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RESEARCH ARTICLE

SOCIO ECONOMIC AND DIETARY ASSESSMENT OF ANAEMIC ADOLESCENT GIRLS (13-18YRS) IN RURAL COIMBATORE.

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Abstract

The Nutritional status of adolescent girls can directly be related to the nutritional status of the community because today's adolescents are future mothers. The nutritional requirement increases during adolescent period. Nutritional anaemia is considered as a major public health problem in India. Most of the health care services in India are on mother and child group only. Nutritional status of adolescent girls plays a vital role in attaining healthy reproductive outcome. Prevalence of malnutrition among adolescent girls is high in India particularly among rural population. Inculcating of healthy eating habits is very important as diet plays a very important role in growth and development of adolescents. A cross sectional community based study was conducted to assess the nutritional status of 920 adolescent girls in the age group of 13-18 years studying in Government Higher Secondary Schools hailing from different rural areas of Karamadai block of Coimbatore District. Relevant data on socioeconomic information, dietary intakes of the girls were assessed by 24 hour dietary recall method. Hemoglobin estimation was done by Cyanmethaemoglobin method. Data was analyzed by mean, standard deviation and ANOVA. Prevalence of anaemia among adolescent girls was reported to be 59.5 per cent at moderate level and 39.5percent of them were reported with mild level of anaemia respectively.

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Introduction:-

Nutrition inadequacy during crucial period of adolescence may have serious health related consequences during adolescence as well as throughout life (Nayar, 2007). Risk of developing anaemia and malnutrition is highest among adolescent girls. It is also recognized as the vulnerable period in the human life cycle for development of anaemia. Anaemia in adolescent girls contributes to maternal and foetal mortality and morbidity in future. Adolescent girls are considered as the backbone of not only healthy but also progressive family and thus future builders of healthy community. Nutritional status of adolescent girls plays a vital role in attaining healthy reproductive outcome. Prevalence of malnutrition among adolescent girls is high in India particularly among rural population (Joshi *et al.*, 2014).

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Globally, anaemia is a public health problem and hampers the health thus adversely affecting the social as well as economic development of the country. WHO (2016) defines anaemia as a condition in which the number and size of red blood cells, or the haemoglobin concentration, falls below an established cut-off value, consequently impairing the capacity of the blood to transport oxygen around the body. Anaemia is an indicator of both poor nutrition and poor health. Mean blood haemoglobin concentrations and prevalence of anaemia varied substantially across regions and countries (Lal, 2007).

WHO (2011) estimates suggest that anaemia affects around 800 million children and women globally. Nearly 1.2 billion individuals aged 10-19 years comprises the world population. India has the largest population of adolescents (243 million) followed by China (207 million) and United States (44 million) (WHO technical report, 1996) Among adolescents, girls constitute a vulnerable group, particularly in developing countries where they are traditionally married at an early age and exposed to a greater risk of reproductive morbidity and mortality (Kauret *et al.*, 2006).

Adolescence is a vulnerable period in the human life cycle for the development of nutritional anemia, which has been constantly neglected by public health programs. Girls are more likely to be victims due to various reasons. In a family with limited resources, female child is more likely to be neglected. (NNMB an over view, 2007).

Inadequate nutritional or poor nutrition during adolescence can impair the work capacity and productivity of adolescent boys and girls in their later years. Further, an undernourished girl is at the risk of developing complications during pregnancy and the chances of her giving birth to a low birth weight baby increases, thus perpetuating a vicious cycle of malnutrition and ill-health, and an intergenerational effect (Aphane *et al.*, 2003).

Dietary intake influences the nutritional status of adolescent to a greater extent. Thus the study aims to assess the dietary pattern of adolescent girls in rural areas of Karamadai Block, Coimbatore district.

Materials and methods:-

Assessment of Nutritional status:-

Different rural schools were visited for selection of eligible adolescent girls for the study. After an initial enquiry made in the rural schools about the feasibility of conducting the experimental study, the investigator approached the authorities of the schools for their cooperation to conduct the study, permissions were obtained from the Chief Education Officer, Coimbatore to carry out the research study in selected schools of Karamadai Block of Coimbatore District.

