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Development and Social Development through Education'

‘सामाजिक विकासातून शिक्षण आणि शिक्षणाद्वारा सामाजिक विकास’
ह्या धोरणास वाहिलेले त्रैमासिक



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| | |
|--|----|
| संपादकीय | ०४ |
| भारतातील प्रौढ शिक्षण : ऐतिहासिक आढावा | |
| विस्वनाथा गुप्ता आणि विकास साबळे | ०७ |
| शिक्षक नैतिकतेचे नवे परिणाम | |
| उदयकुमार शिंदे | १३ |
| किमान अध्ययन क्षमता व सद्यस्थिती | |
| अर्चना झांगडे आणि बालाजी गिरगावकर | १७ |
| उच्च शिक्षण स्तरावर राष्ट्रीय शैक्षणिक धोरणाची अंमलबजावणी | |
| अनुराधा गोल्हार | २३ |
| कोरोना महामारीच्या काळातील उच्च शिक्षण व अध्ययन- अध्यापन प्रक्रिया: समस्या, संधी... | |
| विद्या अवचट | २८ |
| विद्यार्थ्यांच्या शैक्षणिक समस्या हाताळण्यासाठी शाळेची सज्जता आणि शालेय वातावरण... | |
| स्मिता पाटील आणि सुधा पिंगळे | ३६ |
| Role of an Educator in implementing NEP 2020 | |
| Prakash Salavi | 42 |
| A Case on Prevalence of Anaemia and Body Mass Index as Its Associated Risk Factor among Adolescent Girls of University: a Mixed Method Approach | |
| Priyanka Suryavanshi | 48 |
| Why Corporate Social Responsibility (CSR) is an Opportunity for Education Sector in India: A Review Paper | |
| N. Suresh | 57 |
| Fundamentals of Literature Review in Legal Research | |
| Dinesh Kolte | 72 |
| A Review of Cultural Identity Associated with the Weaving of the Bodo Traditional Wear "Dokhona" | |
| Chaitali Brahma, Haribrat Saikia, Sandipan Bhattacharjee, Bhaskar Saha | 86 |
| जानेवारी ते मार्च २०२२ | ३ |

A Case Study on Prevalence of Anaemia and Body Mass Index as its Associated Risk Factor among Adolescent Girls of University: A Mixed Method Approach

Priyanka Suryavanshi*

Abstract:

Anaemia has been globally recognised as one of the health issues that lay serious concern for women and girls. Indian women's and girls' status of anaemia prevalence is not good. The data of National Family Health Survey 2015-16 clearly shows that condition of anaemia in age group 15-49 is of concern. Around fifty percent population of women is anaemic. In spite of various programs and policies the change in condition is not satisfactory. Among various methods and strategy one is addressing the issue at initial stages. Adolescent and young girls entering colleges and university should be checked for anaemia and intervention should be given at that level itself. As they would further lay foundation of good maternal and child health. Thus present study was done to assess the anaemia status of university girl students and measure their BMI. The girl students of the entire faculties were notified and motivated for blood testing and BMI measurement. 239 girls gave their blood samples which were further tested for haemoglobin level and blood count. Height and weight of the university girls was measured and Body mass Index (BMI) was calculated by dividing weight in kilograms by height in meters squared (kg/m^2). 78 percent girls were found to be Anaemic. There was no significant correlation between hemoglobin concentration and BMI in adolescent girls, which was evaluated by Pearson's correlation coefficient.

Key words: Anaemia, BMI, Adolescent Girls, Women health, Mal nourishment.

Introduction:

Anemia is one of the major nutritional deficiency disorders prevailing among young girls and women in India. Gender equality is a step towards sustainable society. Discrimination and disparity with half population that is women can never lead to a sustainable society. Among many areas where women and girls are suffering one is health and nutrition. It is very crucial as

