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## AN ASSESSMENT ON MENSTRUAL CYCLE AND ITS ABNORMALITIES IN GIRLS

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### ABSTRACT

Menstruation is an indication of fertility in the reproductive age of women. It is a rhythmic fashion of cyclical events that takes place every  $28 \pm 3$  days in her fertile age. For a successful normal cycle co-ordination between endocrine system, ovary and endometrium is vital.

The present study tries to analyses the impact of some pertinent factors on the onset and the related abnormalities of menstrual cycle. A positive impact of various factors such as economic status, food habits, habitation, blood groups, BMI, WHR and the duration of cycles on the onset of menarche in girls are traced out. The mean menarche age of the subjects are identified as  $13.14 \pm 1.18$  yrs, while it is  $14.48 \pm 1.4$  yrs in their mothers. The multi-factorial causes of onset of menarche in girls are also confirmed from the present study.

**KEY WORDS** