A Study of Nutritional Health Problems of Adolescent Girls in Rural Area of Nagpur District: A School Based Cross Sectional Study

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ABSTRACT

Introduction: "Adolescence" literally means "to emerge" or "to attain identity" and is essentially the period of rapid physical and psychological development. The World Health Organization (WHO) defines "adolescent" as an individual between 10 to 19 years of age. About 19.7% of Indian population is adolescents. Nutritional health problems are one of the important health problem faced by adolescents. Prevalence of anemia in adolescents (15-19 years) girls is 54%. Underweight is seen among 46.4% adolescent girls. Hence this study was conducted to find out nutritional health problems of adolescent girls in a rural area of Nagpur district. Menstrual hygiene was also studied.

Material and methods: A cross sectional study was carried out in one of the randomly selected school in a rural area of Nagpur. Calculated sample size was 145, though the study was carried out on 150 adolescent girls in August 2019 using a pre-designed and pre-tested questionnaire.

Results: Mean age of study participants was 14.87± 2.77 years. Prevalence of anemia was found to be 80%. Prevalence of undernutrition was 36%. None of the student received weekly iron and folic acid tablets in last three months. Only 28% study subjects received information of menstrual hygiene prior to menarche.

Conclusion: Prevalence of anemia and undernutrition was found to be high in a school of rural area of Nagpur district. WIFS program should be strengthened through inter-sectoral collaboration among health and education sectors.

Keywords: Anemia, Undernutrition, Weekly Iron and Folic Acid Supplementation, Menstrual Hygiene.

INTRODUCTION

"Adolescence" literally means "to emerge" or "to attain identity" and is essentially the period of rapid physical and psychological development. The World Health Organization (WHO) defines "adolescent" as an individual between 10 to 19 years of age.[1] About 19.7% of Indians are adolescents.[2] They are the future of the nation, forming a major demographic and economic force. Important health problems faced by adolescent is classified as nutritional problems, reproductive health problems, mental health problems and consequences of risk taking behaviour. Proper food and good nutrition are essential for physical growth and mental development. The adolescent growth spurt places extra demand on nutritional requirements. Adolescent girls need additional iron to compensate for menstrual blood loss.[3] As per National Family Health Survey- 4, prevalence of anemia in adolescent girls of age group 15 -19 years is 54%.[4] A study shows that, 46.4% of adolescent girls are underweight.[5]

The Ministry of Health and Family Welfare has launched the Weekly Iron and Folic Acid Supplementation (WIFS) Programme in 2012 to meet the challenge of high prevalence and incidence of anemia amongst adolescent girls and boys. These adolescents are given weekly supplementation with iron (100 mg) and folic acid (0.5 mg) tablets on every Monday by their teacher for 52 weeks.[6] The 2030 Agenda for Sustainable Development and United nation's Global Strategy for Women's, Children's, and Adolescents' Health provide a unique opportunity for accelerated action for the health of adolescents.[7] Improper nutrition affects not only current health of adolescent but put them at high risk of chronic diseases later in life.[3] The menstruation is unique to girls, menarche occurs between 11 and 15 years with a mean of 13 years of age. Hygiene-related practices of women during menstruation are of considerable importance, as it has a health impact in terms of increased vulnerability to reproductive tract infections (RTI).[8] Considering the importance of adolescent's health in Nation's development and their vulnerability to various health problems, this study was conducted to find out nutritional health problems of adolescent girls in a rural area of Nagpur district. Knowledge of menstrual hygiene and compliance to weekly iron and folic acid tablets (WIFS) among the girls was assessed and various factors associated with anemia was studied.

MATERIAL AND METHODS

This cross sectional study was carried out in August 2019. It was conducted at Hingna, a rural area of Nagpur district after approval by the Institutional Ethics Committee. Sample size was calculated using formulae, $4pq/l^2$. It came to be 145, considering prevalence of severe anemia in adolescent 10.48% and allowable error of 5%.[9]

Though, 150 girls were enrolled eventually. Out of 43 school, one school was selected by random number generation.

