A study on nutritional status among vegetarian and non vegetarian adolescent girls

Ms.R. Kaviyarasi [1] and M. Sylvia Subapriya [2]
[1]*Department of Nutrition and Dietetics, STET Women's College, (Autonomous), Mannargudi, Tiruvarur Dt, Tamil Nadu-614 001, India.*
[2]*Professor, Department of food science and Nutrition Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore – 641043, India.*

Abstract: Adolescence is a period of change and development with opportunity for interventions to enhance the nutritional status and well-being of this and future generations simultaneously. Policies and programs will be most effective if they concurrently address the immediate causes of malnutrition but also individual, household, and community level determinants. This study compared the nutritional status of vegetarian and non vegetarian adolescents girls, between 13 16 years old. Weight and height were measured for Anthropometric profile , blood haemoglobin, serum protein and serum albumin level were estimated for biochemical profile. Clinical symptoms were examined for the vegetarian and non vegetarian adolescent girls. 24 hour recall method were used for dietary assessment. Mean anthropometric profile, biochemical parameter, clinical symptoms and mean nutrient intake were less in vegetarian adolescent girls than non vegetarian adolescent girls. The study revealed that the food items consumed by the vegetarian adolescent girls generally did not constitute the balanced diet and mostly deficient in iron contents. Anthropometric determination, clinical symptoms and hemoglobin status (11-14gm/ %) revealed that they were not up to the satisfactory level on the contrary, the mean hemoglobin level was (10.67g/ %)among the Non vegetarian adolescent girls which was higher than the mean hemoglobin content (8.15g/ %) among Vegetarian adolescent girls. It was concluded that the intake of vegetarians was lower in macro nutrients and less adequate in micronutrients than the non vegetarian.

Key Word: Adolescent girls, Hemoglobin, Anthropometric measurement, Nutritional status, Anemia.

INTRODUCTION

The world's current adolescent cohort (10–19 y) is the largest in human history, 90% of whom live in low- and middle-income countries (LMIC). The need to tailor policies and programs to meet their unique needs is now recognized. Health and nutrition interventions should optimize this period of growth and development to promote inter generational health. The health and well-being of adolescent girls must be protected not only for themselves but also so that healthy adolescent girls can become healthy mothers of healthy children. Because of the adolescent growth spurt, nutrient requirements during adolescence increase. There is also some evidence suggesting that "catch-up" growth is possible during adolescence if nutrition is adequate. Adolescence is therefore a second window of opportunity to lay the foundation for health across the life course. (Kenda Cunningham, 2020)

In developing countries, the adolescent group is more exposed to nutritional challenges and adolescent girls are more vulnerable to the disease. Studies showed that adolescent anemia was the greatest nutritional problem encountered in developing countries. India had reported high incidence of iron deficiency among adolescent girls, which is apparently reach upward when compared with the other developing nations.

In the age of 10 and 19 years has been defined as adolescence by the World Health Organization. This period has been considered as the transitional phase from childhood to adulthood. During this phase, major psychological, behavioral, and physical developments ensue, because of labeled. physical activity and increased growth spurt, adolescence needs high amount of nutritional requirements. According to recent statistics, there were about 1.2 billion adolescents worldwide, which constitute one-fifth of the total world's population and the figures are escalating. Developing countries account for about 5 million adolescents of the total adolescent population, and in India about 21% of the total population are adolescents.

Presently, the causes of iron deficiency among adolescent girls is on the rise in India. Since adolescent period signalizes the beginning of menstrual period in girls, they are at a higher risk for nutritional anemia. In rural areas of India, pregnancy during late adolescent period, thus increasing a situation involving exposure to danger. of iron deficiency during adolescent girls and low birth weight babies.

MATERIAL AND METHODS

Selection of study area and Samples

The sample for this comparative study consisted 200 adolescent girls in the period of 13 to 16 years at Tanjore District. Datas were gather from school going adolescent girls around in Pattukkottai. Convenience sampling method was used to assess the study involved an Extensive data collection.

