia and 49 girls were aware about anemia.
- Out of 35 married adolescent girls, 28 were the girls that were unaware about anemia and only 7 were aware about the same.

Table 5 represents Association between Demographic characteristics and Awareness about Anemia

Null Hypothesis	Demographic Characteristics	Chi-Square value	p-Value	p< 0.05	Result
No association between Study Status and Awareness about Anemia	Study Status	85.42	0.00	0.00<0.05	Statistically significant Null Hypothesis rejected
No association between Age category and Awareness about Anemia	Age Category	1.422	0.49	0.49>0.05	Statistically not significant Null Hypothesis accepted
No association between Mother's Occupation and Awareness about Anemia	Mother's Occupation	1.094	0.29	0.29>0.05	Statistically not significant Null Hypothesis accepted
No association between Marital Status and Awareness about Anemia	Marital Status	5.86	0.01	0.01<0.05	Statistically significant Null Hypothesis rejected

The above characteristics were analyzed to identify any significant association with the awareness about Anemia. It clearly seems that study status shows significant relationship with the awareness about anemia as p value was less than 0.05. Age category and Mother's occupation did not show a significant relationship with the awareness about anemia. A significant relationship was seen between marital status and awareness about anemia as p value 0.01 which is less than 0.05.

DISCUSSION

Adolescence is an opportune time for interventions to address anemia. Not only is there a need (growth, preparation for pregnancy), but large numbers of both boys and girls can be reached easily if school attendance or participation in other group activities is high. Also, adolescents are open to new information and new practices since they are often striving for physical and academic excellence .

Education seems to be critical for awareness regarding Iron Deficiency Anemia (IDA) as this study shows that only 38% of adolescent girls who attended school were aware of IDA The adolescent girls who were included in this study were unaware regarding seriousness about IDA as a disease, as well as unaware about the sources of iron. Therefore, there is a high need for creating awareness among adolescent girls. These girls residing in slum areas should be encouraged for education and not only them but also their parents can be counselled to provide education to their children .

School settings can be an essential, effective, and efficient place to implement a comprehensive nutrition education program to develop the knowledge of school going children with respect to anemia .

Careful planning is essential to the success of health education program to prevent nutritional anemia among the adolescent girls in India . Health education through a school based intervention can be provided to educate about the importance of nutrition for preventing nutritional anemia, to introduce with the food varieties (sources of vitamins, minerals, iron etc.), to teach the causes and consequences of nutritional anemia and to inform different strategies for the prevention of nutritional anemia. Therefore, School health programs are crucial to improve student's nutritional habits, knowledge and awareness .

Health programs for mothers on utilization of easily available and affordable iron rich diet can help in promoting awareness . Parents as well as teachers should be sensitized on under nutrition, role of healthy diet and consequences of anemia. Though initiation of Iron fortification had been done, it should be in commonly reachable vehicles like salt, sugar and available for all, which doesn't demand individual co-operation .

Counseling can be done to empower adolescents to generate the awareness of iron deficiency anemia so that precaution measures can be taken to avoid anemia in adulthood. Training program should be organized to make community aware about fortification of food as well as importance of iron for adolescents .

Health education sessions with more focus on specific issues and information on anemia, general information, such as the adverse effects of drinking tea with meals in reducing the absorption of iron and about the side effects of misuse or overuse of iron tablets .

Special education and awareness programs should be planned and implemented keeping the family of adolescent girls in mind which would involve bringing the mother and daughter on the same platform and teaching them together .

CONCLUSION

Adolescent girls are in a period of rapid physical, sexual and emotional development . For about five to six years of their life, most of them suffer from various emotional and psychological problems such as fear, confusion, doubts and anxieties due to physical change with the development of the primary and secondary sex characteristics along with the maturation of reproductive functioning . Due to lack of information on physical change and reproductive health, they have a hard time coping with such problems . Anemia poses a threat to the girl's life that has lifelong consequences, an additional burden for the nutritional interventions .