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Adolescent girls from 10 to 19 years were included in the study. Figure 1 shows the recruitment procedure. Institutional Ethics committee approval was obtained. Consent was obtained from the principal of school and parents. Assent was obtained from study participants. Data was collected by interviewing the students using a pretested questionnaire. Anthropometric measurements were recorded using standardised methodology as recommended by World Health Organisation. Body mass index (BMI) was calculated and subjects were categorised into various grades based on BMI according to South Asian classification.[10] Those with BMI less than 18.5 KG/M^2 were categorised as underweight. Complete blood count was done using automated differential count and anemia was graded into mild, moderate and severe as per guidelines of Anemia Mukt Bharat.[11] One millilitre of whole blood was collected from left cubital vein in ethylene diamine tetraacetic acid (EDTA) tube. Haemoglobin was calculated using Mindray BC-5390 Auto hematology analyser, at nearest Primary health centre. Safe injection practices was followed while sampling.[12] Biomedical waste was disposed as per Biomedical Waste Management rules, 2016.[1]

STATISTICAL ANALYSIS

Data was entered in excel and was analyzed by using the Epi-Info (version 7). The continuous data were presented as mean values along with their Standard Deviations (SD). Chi-square test was applied to test the difference between two proportions. p -value of less than 0.05 was considered as statistically significant.

RESULTS

Mean age of study participants was 14.87 ± 2.77 years, ranging between 10 – 19 years. Maximum study participants i:e 37.33% were in age group of 14 to 16 years. Parents of mosts study participants, 68% of mothers and 69.33% fathers were educated to more than or equal to middle school. Highest number of the study participants i:e 59.33% were living in Nuclear family. Maximum study participants, 66.67% were from lower socioeconomic class. Largest number of study participants, 81.33% were taking mixed diet. Prevalence of anemia was found to be 80%. Mean Hemoglobin of study participants was found to be 10.52 ±

1.61 gm/dl, ranging between 7 - 14 gm/dl. Thirty six percent of girls were underweight. Anemia in study subjects was found to be significantly associated with underweight with p value 0.007. Vegetarian diet was found to be associated with anemia and p value was 0.02. Maximum number of girls attained menarche at mid adolescents age group of 14 – 16 years. Only 28% study participants received any information about menarche and menstrual hygiene prior to menarche, of this 61.90% received information from mother and remaining got knowledge from friends, sister and teachers. Overall 20.4% adolescent girls were using sanitary napkins as menstrual absorbent, while 40% were using new cloth every time and remaining girls were reusing cloth after washing and Sundrying. None of the student received weekly iron and folic acid tablets in last three months. All the student received tablet Albendazole on the national Deworming day 10th August. However, compliance to albendazole was observed to be only 13.33%.

DISCUSSION

In present study, 80% of study participants were suffering from anemia and 36% were underweight. Anemia was found to be statistically significant with being underweight and vegetarian diet. In our study, prevalence of anemia was higher, similarly a study conducted in urban slum of Nagpur by Kulkarni et al. reported prevalence of anemia 90.1%.[14] Studies done by Toteja et al. and Gawarika et al. among adolescent girls from various rural districts of India observed prevalence of anemia as 90.1% and 96.5%, respectively.[15,16] In contrast to our finding, study conducted by Nagaraj Patil et al. in one of the Schools of north Karnataka it was 44.4%.[17] Aggarwal et al. in their study conducted among adolescent girls in the North East Delhi in slums, showed 45% prevalence of anemia.[18] Devi S et al. conducted a school based study among adolescent girls in Haryana, they found out prevalence of anemia as 73%.[19] In a study conducted by Kaur S et al. in rural Wardha among adolescent girls, prevalence of anemia was 59.8%.[20] Chandrakumari AS et al. found prevalence of anemia to be 48.63% among adolescent girls in a rural area of Tamil Nadu.[9] Chapparbandi SR et al. found prevalence of anemia to be 64.15% among adolescent girls in a rural area of Karnataka[21]

