Health Related Problems Associated with Early Puberty in Women

P. Indumathy[1]*, A. Ashma Zunaira[2] and M. Raju[3]

[1]Department of Foods and Nutrition, Vellalar College for Women, Erode - 638012, Tamil Nadu, India;
indumathy@vcw.ac.in
[2]Department of Foods and Nutrition, Vellalar College for Women, Erode - 638012, Tamil Nadu, India;
ashmazunaira19@gmail.com
[3]Department of Economics, Gobi Arts and Science College, Gobichettipalayam - 638453, Tamil Nadu, India;
raju_gobiarts@yahoo.com

Abstract

Early puberty is a causative agent for variety of disease in later life. The intake of unhealthy food and lack of physical activity among girls corresponds to the increase in body mass index and the development of early puberty among girls. The objective of the present investigation was to study the diet and health related problems associated with early puberty in women. The data was collected by interview method with the help of structured and validated questionnaire. A sub-sample of 10 subjects was selected for dietary assessment and biochemical examination by convenient sampling method. Diet survey was done by weighment method. Height and weight of the respondents was measured with the help of required tools and BMI was computed. Health problems like anaemia and obesity were also assessed among the respondents.

Keywords: Anaemia, Dietary Pattern, Menstrual History, Nutritional Status, Puberty, BMI

1. Introduction

Menarche is the first occurrence of menstruation, denotes the beginning of fertility and is an essential marker of sexual maturity in young females. The menstrual cycle is complex and is controlled by many different glands the hypothalamus causes the nearby pituitary gland to produce certain chemicals, which prompt the ovaries to produce the sex hormones oestrogen and progesterone[1]. The mean age of menarche is 12 years 4 months. Many symptoms are found related to early puberty syndrome that are mood swings, headache, stomach pain, food cravings, leg cramps, giddiness, fatigue, irritability, insomnia and depression etc[2]. Healthy eating in childhood and preadolescence is important for proper growth and development and can prevent health problems such as obesity, dental caries, iron deficiency and osteoporosis[3].

The prevalence of anaemia in adolescence girls in the age group of 12-14 years ranged from 53.7% in Tamil Nadu and according to the WHO health report (2015), many low and middle income countries are now facing a double burden of disease. While they continue to deal with the problems of infectious disease and under-nutrition, at the same time they are experiencing a rapid upsurge in chronic disease risk factors such as obesity and overweight, particularly in urban settings[4]. Physical activity level would have a stronger impact on fatness during childhood than at preadolescence. Hence, a special attention should be brought early to the nutritional status, food and physical activity, habits of young children, given

Author for correspondence

the risks to develop degenerative diseases when they become adults[5].

2. Materials and Methods

2.1 Selection of Area and Subjects

The area selected for present study is Avinashi taluk of Tiruppur district as it is the native place of the investigator. Out of the 15 schools in Avinashi taluk two Schools namely Rayar Kalvi Nilayam and St. Joseph Girls Higher Secondary School were selected based on convenience sampling method.

A total 200 preadolescent girls were selected for the study. 60 students were selected from Rayar Kalvi Nilayam and 140 students were selected from St. Joseph Girls Higher Secondary School based on proportion sampling. A sub-sample 10 subjects were selected for dietary assessment and biochemical examination by convenience sampling method.

2.2 Collection of Data

2.2.1 General and Socio-Economic Information

Assessing general information and socio economic status is one of the important methods to study its impact on nutritional status of the individuals[6]. General information like name, age, religion, age of menarche, parent's educational qualification, family size and family income were collected for all the subjects.

2.2.2 Details on Menstrual History

Adolescence is the most significant phase of human development which is associated with numerous bodily changes starting from puberty to adulthood. The period of adolescence is marked by physical growth and maturation along with mental and psychological development[7]. The normal menarche age of women is 13 in India. The normal menstrual flow might occur every 21 to 35 days and last for two to seven days. The menstrual cycle is controlled by hormones. In each cycle, rising levels of the hormone oestrogen cause the ovary to develop and release an egg[8].