In this study it was observed that adolescent girls who go to school regularly were more aware of IDA than those who never went to school . The family of such adolescent girls should be motivated so that every girl can get a chance to go to school. School based nutrition education has potential to improve dietary practices that affect young person's health, growth, and intellectual development . This health educational intervention will enhance adolescent girl's knowledge, skills and support to build positive attitudes towards preventing nutritional anemia . It is also important to conduct these sessions with a regular interval with updated content and diversified methodologies that respect regional and local characteristics .

School authorities, community leaders and parents must engage and commit to implementing and sustaining nutrition education program within the school . Such support is crucial to promote healthy behaviors . Health education through school based intervention proposes employed methods that favors dialogues, exchange of experiences and reflection on the student's own practices from their previous experiences . This interdisciplinary approach will be beneficial to sensitize adolescent girls on related topics and contribute to self-care and behavior change, therefore, improve their quality and value of life .

Factor affecting awareness about anemia like study 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 . This should be supported by programs for the prevention of anemia among adolescent girls through nutrition education and anemia prophylaxis .

Therefore, to increase the awareness about Anemia, Health education plays an effective role in improving knowledge of adolescents and changing their attitude towards it .

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ANNEXURES-I

QUESTIONNAIRE

Namaskar my name is Dr. Yashika Kapoor, I am working as public health intern in IQVIA Consulting and Information Services India Pvt. Ltd. The information collecting in the following questionnaire is solely for research purposes and will be used for a dissertation thesis at The IIHMR University, Jaipur. Hence whatever the information provided by you will be kept confidential. Kindly provide your consent to help in this research. I would be highly thankful.

Signature: Date:

Personal Details

1) Name:
2) Age:
3) What is your current marital status?
    a) Married
    b) Unmarried

4) Do you go to school?
    a) Yes If No, Skip to Question 6
    b) No
    c) Drop out
    d) Never gone to school

5) Highest level of education?

   Ans:

6) What is your mother's occupation?

   a) Housewife

   b) Employed

7) What is your place of residence?

   a) Kachha house

   b) Semi- pakka house

   c) Pakka house

   d) Construction site

   e) Nomadic Population

   f) Others, please specify

8) Have you heard about anemia?

   a) Yes

   b) No Skip to Question 13

9) How did you come to know about Anemia? (You can Ans more than one)

   a) Health worker

   b) School teacher

c) Family members

d) Friends

e) Mass media (print media/ electronic media/ poster/ banner/ hoarding/ wall writing)

f) Others, please specify

10) Do you agree anemia as a serious issue?

a) Strongly disagree

b) Disagree

c) Neither agree nor disagree

d) Agree

e) Strongly agree

11) What are the symptoms of anemia?

a) Darkness in front of eyes Yes No Don't Know

b) Dizziness Yes No Don't Know

c) Weakness Yes No Don't Know

d) Faint Yes No Don't Know

e) Pale Yes No Don't Know

a) Others, please specify

12) What do you think among these can be used for prevention of anemia?

a) Intake of iron tablets Yes No Don't Know

b) Usage of iron utensils Yes No Don't Know

c) Intake of deworming tablets Yes No Don't Know

d) Intake of iron rich food Yes No Don't Know

e) Intake of vitamin C Yes No Don't Know

f) Others, please specify

13) Which of the following are rich sources of iron?

a) Carrots Yes No Don't Know

b) Apples Yes No Don't Know

c) Spinach Yes No Don't Know

d) Meat Yes No Don't Know

e) Others, please specify

14) Do you think that female adolescents require more iron after reaching menarche?

a) Yes

b) No

c) Don't Know

15) Which of the following statements are correct?

a) Cooking in iron utensils increases iron content Yes No Don't Know

b) Consumption of green leafy vegetables helps in iron absorption? Yes No Don't Know

c) Adolescent girls are more prone to anemia Yes No Don't Know

d) Anemia in adolescent girls can't be prevented Yes No Don't Know