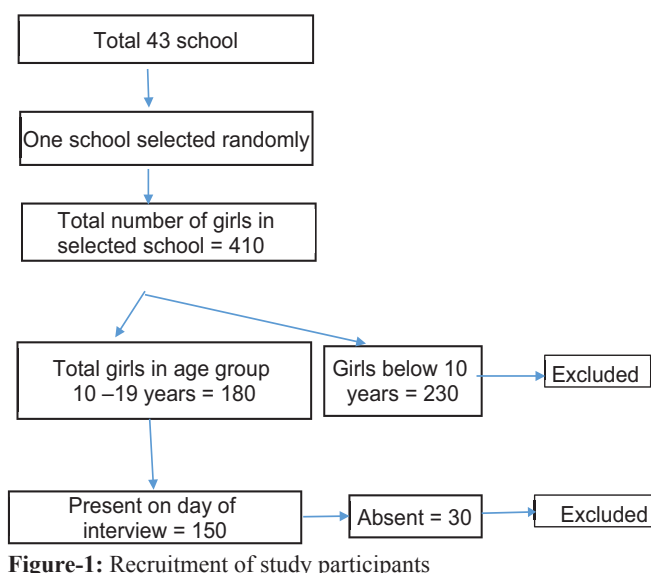| Variable	Group	Frequency (%)
Age group	10 – 13	42 (28)
	14 – 16	56 (37.33)
	17 - 19	52 (34.67)
Education of mother	Less than middle school	48 (32)
	More than or equal to middle school	102 (68)
Education of father	Less than middle school	46 (30.67)
	More than or equal to middle school	104 (69.33)
Type of family	Joint	43 (28.67)
	Nuclear	89 (59.33)
	Three generation	18 (12)
Socioeconomic class	Upper (I, II, III)	50 (33.33)
	Lower (IV, V)	100 (66.67)
Table-1: Distribution of Study Participants according to Sociodemographic Profile		

Anemia grading (Hb gm/dl)	Frequency (%)
No anemia	30 (20)
Mild (11 – 11.9)	50 (33.33)
Moderate (8 – 10.9)	50 ((33.33)
Severe (<8)	20 (13.34)
Total	150 (100)

Table-2: Distribution of Study Participants according to Grades of Anemia.

BMI (KG/M²)	Frequency (%)
<18.5	54 (36)
18.50 – 22.9	89 (59.33)
23.0 – 27.5	5 (3.33)
≥ 27.5	2 (1.34)
Total	150 (100)

Table-3: Distribution of Study Participants according Body Mass Index.

Total 43 school → One school selected randomly → Total number of girls in selected school = 410 → Total girls in age group 10 –19 years = 180 / Girls below 10 years = 230 → Excluded. Present on day of interview = 150 → Absent = 30 → Excluded

Figure-1: Recruitment of study participants

Variable	Group	Anemia		Total	Chi square P value
		Yes	No		
BMI	< 18.5	50 (92.59)	4 (7.41)	54	7.17
	≥ 18.5	70 (72.92)	26(27.08)	96	0.007* Df = 1
Diet	Vegetarian	28 (100.00)	0 (00.00)	28	4.86
	Mixed	99 (81.15)	23 (18.85)	122	0.02* Df = 1
Socio- economic class	Upper (I,II,III)	41(82.00)	9 (18.00)	50	0.005
	Lower (IV,V)	79 (79)	21 (21)	100	0.941 Df = 1
Education of mother	Less than middle school	38 (81.25)	10(18.75)	48	0.00
	More than or equal to middle school	82(80.39)	20(19.61)	102	1.00 Df = 1
Menstrual cycle	Regular	84 (80.77)	20(19.23)	104	0.0176
	Irregular	36 (78.26)	10 (21.74)	46	0.894 Df = 1
Albendazole consumption	Yes	15 (75.00)	5(25.00)	20	0.090
	No	105 (80.77)	25 (19.23)	130	0.763 Df = 1

