Research Article

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PREVALENCE OF IRON DEFICIENCY ANEMIA IN ADOLESCENT GIRLS IN JAIPUR DISTRICT: A CROSS SECTIONAL STUDY

Priyanka Kumari [1]*, Nisha Kumari Ojha [2]

[1] PG Scholar, PG Department of Kaumarabhritya, National Institute of Ayurveda, Jaipur, Rajasthan, India

[2] Associate Professor and HOD, PG Department of Kaumarabhritya, National Institute of Ayurveda, Jaipur, Rajasthan, India

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***Corresponding author**
E-mail: priyankatripathy02@gmail.com

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ABSTRACT

Globally anemia accounts for a majority of the nutritional problem and it is principally engendered by deficiency of iron. Its prevalence is inordinately higher among developing nations, because of low socioeconomic status and poor access to healthcare services. In developing countries, the adolescent group is more exposed to nutritional challenges and adolescent girls are more vulnerable to the disease. This survey is intended to evaluate the prevalence of anemia and its associated factors among adolescent girls in age group of 12-15 year in Jaipur district, this survey also generated the anemic cases in the adolescent girls of age 12-15 year. A cross sectional study was conducted from August 2019 to January 2020 by attending health check-up camps at various areas situated within 20 kilometers in Jaipur district. Hemoglobin estimation was done by using three-part auto analyzer method. Statistical analysis was done using Percentages and Chi-square Test. 75.39% girls were found anemic. Statistically significant association ($p < 0.05$) was found in anemia in adolescent girls with the history of receiving iron folic acid (IFA) supplementation, deworming, age, habitat, family type and status of menarche. Present study reveals that 75.39% girls were found anemic and the problem is significantly associated with status of IFA supplementation, deworming and family type.

Keywords: anemia, adolescent girls, health check-up camps

INTRODUCTION

Globally anemia accounts for a majority of the nutritional problem and it is principally engendered by deficiency of iron. Even though it occurs in all the age group, prevalence is on a higher side among women of childbearing age[1]. Its prevalence is inordinately higher among developing nations, because of low socioeconomic status and poor access to healthcare services[2]. In developing countries, the adolescent group is more exposed to nutritional challenges and adolescent girls are more vulnerable to the disease. This period has been considered as the transitional phase from childhood to adulthood. During this phase of major psychological, behavioral and physical developments and because of marked physical activity and growth spurt, adolescents need additional nutritional requirements[3].

In addition, it gets precipitated by blood loss during menstruation. Anemia not only affects the present health status of girls but also has deleterious effects in future pregnancy, that puts the women at three times greater risk of delivering low birth weight and nine times higher risk of perinatal mortality, thus contributing significantly for increased infant mortality rate and 30% maternal deaths.[4] Also, intestinal parasitic infections are widely prevalent in many developing countries including India.[5]

According to WHO, adolescent age group is defined as life span between 10-19 years.[6] In India the prevalence of anemia among adolescent girls were 56% and this accounts to an average 64 million girls at any point in time[7]. Anemia affects the physical and mental development of an individual leading to decreased working capacity which in turn affects the development of country[8]

This survey is intended to evaluate the prevalence of anemia and its associated factors among adolescent girls in age group of 12-15 year in Jaipur district. This survey also generated the anemic cases in the adolescent girls of age 12-15 year

Subjects

All unmarried, non-pregnant, non-lactating adolescent girls (12-15 years) were included in the study (n = 504).

MATERIALS AND METHODS

A cross sectional study was conducted from August 2019 to January 2020 by attending health check-up camps at various areas situated within 20 kilometers in Jaipur district. The field practice area is urban area, out of which one area was selected by simple random sampling. The population of the area is approximately 10,000. For better coverage it was decided to include all eligible adolescent girls in the study (n = 504).

After obtaining permission from Institutional Ethical Committee, IEC/ACA/2018/67 dated-11/05/2018 and CTRI with registration No. CTRI/2019/08/020513 a team of investigators and lab technicians surveyed by attending health check-up camps at various schools situated in Jaipur district. After getting informed consent, information regarding socio-demographic and menstrual factors was recorded in pre-designed, pre-tested proforma. Girls were also questioned about diet, history of worm infestation, past illness in last 3 months, menstrual problems and symptoms of anemia viz. headache, fatigue, dyspnea. All girls were clinically examined for signs of anemia. Socio-economic status was estimated according to Kuppuswamy socio-economic scale.