Out of the four schools available in Karamadai Block, the study was carried out in two schools namely Government Higher Secondary School, Karamadai and Government Middle School, Kannarpalayam. These particular schools were selected because the children enrolled in the schools mainly hailed from different rural areas of Karamadai forming a homogeneous group in terms of their socio-economic status.

The subjects were screened as per the inclusion criteria of age, willingness to participate in the study and eligible subjects were enrolled in the study. Initial rapport was created with subjects and family members about the programme and its objectives. Consent from the subjects was obtained for participation in the study. The study was presented in the IHEC and Ethical clearance was obtained from the Institutional Human Ethical Committee of Avinashilingam Institute for Home Science and Higher Education for Women (HEC.2010:16).

Nutritional status was assessed by collecting the following information from the selected adolescent girls.

Collection of Background Information:-

Background information was collected from all the anaemic adolescent girls and young women using a pre tested questionnaire specially designed for the purpose. The details collected involves information on the socio- economic background including educational status, occupation of the head of the family, family income, family type and size along with details on the various health problems faced by the subjects and morbidity pattern. The questionnaire also included questions related to basic concepts of micronutrients, their sources, deficiency symptoms and preventive measures. Various anthropometric measurements such as height, weight and body mass index were measured using standardized procedures for all the anaemic subjects chosen for the present study.

Dietary Assessment:-

A total of 12,446 households were available in Karamadai from which 1330 adolescent girls belonging to the age group of 13-18 yrs were identified initially and selected through purposive sampling and screened for the anaemia prevalence by conducting blood haemoglobin analysis.

From the available households of the anaemic subjects a sub sample of 165 subjects using purposive random sampling method were selected for the assessment of food and nutrient intake. A 24 hour dietary recall method was conducted using the standardized cups and spoons according to the procedure described by Gopalan *et al* (1989) for collecting information regarding the food and nutrient intake. The sub samples were asked to recall all the food items consumed by them on previous day along with quantity of each food item consumed. The intake of foods consumed by an individual per day was recorded and the raw equivalents of each food item was computed. The daily food and nutrient intakes were computed using Tables of Food Composition (ICMR 2010) and Nutritive Value of the Indian Foods (Gopalan *et al.*, 2012). The food and nutrient intakes were compared with Recommended Dietary Allowances for nutrients (RDA) of the corresponding age groups suggested by ICMR (2010).

Results and Discussion:-

The results of the study is discussed in terms of socio economic status

Table 1 gives the socio-economic background information of selected anaemic adolescent girls

Table 1:- socio economic background of anaemic adolescent girls (n = 920)

Socio economic factors	Categories	Number	Percent
Age of girls (13- 18 yrs)	12-13 yrs	320	34.8
	14-15 yrs	454	49.3
	16 -18 yrs	146	15.9
Socio-economic status			
Type of family	Nuclear	710	77.2
	Joint	210	22.8
Size of the family	2-3	110	12.0
	4-5	717	77.9
	>5	93	10.1
Monthly income	<Rs 3300	506	55.0
	Rs 3301- 7300	340	37.0
	Rs 7301-14500	71	7.7
	>14500	3	0.3

Majority of the adolescent girls selected for the study belonged to 14-15 years of age (49.3%) followed by 12-13 years (34.8 %) and 15.9 per cent of the subjects belonged to 16-18 years. Family size and type of family influences the nutritional status of the individual. Majority (77.2%) of adolescent girls belonged to nuclear family while remaining 22.8 per cent of the respondents lived in a joint family. In the present study, about 77.9 per cent of the respondents reported the size of the family with four to five members (NNMB, 2012).

Choudhary *et al* (2009), opines that socio-economic status is significantly associated with nutritional status of the individual. Assessment of total family income as per 11th Five year plan (2007-2011) classification revealed that the families of the chosen subjects belonged to economically weaker section. Majority (55.0 %) of the girls belonged to the families having an income of less than Rs.3300 followed by 37 per cent of families with an income range of Rs.3301 to 7300 (37%). Nearly 7.7 per cent of the girls belonged to the family having a monthly income of Rs.7301-14500 and only 0.3 per cent of the subjects belonged to the families having an income of more than Rs.14500 per month.