Collection of Data

In order to collect the information from the selected subjects, a questionnaire cum interview schedule was prepared. The schedule includes general information like age, educational qualification, family back ground, life style pattern, Health status, medicinal information, assessment of nutritional status such as Anthropometric, Clinical, Bio chemical and Dietary assessment.

Assessment of Nutritional Status:

Anthropometric is the scientific study of the measurements of the human body. Anthropometric assessment by means of physical measurement of body weight and dimensions body composition may be estimated from Anthropometric measurements

Bio chemical test are the most objective measure of nutritional status. Clinical examination for nail, skin, hairand eye lid were carried out for all the selected vegetarian and non vegetarian adolescent girls. .

How ever their precision and accuracy are vulnerable to the methods used. Hemoglobin, serum albumin, serum protein and iron status were analyzed 50 sub samples from vegetarian and non vegetarian adolescent girls.

The data obtained from 24 hours recall method are useful to determine the food consumption pattern or who exclude the important food groups from their diet. The collected data were analyzed and interpreted statistically.

RESULT AND DISCUSSION

Socio Economical Background

Prevalence of severe anemia were highest in labor class of vegetarian adolescent girls. Moderate anemia were equal in three classes and Mild anemia were highest in service class.

Health status of the subject :

TABLE: I

S. No	Age of menarche	Non Vegetarian	Vegetarian
1	13-14	98	14
2	14-15	-	-
3	15-16	2	86
	Total	100	100

Among the selected sample 98 percent of the selected non vegetarian sample were started their menstruation at first time from the age of 13 to 14 years .only few percent (14%)of the vegetarian samples were reached their puberty in the age group 16to 17 Puberty refers to the mechanism. of physiological changes from a child to adult which start about 10 or 11 females it peak at age 13 and is completely 16. (David zieve, 2011)

Menarche occurs in the setting of a maturing hypothalamus-pituitary-ovarian (HPO) axis and relies on the following processes: normal hypothalamus and pituitary function, normal female reproductive anatomy, normal nutrition, and the general absence of other intervening chronic illnesses. It is a marker of normal female reproductive health and wellness. Most females recognize Menarche as their body's critical declaration of fertility.(Amy E. Lacroix , *et al, 202*3)

Bleeding duration of the subject:

TABLE: II

Bleeding duration	Non Vegetarian	Vegetarian
Three days	44	84
Four days	28	-
More than 5 days	8	16
Total	100	100

Normal menstruation ,a women loss from 35-75 ml of blood /representing a total loss of iron in hemoglobin of 15-25 mg. over the span of has reproductive years in normal women has a continuous average iron loss of 0.5to 1mg per day. Excessive menstrual bleeding is a cause of anemia

Depicts that vegetarian people in (84 percent)and Non vegetarian (44 percent) samples had the menstrual duration of 3 days and more than 5 days of menstrual period was found that 8 percent of urban adolescent girls16 percent of rural adolescent girls.

Menstrual problems

TABLE: III

Menstrual problems	Non Vegetarian	Vegetarian
Nausea and vomiting	36	64
Severe stomach pain	60	24
Head ache	4	12
Total	100	100

TABLE-III indicates that most of the Non vegetarian people (60 percent) and vegetarian people (24 percent) samples where suffer by stomach pain during menstruation , vomiting, back pain and head ache were also their symptoms experience by both vegetarian and non vegetarian sample during menstruation.

Assessment of Nutritional Status:

Anthropometric measurement: TABLE: IV

Mean anthropometric measurement	Non Vegetarian	Vegetarian
Height in (cm)	125-92+9.931	125.14 +8.66.7
Weight in (kg)	28.58+ 6.803	26.32 +5.811
Body mass index (BMI)	18.080 + 3.533	16.52 +2.827

Table IV predicted that mean anthropometric measurement of the vegetarian and non vegetarian adolescent girls. Mean Body Mass Index(BMI) were lower in vegetarian adolescent gilrs (16.52 +2.827) than non vegetarian adolescent girls (18.080 + 3.533).

Human height is one of the areas of study with Anthropometric While height variation with in a population are largely genetic height variations between population are mostly environmental.