Hemoglobin estimation

Hemoglobin estimation was done by using three-part auto analyzer method. For interpretation of anemia, cut off point for Hemoglobin % was taken as < 11.9 gm/dl. The severity of anemia was graded as follows[9]

- Mild- 10-11.9 gm/dl
- Moderate- 7 to 9.9 gm/dl
- Severe- <7 gm/dl

Statistical Analysis

Statistical analysis was done using Percentages and Chi-square Test.

RESULTS AND DISCUSSION

Out of 504 adolescent girls in the study population 380 (75.39%) girls were found to be anemic. Majority of the girls 272 (53.96%) were having mild anemia and only 8 (1.58%) girls were severely anemic. (Figure 1**)**

Prevalence

Study was conducted over 504 adolescent girls. Out of 504 adolescent girls in the study population 380 (75.39%) girls were found to be anemic.

Type of anemia

Mild type of anemia was found in 272 girls (53.96%), while moderate and severe type were found in 106 (21.04%) and 8 (1.58%) girls respectively (Figure 1). This study shows that mild variety of anemia is more prevalent among adolescent girls. The prevalence of mild anemia was more due to greater emphasis on iron folic acid supplementation and de worming program run by Government at various school levels. This present finding is supported by previous studies.[10-12]

Age

Out of 504 girls 128 girls belonged to the age group 12-13 year, 91 girls in the age group13-14 years and 285 belonged to age group 14-15 years (Table 1). On statistical analysis relationship between age and anemia were significantly associated ($p < 0.05$) (Table 1). Increased prevalence of anemia was seen during the late adolescent age. The high prevalence of anemia among girls who were more than 14 year of age could be related to heavy menstrual loss. Previous studies also revealed the same finding [13-15].

Socio economic status

Out of 504 girls, 306 girls were belonging to socioeconomic class IV, 176 girls in socioeconomic class III, 20 belonged to socioeconomic class II and 4 belong to socioeconomic class I. Majority of girls i.e., 252 (82.35%) were found anemic in socioeconomic class IV (Table 1). On statistical analysis relation between socioeconomic status and anemia was found non-significant ($p > 0.05$) (Table 1). Patients of low socioeconomic status families were having higher incidence of iron deficiency anemia. The reasons behind high incidence of iron deficiency anemia in lower status of society are poor hygiene, poor mother health, illiteracy, inadequate child spacing, poor food quality and quantity, poor quality of drainage water, poor sanitation and higher risk for infections. Previous studies also document the similar findings[16-18]

Habitat

Out of total 504 girls, 289 belonging to urban slum area and 215 girls belonged to the rural area. Majority of girls i.e., 198 (92.09%) were found anemic in rural area and 182 (62.97%) girls found anemic in urban slum area (Table 1). There was significant association found between habitat and anemia in girls ($p < 0.05$). The cause may be poor hygiene maintenance; the poor income group is inability to afford proper diet and poverty. This present study supported by previous study.[19-21]

Family Status

In present study out of 504 adolescent girls, 244 were found from joint family and 260 from nuclear family. Majority of the girls 240 (98.36%) (Table 1) were found anemic from joint family. Statistically family status and anemia were significantly associated ($p = 0.0001$) (Table 1). This is may be due to the ignorance, less care of girl child and more division of food among children in large family. This present finding supported by previous study[22-24]

Risk factor

In present study out of 504 girls (1) frequent illness was most prevalent factor in daily routine life in 184 girls (Table 1). Prevalence of anemia was more common in girls with problem in (2) poor water supply and (3) little food which leads to deficiency of nutrition which is the most common cause of iron deficiency anemia in India[25]. (4) Worm infestation and (5) heavy menstrual bleeding were also common observation found in anemia because of blood loss in adolescent girls leads to increased demand. On statistical analysis risk factor and anemia were not significantly associated ($p = 0.650$) (Table 1). Previous studies also document the similar finding[26,27]

Receiving Food from National Program

Most of the girls (374) were not receiving food from National Program. Out of them 270 were (71.05%) were found anemic (Table 1). No significant relation was found between anemia and girls receiving food from National Program. Iron fortification of mid-day meal was effective in significantly reducing the prevalence of anemia among school children[28,29]

Diet

Out of total 504 girls 360 girls were found to take vegetarian diet and 144 girls were taking mixed diet. Majority of girls i.e., 122 (84.72%) were found anemic were non-vegetarian (Table 1). This is may be due to low socioeconomic status, Poor hygiene, large family and worm infestation. No statistically significant association between dietary habits and prevalence of anemia was observed in this study ($p = 0.2568$) (Table 1). A higher proportion of vegetarians, compared to non-vegetarians, had iron deficiency anemia[30,31]

Age of Menarche

Out of total 504 girls 260 girls achieved menarche and 244 girls did not achieved menarche at the time of study. Anemia was found more prevalent in 208 (80%) girls who achieved menarche (Table 1). On statistical analysis, there was significant association between anemia and menarche ($p = 0.0008$) (Table 1). This finding was consistent with a previous similar studies[32-34].