The education level of parents revealed that about 32 per cent and 28.7 per cent of fathers and mothers of adolescent girls completed primary education. Rate of illiteracy was found to be high among mothers (33%) followed by fathers (22.7%). An appreciable per cent of fathers (27.4%) and mothers (23.5%) had completed middle school education. Only few per cent of both parents had education higher than middle school is given in Fig 1.

Occupation of the parents revealed that majority of fathers (42%) and mothers (49.5%) of adolescent girls were labourers. About 26.8 per cent of fathers of adolescent girls were engaged in business while 21.8 per cent of fathers

were engaged in private sector. The occupations of mothers were different from that of father. About 17.4 per cent of mothers were found to work in private sectors while 16.9 per cent of the mothers were home makers. A very few per cent of mothers (1.4%) and fathers (0.9%) were government employees. Fig 2.

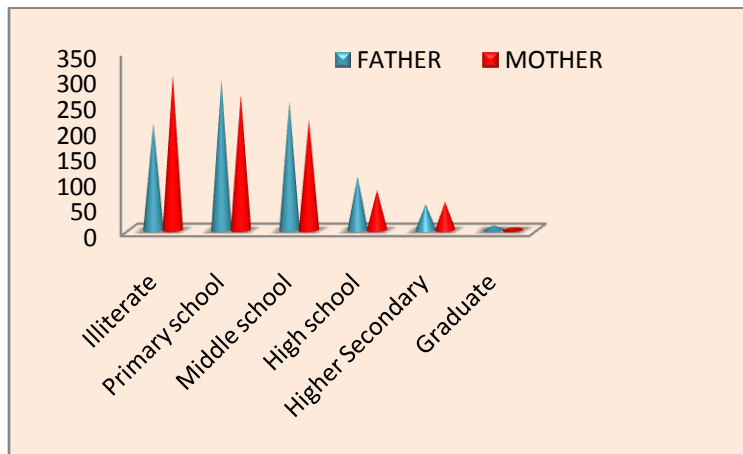


Fig 1:- Education of the parents.

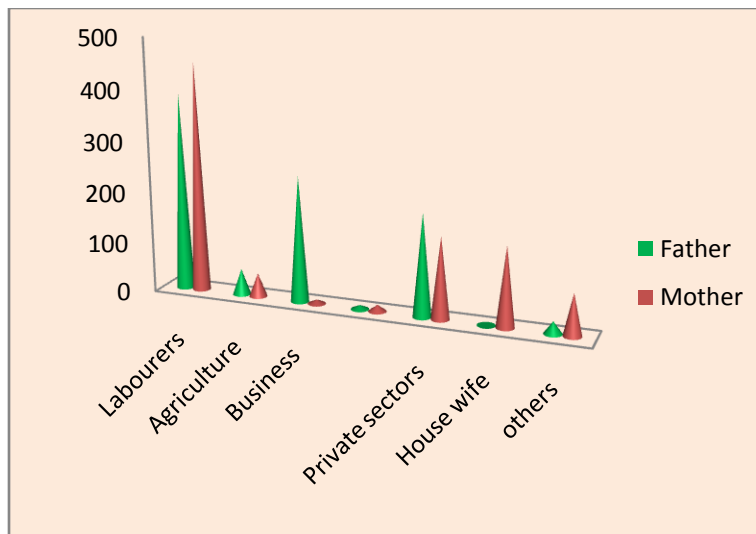


Fig 2:- Occupation of the Parents

Dietary Survey:-

Diet plays an important role in growth and development of adolescents, during which the development of healthy eating habits is of supreme importance. There is a dual burden of under nutrition and over nutrition in this age-group.

Some dietary patterns appear quite common among adolescents, to mention a few, snacking, usually on energy-dense foods, meal skipping, particularly breakfast, or irregular meals; wide use of fast food; and low consumption of fruits and vegetables (9-10 per cent). Among urban adolescents in India, some of these patterns are also likely to be common but very little information is available (Kotecha *et al.*, 2013). Around 165 members of anaemic adolescents (18 per cent) were randomly selected for dietary assessment.