The data regarding age of menarche and problems are to be collected from all the selected preadolescent girls.

2.2.3 Anthropometric Measurement

Anthropometry is the branch of the human science that studies the physical measurement of the human body, particularly size and shape. Height and weight are the major two determinants for various anthropometric properties at any age in life. People of different racial origins and geographical locations have specific anthropometric features[9]. Height and weight of the respondents was measured with the help of required tools and BMI was computed.

2.2.4 Dietary Survey

The data regarding the dietary pattern of the selected 10 subjects was collected by weighment method for three consecutive days. In this method, food either raw or cooked is actually weighed using an accurate balance. It is ideal to conduct the survey for 7 consecutive days to know the true picture of diet. Every day food is weighed in the morning and evening, before and actual cooking is begun by the housewife. Only edible portion of raw food is weighed. Survey should not be done on fast and festival days[10]. Based on food intake and frequency of consumption of food items nutrient intake was assessed. The cooking method was also noted.

2.2.5 Biochemical Assessment

Biochemical tests are precise measurement of individual nutrient concentration in body fluids to help diagnose malnutrition in its preclinical stage[11]. Blood samples of the selected 10 subjects were collected for the estimation of haemoglobin with the help of lab technician.

3. Results and Discussion

3.1 General and Socio-economic Status

Of the 200 early puberty preadolescent girls, majority (45%) were in the age group of 13 years. Most of the selected subjects belonged to nuclear families (85%) and 71% of the families had a family strength less than five members. Majority of the parent's occupation was agriculture. 67% and 30% of the selected preadolescent girls belonged to upper class and upper middle class category respectively.

3.2 Details on Menstrual History

3.2.1 Age at Menarche

The age at menarche of the selected preadolescent girls is given in Table 1.

Table 1 shows that among 200 preadolescent girls, majority (46%) attained the menarche in the age of 12 years and only around 10% attained the menarche in the age of 10 years.

3.2.2 Menstrual Problems

The study also revealed that 37% of the selected subjects had menstrual interval duration of less than 21 days and 20% had the duration of above 35 days. About 35% and 18% of the preadolescent school girls reported to suffer from menorrhagia (heavy periods) every month and once in 2 months respectively. Most of the preadolescent school girls have 32% experienced severe abdominal pain, 15% of them reported to have muscle cramps, 29% of them

had back pain and the remaining 24% did not report to have painful periods and that majority 47% of the preadolescent girls had length of the cycle as above 5 days. Majority of the preadolescent girls (39%) experienced stomach pain during premenstrual stage followed by headache (26%), leg cramps (17%) and giddiness (4%). 22.5% of preadolescent girls had difficulty in sleeping during menstruation periods.

3.2.3 Anthropometric Measurements

The mean height and weight of the selected subjects were compared with the ICMR standards are presented in Table 2.

Table 2 shows that the mean weight of 10 years and 11 years was higher than the ICMR standards and the mean weight of 12 years and 13 years was lower than the ICMR standards. It was noted that the mean height of 10-13 years of selected preadolescent girls was lower than the ICMR standards.

Table 1. Age at Menarche   (N=200)

Age in Years	Number of subjects	Percent
9	1	0.5
10	20	10
11	47	23.5
12	92	46
13	40	20
Total	**200**	**100**

Table 2. Comparison of Weight and Height with Indian Standards   (N=200)

Age in years	Mean weight (kg)	Standard weight (kg)	Mean height (cm)	Standard height (cm)	Mean BMI
10 years	34± 6.60	32.5	133.35 ±6.37	138.3	17.34 ± 3.06
11 years	35.93 ±4.97	35	140.25±7.43	142	18.4 ± 2.94
12 years	35.22 ± 6.40	39	140.41 ±8.93	148	18.6 ± 4.15
13 years	38.13 ± 7.43	44	142.55 ±7.88	150	±3.59

3.4 Dietary Pattern of the Selected Subjects

3.4.1 Type of Diet

The type of diet of the selected subjects is given Table 3.