Biochemical estimation of the subject: TABLE: V

Mean biochemical analysis (g/dl)	Normal (g/dl)	NonVegetarian (g/dl)	Vegetarian (g/dl)
Hemoglobin	12-16	10.67+0.9163	8.15+0.7060
Serum protein	6.2-8.0	6.478+0.682	5.38+0.698
Serum albumin	3.5-5.5	4.84+0.339	3.30+0.227

Over all mean hemoglobin and prevalence of anemia were calculated. In non vegetarian adolescent girls the mean hemoglobin level was found to be 10.67 +0.9163 gm/dl, the mean total serum protein was found to be 6.478+0.682 gm/dl the mean serum albumin level was found to be4.84+0.339 gm/dl , and mean serum globulin level was found to be 2.498+0.437 gm/dl. In vegetarian adolescent girls, mean hemoglobin level was found to be 8.15+0.7060 gm/dl the mean total serum protein level was found to be 5.38+0,698 gm/dl, the mean serum albumin level was found to be 3.30+0.227 and the mean serum globulin level was found to be 2.15+0.423 gm/dl.

Bomji. K, 2010 reveals that the hemoglobin level is low 5 to 9 gm/ 100 ml children are dull, inactive there is pallor of skin. The appetite is poor growth is returned. There is pica that is eating substance including day. Ash , laundry starch oysters shells etc..

The first indication of malnutrition is the lowering of serum total protein and serum albumin. The normal albumin level 3-5, 5-60/dl , during protein energy malnutrition(PEM). The levels may slow down to 2.5 to 2.5 gm/ dl. Alpha globulin and gamma globulin fraction show a small rise but the albumin, globulin ratio, shows tendency to decrease.

CLINICAL SYMPTOMS OF THE SUBJECT:

TABLE VI - GENERAL APPEARANCE:

S.NO	Clinical signs	Vegetarian	Non Vegetarian
1	Good	42	52
2	Fair	25	28
3	Poor	23	3
4	Normal	10	17
FACE			
5	Bright	28	42
6	Swollen	10	-
7	Normal	62	58

HAIR			
8	Normal	33	72
9	Loss of luster	23	16
10	Dry and rough	36	12
EYES			
11	Conjunction	-	-
12	Pigmentation	17	4
13	Discharges	-	-
14	Normal	83	98
MOUTH			
15	LIPS :		
16	Normal	73	97
17	Angular stomatitis	27	3
TONGUE			
18	Normal	55	75
19	Pale	23	15
20	Chalky teeth	16	8
21	Mottle	6	2
22	Normal	-	-
GUMS			
23	Normal	50	57
24	Bleeding	30	36
23	Normal	20	7
SKIN			
26	Normal	59	76
27	Loss of luster	41	24

Table VI reveals that clinical symptoms of vegetarian and Non vegetarian adolescent girls.The general appearance of face, hair, eyes,mouth, tongue, gums and skin were clinically examined to Vegetarian and Non Vegetarian adolescent girls. Majority of Vegetarian girls were had clinical symptom than compared to Non vegetarian adolescent girls.

Food consumption Pattern

Frequency consumption of food revealed that the diets were predominantly cereal based. Rice is the stable food. All of them consumed wheat once or twice in a fortnight. Consumption of pulses including sprouts was two or three times in a week. Milk and milk products and protective foods were taken only occasionally. Meat, egg, poultry and fish were taken once or twice in a week by urban area of adolescent girls. Majority of vegetarian adolescent girls were consumed cereal based food and with negligible quantity of citrus fruits. All of these factor contributed to low bio availability of iron resulting in high nutritional deficiency diseases among vegetarian adolescent girls than compared to non vegetarian adolescent girls.