The mean food intake pattern of the selected adolescent girls is presented in Table 2

Table 2:- Mean food intake of the selected adolescent girls (n =165)

Food Groups	Average consumption b Adolescent girls		
	RDA * ICMR 2010	Food intake	% Deficit / Excess
Cereals and millets (g)	300	322.46 ±15.91	+7.48
Pulses(g)	60	48.02 ± 1.05	19.96
Green leafy Vegetables(g)	100	52.06 ±1.52	-47.93
Other vegetables(g)	100	50.53 ± 3.70	-49.47
Roots and tubers(g)	100	52.78 ± 2.08	-47.22
Fish and fleshy foods (g)	50	24.47 ± 1.37	-51.06
Fruits(g)	100	38.77 ± 2.22	-61.23
Milk and milk products (ml)	500	331 ± 17.82	-33.75
Fat and oils (ml)	25	16.8 ± 0.57	-32.72
Sugar and jaggery (g)	30	15.8 ± 1.31	-47.1

ICMR (2010)

Food Intake:-

The mean food intake of the adolescent girls was compared with the recommended dietary allowances suggested by ICMR (2010). Data on daily intake of different food groups showed that mean intake of green leafy vegetables, other vegetables, roots and tubers, fruits, milk and milk products, sugar and jaggery, fats and oils, fish and fleshy foods were inadequate and found to be deficit which was reflected in their low nutritional profiles. Similarly Prabhakaran (2003) also revealed inadequate intake of these food groups in adolescents.

Studies revealed the study participants have been represented from socio-economically weaker stratum, showed overall poor knowledge on nutritional deficiency diseases along with poor dietary management. The result showed that very less percentage of students had proper knowledge, attitude and practice about said diseases at the pre-awareness stage. Anaemia is very common among rural adolescent girls but they had no knowledge about its etiology and dietary management by the locally available low cost foods. Nutritional education to fulfil the food adequacy is recommended. Table 3 gives mean nutrient intake of the selected adolescent girls.

Table 3:- Mean nutrient intake of the selected adolescent girls (n =165)

Food Groups	Average consumption by Adolescent girls		
	RDA * ICMR 2010	Nutrient Intake	% Deficit / Excess
Energy (Kcal)	2330	1951± 93.02	-16.75
Protein (g)	51.9	41.29 ± 1.26	-20.43
Fat (g)	40.0	17.51 ± 0.71	-56.21
Iron (mg)	27.0	20.8 ± 0.84	-22.9
Calcium (mg)	800	616.8 ± 3.06	-22.9
Retinol(µg)	600	524.86 ± 3.08	-12.52
Thiamine (mg)	1.2	1.44 ± 0.14	+20
Riboflavin (mg)	1.4	0.94 ± 0.09	-32.42
Niacin (mg)	14.0	15.06 ± 0.40	+7.59
Vitamin c (mg)	40.0	48.2 ± 0.63	+20.5
Pyridoxine (mg)	2.0	1.6± 0.05	-22.35
Folic acid (µg)	150.0	129.8 ± 4.46	13.44
Vitamin B12 (µg)	1.0	0.58± 0.09	-42.4

ICMR (2010)

The average daily intake of energy, protein, total fat, iron, folic acid and vitamin B12 were found to be inadequate as compared to recommended dietary allowances (ICMR, 2010). In general, the deficient intake of iron rich foods by the adolescent subjects reflect their iron nutriture. In the present study, the adolescent girls randomly selected for the study was receiving lesser amounts of iron when compared to RDA leading to deficiency of iron 20.7 per cent. Calcium plays an important role in haematopoiesis by increasing the absorption of iron, hence inadequate calcium in

diet leads to decreased hemoglobin synthesis resulting in anaemia (Fleming, 2005). Lower amounts of calcium, vitamin A, pyridoxine, folic acid and vitamin B12 were found to be reported. The average intake of thiamine, riboflavin and ascorbic acid, niacin was marginally adequate. The intake of thiamine contents were higher when compared to RDA.

Conclusion:-

From the above salient findings of the study, it is evident that anaemia is prevalent among adolescent girls of Coimbatore. Results revealed a marked deficit in micronutrient adequacy especially in terms of iron which calls for interventions. It is recommended that dietary diversification coupled with effective intervention strategies would be a sustainable strategy to combat anaemia among the adolescent masses.

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