Determination of socio-economic and dietary factors influencing anaemia among the adolescent girls in Kottayam district

R. RAMYA AND ANOOJA THOMAS

ABSTRACT: Adolescence is a vulnerable period for the development of nutritional anaemia even in higher socio-economic status. Thus, the study aimed to explore in detail the incidence of anaemia among the adolescent girls of Kottayam district with reference to the socio-economic and dietary factors. The study was conducted on 500 adolescent girls (12-19 yrs) of Kottayam Taluk of Kottayam district in Kerala. Overall prevalence of anaemia was 57 per cent. More number (111, 55.0%) of the study respondents were found to have mild anaemia (10-11.9 g/dl), followed by 43.1 per cent were normal subjects (> 12 g/dl) and severe anaemia condition was not observed among the study respondents. Family income, religion, type of family and mother’s education were not significantly related to anaemia. Iron and folic acid intake showed statistically significant correlation with haemoglobin levels.

KEY WORDS: Anaemia, Adolescent girls, Socio-economic factors, Dietary factors, Haemoglobin

of less than 12 g/dL in women.

**Socio-economic factors:**

Socio-economic factors in the current study refers to social and economic factors which can influence haemoglobin status like monthly family income, type of family, Religion, Mothers educational status.

**Dietary factors:**

In this study dietary factors include nutrition and diet related aspects like type of diet, iron intake and folic acid intake.

**Sampling:**

On the basis of sample determination equation five hundred adolescent girls between the age of 12-19 years were selected from Kottayam Taluk area. Multistage random sampling was the technique adopted for sample selection. Out of the 500 adolescent girls selected a sub-sample of 202 subjects were selected for screening of anaemia based on the following criteria.

**Inclusion criteria:**

- Those who are in the late adolescent age group (17-19 years)
- Who were willing to participate and permitted by their parents to take blood sample.

In addition, 150 adolescent girls were selected for detailed dietary assessment, based on their willingness to participate in 24-hour recall and to respond to food frequency questionnaire.

**Justification of sampling:**

Late adolescence, being close to the reproductive phase of a woman’s life, is very significant. Nutritional status during late adolescence thus, requires immediate attention and appropriate interventions.

**Tools and techniques:**

A semi-structured interview schedule was used to collect data from the respondents on socio-economic background and dietary pattern. The same was pre tested among 20 adolescent girls, not involved in the study, which were later excluded from the actual study. After the pre test appropriate changes were made in the survey instrument.

The biochemical parameters assessed were (a) Haemoglobin (Cyanmethemoglobin method), (b) Serum iron (Spectrophotometry) (c) Serum folic acid (Microbiological assay using Lactobacillus casei) and (d) Vitamin B₁₂ (Microbiological assay using Euglena gracilis).

Direct interview method was adopted for the data collection. The researcher explained each item of the schedule and the responses were recorded accordingly. Written consent was obtained from adolescent girls and their parents before blood collection. 5ml of venous blood was drawn using a disposable syringe from 202 adolescent girls with the help of trained lab technicians and 1 ml of the sample used for measuring haemoglobin levels using Cyanmethemoglobin method. Which revealed that 115 subjects were anaemic. Further serum iron, serum folic acid and vitamin B₁₂ levels were analysed for these 115 anaemic adolescent girls. In order to assess the frequency of consumption of nutritious foods and actual nutrient consumption twenty-four-hour recall and food frequency questionnaire were administered among a sub-sample of 150 adolescent girls (17-19 years). The statistical software SPSS version 17 was used for the data analysis.

**RESEARCH FINDINGS AND DISCUSSION**

The total percentage of anaemia of adolescent girls under study was 57 and it is significantly higher percentage with a mean haemoglobin level of 11.7g/dl. As per the anaemia classification of WHO (1989) only 43.06 per cent of the subjects had normal haemoglobin levels (>12 g/dl). Mild anaemia was seen among 55 per cent of the subjects (10-11.9 g/dl), whereas, only 1.9 per cent of the subjects had moderate anaemia (7-9.9 g/dl). Severe anaemia (<7g/dl) was not observed among the study respondents. These results support the UNICEF (2011) data in which the prevalence of anaemia in adolescent girls was estimated at 56 per cent.