Receiving IFA Tablets under National Program

Out of 504 girls 169 girls were receiving IFA tablets under National Program in the survey area at the time of study. Maximum numbers of girls 323 were found anemic out of 335 girls who were not receiving IFA tablets under National program (Table 1). Statistically very strong association was found between anemia and girls who were not receiving IFA tablets under National Program (p=0.0001) (Table 1). The reason of not receiving IFA under national program may be due to unawareness towards National Program, poor taste, intolerance to IFA. Fear of weight gain, sickness, nonavailability of tablets were also the cause of refusal of IFA consumption. Previous studies revealed the same finding.[35-37].

Deworming

Out of 504 girls, 135 girls gave the history of deworming during last six month in the survey area at the time of study. Maximum number of girls 312 (85.47 %) were found anemic out of 365 girls who were not giving history of deworming (Table 1). On statistical analysis significant association was found between anemia and H/O deworming (p = 0.0008). Previous studies also confirm the same findings[38-40]

Table 1: Common Observation of Cross-Sectional Study

S. No.	Factors	Classification	No. of Girls	Girls with Anemia	% of Girls with Anemia	X^2	P- value
1.	Age of girls	12-13	128	70	54.68	17.196	0.0002
		13-14	91	70	76.92		
		14-15	285	240	84.21		
2.	Socioeconomic Status	I	4	2	50	6.233	0.1008
		II	20	6	30		
		III	176	120	68.18		
		IV	306	252	82.35		
3.	Habitat	Urban slum	289	182	62.97	7.767	0.0053
		Rural	215	198	92.09		
4.	Family status	Nuclear	260	140	53.84	19.014	0.0001
		Joint	244	240	98.36		
5.	Risk factors	Frequent illness	184	160	86.95	10.386	0.650
		Inadequate food	39	28	71.79		
		Poor education	70	30	42.85		
		Poor water supply	104	90	86.53		
		Worm infestation	86	60	69.77		
		Heavy menstrual bleeding	21	12	57.14		
6.	Receiving Food from National Program	Yes	130	110	28.94	1.089	0.2966
		No	374	270	71.05		
7.	Diet	Vegetarian	360	258	71.67	1.286	0.2568
		Mixed	144	122	84.72		
8.	Menarche	Achieved	260	208	80	11.294	0.0008
		Not achieved	244	120	49.18		
9.	IFA Tablets	Receiving	169	57	33.72	39.099	0.0001
		Not receiving	335	323	96.41		
10.	H/O deworming	Yes	139	68	48.92	11.331	0.0008
		No	365	312	85.47		
11.	Symptoms	Headache	108	74	68.51	3.341	0.3419
		Fatigue	220	188	85.45		
		Dyspnea	92	66	71.73		
		No symptoms	84	52	61.90		

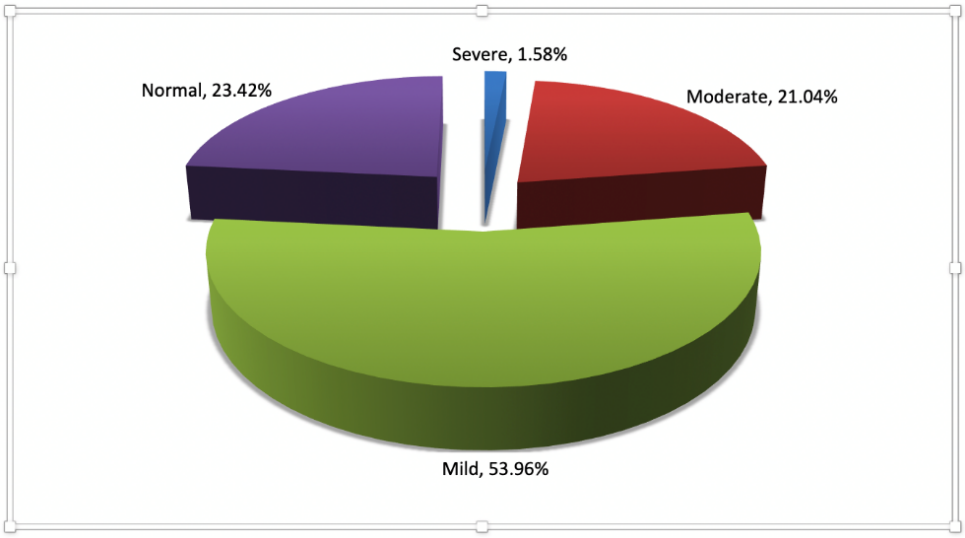

Figure 1: Prevalence of Iron Deficiency Anemia in Adolescent girls (n = 504)