Table-4: Factors Associated with Anemia in Study Participants, *p - value significant

Mean Hemoglobin in our study was found to be 10.52 ± 1.61 gm/dl, which was similar to the one reported by Mehta et al. which was 10.6 ± 1.2 gm/dl.[22] Mean haemoglobin of participants in our study was lower as compared to study conducted by Kotecha et al. and Anil Kumar et al. who reported it as 11.8 ± 1.4 gm/dl and 11.2 ± 1.6 gm/dl among adolescent girls.[23,24]

In this study, 36% of the girls found to be underweight and obesity was found in 2.8% of students. While in study conducted by Beevi P et al. underweight and obesity was 51.6% and 1.34% respectively.[5] Siraj Ahmad et al. conducted study among school-going adolescent girls in North India, they found the proportion of underweight and obese students as 47.0% and 2.7%, respectively.[25] Lower prevalence of 30.3% of underweight among adolescent females was noticed by Gupta A et al.[26] Also, in another study conducted by Singh et al. in Manipur, the proportion of underweight and overweight adolescents were found to

be 28.3% and 5.1%, respectively.[27] In our study, only 28% study participants received any information about menarche and menstrual hygiene prior to menarche. Whereas higher number of girls were found to be aware by Juyal R et al. as 64.5% girls were aware about menstruation prior to the attainment of menarche.[28] Study conducted by A Dasgupta et al. among secondary school girls, in rural area of west Bengal found 67.5% girls were aware about menstruation prior to the attainment of menarche.[29] In present study, 61.90% participants received information from mother and remaining got knowledge from friends, sister and teachers. Abhay Bhausaheb Mudey et al. noted that commercial educational material is an important source of information on menstruation among school going girls of Wardha, but also noticed that it does not deal with girl's emotional needs and anxiety.[30] We observed, overall 20.4% adolescent girls were using sanitary napkins as menstrual absorbent, while 40% were using new cloth every time and remaining girls

Variable		Frequency (%)
Menarche age (in years)	10 - 13	65 (43.34)
	14 - 16	80 (53.33)
	17 - 19	5 (3.33)
Menstrual cycle	Regular	104 (69.33)
	Irregular	46 (30.67)
Received any information about menarche and menstrual hygiene (Prior to menarche)	Yes	42 (28)
	No	108 (72)
Source of information (After menarche)	Mother	26 (61.90)
	Sister	4 (9.53)
	Friends	7 (16.67)
	Teachers	5 (11.90)

Table-5: Distribution of Study Participants according to Knowledge about Menstrual Hygiene.

were reusing cloth after washing and Sundrying. Whereas, Juyal R et al. found that, 38.4% adolescent girls were using sanitary napkins as menstrual absorbent, while 30% were using new cloth.[28] In our study, 53.33% of girls age at menarche was in mid adolescent, whereas, Jain et al. found higher number of girls i;e 67.55% girls attained menarche between 14 and 16 years.[31] Deshpande et al conducted study among adolescent girls from urban slum area and found 72% of girls with age at menarche between the age group of 15–19 years.[32] Also, study in Kolkata by Sudeshna R et al. reports 57% of girls age at menstruation between 15–19 years.[33] Deo et al. reported that the age of menstruating girls ranged from 12 to 17 years.[34] We observed that none of the student was getting weekly iron and folic acid tablets in last three months. Contrastingly, in study conducted by Arkaprabha S et al. 67.7% were "Compliant" to IFA tablet.[35]

CONCLUSION

Prevalence of anemia and undernutrition was found to be high in a school at rural area of Nagpur district. To achieve wholesome adolescent health, we need to have a multidimensional approach covering all the adolescent health problems with special emphasis on nutritional problems. To improve the prevailing nutritional problem, there must be inter-sectorial collaboration among health and education sectors in providing nutritional education and counselling based on age and menarche status. There is a need to educate the girls about menstruation, its importance and hygiene maintenance; so as to enable them to lead a healthy reproductive life in future. WIFS program should be strengthened with regular supply and increasing the compliance.

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