The respondents under this present study had an average Hb level of 11.7 g/dl, a little below the normal range. Serum iron level was found to be well below (25.69 µg/dl) the normal range (35-150 µg/dl) indicated by Monson et al. (2002). Also the serum folic acid level was found to be well below (2.5 ng/ml) the normal range (3-17 ng/ml) prescribed by Ashraf et al. (2008), whereas vitamin B₁₂ status of the subjects found satisfactory with a mean of 359.2 pg/ml. Hence, it has been concluded that haemoglobin, serum iron and serum folic acid levels
measured for the anaemic girls in the study were below the respective average levels indicated (Table 1).

**Nutrient consumption of adolescent girls:**

The intake of all the nutrients except protein, fat and calcium was significantly lower ($P<0.01$) than Recommended Dietary Allowance (ICMR, 2004) among the adolescent girls. It was found that the consumption of energy, iron, vitamin C and folic acid did not meet the RDA. Iron intake of adolescent girls between the age group of 17 to 19 was remarkably low with percentage around 55. Vitamin C intake reported the least percentages, i.e. 55.6 per cent for age 17 and 18 and 41.2 per cent for age 19. These findings were coinciding with the study conducted by Parimalavalli and Sangeetha (2011). Intake of nutrients such as proteins, fat, calcium, iron and vitamin C were found to be significantly far below the RDA among selected government school girls.

**Anaemia and socio-economic factors:**

Correlation between income and Hb level was examined by applying Pearson’s r-correlation test and it has been concluded that household income did not have any significant influence on the respondents’ haemoglobin level. But Karaoglu et al. (2010) identified income level as a predictor of anaemia among the family members, especially children.

Based on the results output of Kruskal-Wallis test, it has been concluded that there has been no statistically significant difference in the level of incidence of anaemia between respondents belonged to Hindu, Christian or Muslim religious groups (Table 2). The same result has been found in other studies too. No significant difference in anaemia prevalence was found by Dutt et al. (2009) between Hindu and Muslim faith adolescent girls in rural area of Raigad district, Maharashtra.

According to the results of Kruskal-Wallis test results, it has been concluded that there has been no significant association between the different educational level of the mothers and the incidence of anaemia among their adolescent female children. According to Abuya et al. (2012), maternal education has been connected with nutrition outcomes among children in studies in different settings.

Based on the results of the Mann-Whitney U-test, it has been concluded that there is no statistically significant difference in the incidence of anaemia
between the joint and nuclear family adolescent girls. More studies have proved that family structure is a substitute for the process variables that specifically impact children's well-being and health (Emery et al., 1985, Block et al., 1988 and Singh and Singh, 2016).

**Anaemia and dietary factors:**

Based on the Kruskal-Wallis test results, it has been concluded that there is no statistically significant difference in the incidence of anaemia between the three dietary groups compared. In a study by Basu et al. (2005) prevalence of anaemia in adolescent girls was found to be related to nutritional status and food habits. Sharma et al. (2003) and Singh and Kumari (2015) in their study concluded different types of dietary habits were found to have no effect on the prevalence of anaemia.

Based on the Pearson’s r-correlation test results, it has been concluded that there is a strong, positive and statistically significant correlation between iron intake and haemoglobin level, i.e. iron intake improves haemoglobin level. The same result has been established by a number of studies. Siddharam et al. (2011) and Ramzi et al. (2011) in their study found that after weekly supplementation with iron-folic acid tablets, the prevalence was diminished by 20.5 per cent.

Based on the Pearson’s r-correlation test results, it has been concluded that there is a very strong, positive and statistically significant correlation (r = .754, p = .000) between folic acid intake and haemoglobin level.
i.e. folic acid intake improves haemoglobin level. The findings of Sen and Kanani (2012) and Chaudhary and Dhage (2008) also confirmed that IFA supplementation significantly improved haemoglobin.

Conclusion:

The current study establishes that anaemia is prevalent even among higher income and educated segments of the population in Kottayam district particularly. The results of the present study is par with the previous studies that irrespective of socio-economic and educational background, diet and nutrition play a crucial role in maintaining good health for adolescent girls. Findings of this study will further contribute to the existing literature on adolescent nutrition related health problems in Kerala. Findings of this study will further contribute to the existing literature on adolescent nutrition related health problems in Kerala. Findings of this study will further contribute to the existing literature on adolescent nutrition related health problems in Kerala.

Fig. 3: Correlation between folic acid intake and incidence of anaemia

DETERMINATION OF SOCIO-ECONOMIC & DIETARY FACTORS INFLUENCING ANAEMIA


Authors’ affiliations:
ANOOJA THOMAS, Department of Home Science, CMS College, KOTTAYAM (KERALA) INDIA (Email : anoojam@gmail.com)

REFERENCES