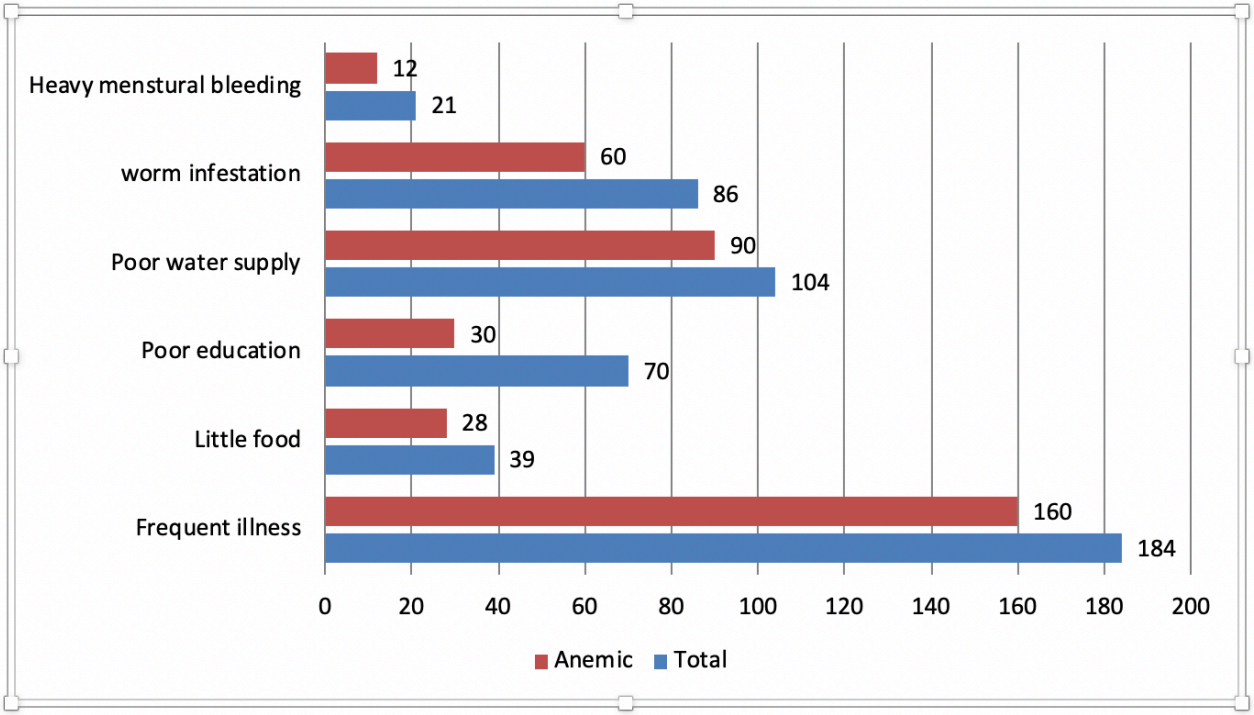

Figure 2: Risk factor wise distribution of adolescent girls in the survey area (n = 504)

Symptoms

Out of 504 girls most prevalent symptom found in girls was fatigue in 220 girls. Out of them, 188 (85.45%) girls were found anemic (Table 1). The symptom of fatigue is most prominent in *Pandu Roga*, the reason behind this may be *dhatukshaya, ojakshaya* as well as presence of *raktalpata* in the subjects. Fatigue of anemic subject is due to decreased supply of oxygen to the body /tissue/muscular mass/cellular level, this hypoxic condition causes anaerobic oxidation and lactic acid formation, this lactic acid if not cleared within due time, present as fatigue sensation in the body. Statistically no significant association between anemia and symptoms of anemia was found (p = 0.3419) (Table 1).

CONCLUSION

Iron deficiency anemia is the commonest form of anemia in Adolescent. During adolescents' period anemia is more prevalent in both sexes due to growth spurt especially in girls where they are exposed to risk of onset of menarche. In present study 75.39% girls were found anemic. This demographic study revealed mild anemia as the most prevalent type of anemia which was observed in 53.96% girls. In this study 51.58% girls were found who achieved menarche. Out of them 80% girls were observed anemic. Lower socioeconomic status was found to be major contributing factor in the present study. Lower socioeconomic status is responsible for unawareness towards health especially in the girl child and also insufficient availability of nutrition.

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