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bad health of adolescent girls make a weak foundation for future mothers and thus impacting new generation. Anaemia is global health concern that is impacting young children and pregnant women in particular. WHO estimates that 42% of children less than 5 years of age and 40% of pregnant women worldwide are anaemic. Women in developing countries are further more impacted. Anaemia is a serious concern for children because it can impair cognitive development, stunt growth, and increase morbidity from infectious diseases. 53% of women age 15-49 are anaemic in India (National Family Health Survey (NFHS-4)). Forty percent of women are mildly anaemic, 12 percent are moderately anaemic and 1 percent are severely anaemic. Government is focusing on Education for all as women contribute 50% to the country's development. India has made improvement from literacy rate 12 % in 1947 to 74% in 2011. In 2020 Literacy rate for adult male is 80.95% and for female population is 62.84%. The gap shows the gender disparity and why focusing on female literacy is needed. Though there is improvement in literacy level but anaemia prevalence in women has barely changed in the 10 years between NFHS-3 and NFHS-4, decreasing from 55 percent in 2005-06 to 53 percent in 2015-16. Anaemia among women has increased by 6 percentage points over NFHS-3.

Chandrakumari AS, Sinha P, Singaravelu S, Jaikumari S. 2019 found late adolescent girls were more impacted in comparison to early adolescent group. Socio economic group was one among the factors that impacted anaemia prevalence. P.M. Siva, A. Sobha, V.D. Manjula J Clin Diagn 2016 found prevalence of anaemia was 21%. It was found that daily activities like washing hands before eating food, frequency of pads used impacted and worm infestation also appeared to be one of the factors. Sanjeev M. Chaudhary, Vasant R. Dhage 2008 reported that women are more prone to nutritional deficiencies as compared to men because of reproductive cycles. Phuong Hong Nguyen, Samuel Scott, Rasmi Avula, Lan Mai Tran, Purnima Menon 2018 did a longitudinal study from 2006- 2016 and found that there are many factors contributing to maternal and child anemia. Vindhya J, Nath A, Murthy G. V., Metgud C; Sheeba B; Shubhashree V; Srinivas P. 2019 studied and found prevalence of anemia to be very high and other than Iron-Folic acid which is available through various government programs other requirement have to be seen through intervention.

Materials and Methods: A state level drive for awareness of anemia has been driven by Honorable Governor of Uttar Pradesh. Under the program all universities and colleges had to conduct anaemia test for female students. Thus permission from authorities was taken to conduct anaemia testing of girl students of Khwaja Moinuddin Chishti Language State Government University. Individual consent was taken from all participants for the use of

their testing data and BMI data for research and analysis. Height was measured by standiometer. Weight was measured by digital weighing scale. After getting informed consent from the subjects blood samples were collected and analyzed using automated hematology analyzer with the help of medical team from KGMU, Lucknow. A total of 239 adolescent girls reported and gave their samples for hemoglobin testing and their height and weight for BMI measurement.

Anaemia Criteria (WHO):

| Level of hemoglobin | CATEGORIES |
|---------------------|-----------------|
| 11.0-11.9 g/dl | MILD ANAEMIA |
| 8.0-10.9 g/dl | MODERATE ANEMIA |
| LESS THAN 8.0 g/dl | SEVERE ANAEMIA |

BMI reference values are based on WHO and Asian Criteria:

| CATEGORIES | BMI |
|----------------|-----------------|
| UNDERWIEGHT | LESS THAN 18.5 |
| HEALTHY WEIGHT | 18.5- 24.9 |
| OVER WEIGHT | 25- 29.9 |
| OBESE | 30 AND ABOVE 30 |

Body mass index (BMI) is a measure of body fat based on height and weight that applies to adult men and women.

Formula for BMI:

$$BMI = WEIGHT \text{ IN KG} / (HEIGHT \text{ IN METERS})^2$$

Results and Discussion:

Objective 1: To study the prevalence of anemia in relation to BMI (Body Mass Index) among adolescent Girls.

H1: There is significant relationship between BMI and anemia among adolescent girls.

A total of 239 adolescent girls were interviewed and their hemoglobin (%) and BMI (kg/m²) data were included in the analyses. Table 1 presents the Body Mass Index and Anaemia classification of adolescent girls of university. The mean BMI and hemoglobin with standard deviations of the study participants were 21.40 ± 3.31 and 10.65 ± 1.63, respectively. Majority (78.2%) of the adolescent girls were anemic. Among 187 adolescent girls

having anaemia 55 were mildly anemic, 120 had moderate anaemia and 12 had severe anaemia.