MEAN NUTRIENTS INTAKE OF THE SUBJECT SUB SAMPLES

TABLE: VI

Nutrients	Mean and nutrient intake of Non Vegetarian	Mean and nutrient intake of Vegetarian	RDA	Deficit	
				Non-Vegetarian	vegetarian
Energy (kcal)	1914.92	1468.75	1970	55.08	501.25
Protein (gm)	47.91	22.99	67	9.09	34.01
Fat (gm)	31.14	16.20	22	9.14	5.8
Carbohydrate (gm)	290.746	125.5	-	-	-
Calcium (mg)	558.54	35.11	60.0	41.46	249.89
Iron (mg)	24.454	9.270	19	+ 5.45	9.73
Vitamin-A(µg)	498.52	341.12	600	-101.5	258.88

Nutrient intake of the selected subjects

The mean nutrient intake of the selected subjects based on their nutrient intake p is tabulated in table VI. The proximate principles, calorie, protein, fat, calcium, iron and vitamin –C was calculated for twenty four hours recall method and mean nutrient intake was found out for adolescent girls to understand their dietary pattern and it was compared with ICMR -2020)

CONCLUSION

The study revealed that the food items consumed by the vegetarian of adolescent girls generally did not constitute the balanced diet and mostly deficient in iron contents. Anthropometric determination,

clinical symptoms and hemoglobin status (11-14gm/ %) revealed that they were not up to the satisfactory level on the contrary, the mean hemoglobin level was (10.67g/ %)among the non vegetarian adolescent girls which was higher than the mean hemoglobin content (8.15g/ %) among the rural area of adolescent girls. Anemia is a significant public health defects among school adolescents in the rural areas. The prevalence was high among girls who were vegetarian adolescent girls who belonged to lower socioeconomic groups. Special importance should be given for developing corrective measures against nutritional status among adolescent girls. School-based intervention among school-going adolescent girls plays a important role in the eradication of iron deficiency among this group. There is a need for regular intake of greens and citrus fruits to improve protective nutrients like that iron and vitamin C regarding consuming these foods among adolescent girls.

REFERENCE

[1] Shah BK, Gupta P. Weekly vs daily iron and folic acid supplementation in adolescent Nepalese girls. Arch Paediatr Adolesc Med 2002;156:131

[2] Kaur S, Deshmukh PR, Garg BS. Epidemiological correlates of nutritional anaemia in adolescent girls of rural Wardha. Indian J Community Med2006;31:255-

[3] Chatterjee R. Nutritional needs of adolescents. Paediatrics Today2008;3:110-4.

[4] Kurtz KM, Johnson WC. The Nutrition and Lives of Adolescents in Developing Countries. The Nutrition of Adolescent Girls Reach Program. Washington, DC: International Centre for Research on Women; 1994.

[5] Programming for adolescent health and development: WHO Tech. Rep. Sr. no. 886; 1996. p. 2.

[6] Kishore J. Editor. National Health Programs of India. 6th ed. New Delhi: Century Publications; 2006. p. 82-4.

[7] Lal S, Pankaj A. Editors. Textbook of Community Medicine (Preventive and Social Medicine).1st ed.New Delhi: CBS Publishers and Distributors;2007.p.166-8.

[8] Pawashe A, Raman L, Nair KM, SarmaMKJ. Validity of using capillary blood formeasurement of plasma f erritin. Clin ChemActa 2013, 163: 119-120.

[9] Raman L, Subbalaxmi PV, Vasumathi N, et al. Iron and folic acid nutritional status of women in slum. Nut Rep Int2010, 39: 73-80. 132.

[10] Shahabuddin A K, Talukder K, Talukder MK et al. Adolescent nutrition in a rural community in Bangladesh. Indian J Pediatr 2009; 67: 93-98.

[11] Singh N, Mishra CP. Nutritional status of adolescent gils of a slum community of varanasi. Indian J Public Health 2011; 45 : 128-134..

[12] Toteja GS, Singh P, Dhillon BS, Saxena BN, Ahmed FU, Singh RP et al. Prevalence of anemia among pregnant women and adolescent girls in 16 districts of India. Food Nutr Bull 2010; 27 : 311-315.

[13] Venkaiah K, Damayanti K, Nayak MU, Vijayaraghavan K. Diet and nutritional status of rural adolescents in India. Eur J Clin Nutr 2012; 56 : 1119-1125.

[14] World Health Organization. Measuring Change in Nutritional Status. Geneva, World Health Organization, 2013.