Figures in parenthesis indicate percentage of subjects

The dietary pattern of the selected preadolescent girls (Table 3) showed that majority of them (91%) were non-vegetarian and only 9% were vegetarians. Data regarding the consumption of iron rich foods revealed that 29% of the preadolescent girls consumed bajra. Rice flakes was consumed weekly once by 23% of the preadolescent girls and 24% consumed daily. About 48% of the preadolescent girls consumed soya beans weekly once and 7% of the preadolescent girls consumed roasted Bengal gram daily. About 55% of the preadolescent girls consumed horse gram weekly once. Majority of the preadolescent girls (65%) reported to consume drumstick leaves weekly twice and 31% of the preadolescent girls consumed manathakkali leaves weekly once and Amaranth was

not consumed by 91%, 25% of the preadolescent girls consumed chicken weekly twice, 27% of the preadolescent girls consumed mutton once in a week and none of the preadolescent girls consumed prawn.

3.4.2 Nutrient Intake of the Preadolescent Girls

Nutrient intakes of the selected sub sample of preadolescent girls are given in Table 4.

From Table 4 it is evident that energy, fat, calcium, iron, vitamin A and vitamin C intakes of preadolescent girls were lower than Recommended Dietary Allowance given by Indian Council of Medical Research.

3.5 Blood Haemoglobin Level of Selected Subjects

Haemoglobin levels of the selected sub sample of preadolescent girls are given in the Table 5.

Table 3. Type of Diet (N=200)

Nature of diet	Number of subjects				Total
	10 yr (%)	11 yr (%)	12 yr (%)	13 yr (%)	
Vegetarian	2 (5)	4 (19)	4 (9)	9 (10)	19 (9)
Non- vegetarian	41 (95)	17 (81)	42 (91)	81 (90)	181 (91)
Total	43 (21)	21 (11)	46 (23)	90 (45)	200 (100)

Figures in parenthesis indicate percentage of subjects

Table 4. Nutrient intake of the selected preadolescent girls (n=10)

Age in years	Nutrient intake	Mean± S.D	ICMR RDA
10-13 years	Energy (KCal)	1897.97±105.27	2010
	Protein (g)	49.43±2.20	40.4
	Fat (g)	78.7±3.19	35
	Calcium (mg)	372.42±16.87	800
	Iron (mg)	22.05±0.44	27
	Vitamin A (µg)	791.55±260.27	1200
	Vitamin C (mg)	33.82±4.98	40

Table 5. Haemoglobin Levels of the Preadolescent girls   (n=10)

Grades of anaemia (WHO)	Number (%)	Haemoglobin g/dl
		Mean ± S.D
Normal (12 g/dl)	-	-
Mild (10 – 12 g/dl)	6 (60)	10.42±0.35
Moderate (7 – 10g/dl)	4 (40)	9.4±0.31

Table 5 indicates that among the 10 preadolescent girls, 60% had their blood haemoglobin levels in the range of 10-12g/dl and were mildly anaemic and 40% had between 7-10g/dl and were moderately anaemic.

4. Conclusion

The present study concludes that among 200 preadolescent girls, majority attained menarche at the age of 12 years, having their menstrual interval below 21 days. They had the problem of menorrhagia and irregular menstrual cycle. On the basis of anthropometric assessment 89 preadolescent girls were found to be having under nutrition of different grades when compared with the Indian standards. In biochemical analysis, the haemoglobin level was found to be below normal and they were grouped as mildly and moderately anaemic. The present study also revealed dietary inadequacy among the selected preadolescent girls particularly energy and micro nutrients especially calcium and iron.

5. References

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