As per data of Nation family health survey 2015-16 around 50 percent of women (15 years to 49 years) are anemic. Nation family health survey 2019-20 first phase results are also not in favour. Most of the states still reported for same status of anemia with hardly much improvement from previous survey. Only 22 states data is available but that is also not satisfactory. Thus still anemia is a global public health problem for girls and women which need immediate concern. The present study shows alarming situation as 78% girls reported anemic. The data is from an educational institute in the city. It shows concern as an educational institute where often awareness programmes and sensitization is being done the result is poor. Thus those areas where illiteracy and gender sensitization is lacking would be in further bad conditions. Thus we need to find out its causes and solutions to improve girls and women health. The result also shows mean hemoglobin to be around 10. Still we need to improve health condition of women in particular.

Table 1: BMI and Anaemia Classification of Research Participants

| | MEAN | SD (Standard Deviation) | N (Frequency) |
|---|-----------|----------------------------|------------------|
| BMI | 21.4 | 3.31 | 239 |
| HAEMOGLOBIN | 10.65 | 1.63 | 239 |
| ANAEMIA PREVELANCE IN ADOLESCENT GIRLS OF UNIVERSITY | | | |
| | FREQUENCY | % | |
| NON ANAEMIC | 52 | 21.8% | |
| ANAEMIC | 187 | 78.2% | |
| SEVERE ANAEMIC | 12 | 5% | |
| MODERATE ANAEMIC | 120 | 50.2% | |
| MILD ANAEMIC | 55 | 23% | |

Table 2 shows the prevalence of anemia and the BMI classification of the research participants. Majority (121) of the adolescent girls that had anaemia were having normal BMI, (43) of anaemic girls were underweight and 23 were overweight. The results indicate that weight is not impacting haemoglobin level of adolescent girls. 64 % girls with normal weight to have anemia. 12% obese and overweight also have anemia. More than quantity its quality of food that may be impacting. The new generation inspite of education and awareness is attracted to junk food items and food timings are

also vague and accidental rather than organized and scheduled. Sephali Acharya, Minati Patnaik, Snigdha Prava Mishra, Amita Kumari Panigrahi 2018 found negative correlation between haemoglobin level and BMI and body fat. Many researchers have also reported that increase in weight may result in less iron absorption. Thus present study also revealed that haemoglobin level and BMI were not related. Thus quantity and quality of food both aspects are unhealthy and needs intervention to bring improvement in status of anaemia among girls.

Table 2. Classification of adolescent girls based on BMI & Anaemia prevalence

| BMI CLASSIFICATION | ANAEMIA (FREQUENCY(%)) | NON ANAEMIA (FREQUENCY (%)) |
|----------------------|---------------------------|--------------------------------|
| UNDERWEIGHT | 43 (23.0) | 10(19.23) |
| NORMAL WEIGHT | 121 (64.7) | 35 (67.31) |
| OVERWEIGHT AND OBESE | 23 (12.3) | 7 (13.46) |

There was no significant correlation between hemoglobin concentration and BMI in adolescent girls, which was evaluated by Pearson's correlation coefficient (Table 3). Multiple regression analysis of BMI associated with adolescent anemia are presented in Tables 4 and 5. Anaemia accounted for 0.2% of the variance, respectively (Table 4). There is no significant relationship between BMI and anemia among adolescent girls ($\hat{\alpha} = 0.098$; $P \tilde{A} 0.05$; Table 5). Thus, hypothesis 1 is rejected.

Since there is no much improvement in anemia prevalence from last 15 years it emphasizes that women and girls health is impacted by not just physiological but social, emotional and cultural factors. To bring change in behavior and attitude towards food practices intervention at all levels from availability of healthy food to bringing change in consumption of that food has to be done.

Table 3 Correlations between BMI and hemoglobin concentration in adolescent girls

| | | BMI | Hemoglobin |
|-----------------|------------|-------|------------|
| Pearson | BMI | 1 | |
| Correlation | Hemoglobin | 0.048 | 1 |
| Sig. (1-tailed) | Hemoglobin | 0.230 | |

Table 4 Model Summary

| R | R Square | Adjusted R Square | Std. Error of the Estimate | R Square Change | Change Statistics | | | |
|-------|----------|-------------------|----------------------------|-----------------|-------------------|-----|-----|---------------|
| | | | | | F Change | df1 | df2 | Sig. F Change |
| 0.048 | 0.002 | -0.002 | 3.317 | 0.002 | 0.549 | 1 | 237 | 0.459 |

Table 5 Estimates of effects

| | Un standardized Coefficients | | Standardized Coefficients | t | Sig. |
|------------|------------------------------|------------|---------------------------|--------|-------|
| | B | Std. Error | Beta | | |
| (Constant) | 20.357 | 1.422 | | 14.312 | 0.000 |
| Hemoglobin | 0.098 | 0.132 | 0.048 | 0.741 | 0.459 |

Qualitative Study

Focus group discussions: Parents of anemic girls were called and interviewed individually and in groups. Majority of parents complained about skipping breakfast. Majority girls started from home to university without breakfast which should be the heaviest meal for the start of the day. Girls preferred keeping money for junk foods as samosa, chips, sandwiches, maggi etc. Nobody reported for financial constraints for home food but they said dislike for home food and preference of junk foods over taking healthy home foods. In spite of having knowledge about healthy diet and food parents reported that the reason could be attraction towards fast food not just because of taste but the socialization that these youngsters enjoy in canteens and outside eatable places.

Few parents of girls under severe anemia category told that they take care of diet and the student is also conscious and eats well. But still are anemic. Worm infestation is another major reason for anemia. But to surprise no parent was aware about it. Thus awareness about other reasons like worms is also necessary to give proper help to anemic girls. These girl students were referred to medical university for further follow up and analysis.

Another important perspective that appeared during interviews was that mothers were worried about their daughters' health but were not sensitive about their own health. Most of the mothers reported for taking breakfast late after completing daily household chores. Thus adolescents often find it conflicting that they preach what they are not following. Many idealize

mothers as role model since they care for family on the cost of their health. This attitude is observed by them from childhood and they idealize it as to be a part of ideal women image in their society. Behavior learning theories talk about observational learning, modeling and reinforcement. In depth discussion revealed all these learning in adolescent girls are also a cause of poor eating habits. They observe their mothers and family women to sacrifice or compromise on their health for other family members. Most mothers followed stereotypical roles as delaying breakfast due to household work or morning pooja or even skipping breakfast; eating after all male members have taken meals, giving priority to male member's diet thinking they need more strength etc. Thus adolescent girls observe, model and even idealize them unconsciously. Even education and awareness is not sufficient to change their practices as socialization in long term makes it rigid.

To fight anemia multiple steps have to be taken as on one side modern life style is deteriorating health with attraction towards junk food and on the other hand traditional stereotypical roles of women do not promote healthy food practices. Thus these cultural and social factors are too needed to be studied and resolved for behavioral changes.

Conclusion:

The present study revealed that majority that is 78 % university girls were suffering from anemia. The two variables body mass index and anemia were not related to each other. Thus it's not quantity of food but also quality of food and many other factors impacting anemia. Contrary to the finding of other studies BMI was not related to Anaemia that highlights the importance of going in-depth of other reasons that could be the prevailing cause of anemia among adolescent girls. Adolescent girl health is of concern to whole nation as they would be future mothers. National family health survey shows bad health condition of pregnant and lactating mothers. Adolescent phase is the intermediate phase and a good opportunity phase for improving health of future mothers. Anaemia in children and mothers can be addressed through strengthening health of adolescent girls.

The qualitative analysis of interviews also suggests initiatives from society and government to bring changes in food practices of adolescents. Since anemia is severe health problem impacting adolescent girls higher education system of universities and colleges should organize workshops and seminars to detect anemia and follow up of anemic patients through diet counseling and further medical consultation.

Canteens and food outlets in universities should be strictly checked for their eatables. Junk food should be banned. Concept of common eating places for sharing home food should be promoted by teachers and student leaders.

Food is part of culture. Thus healthy food can be slowly incorporated in university culture to change the attitude of students.

Mothers should be engaged in gender sensitization through workshops to change gender stereotypical food habits to androgynous roles and behavior. For bringing change in attitude of adolescent girls change in attitude of mothers had to be focused.

University should compulsory introduce Nutrition and health papers as non credit courses for students to take up and try to practically bring awareness for health and hygiene. The paper should cover women and girl health issues in particular to sensitize and mobilize youth for it.

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Authors Note:

Dr. Priyanka Suryavanshi, Assistant Professor, Department of Home Science, KMCL Language University. Author declares no conflict of interest with any parties.

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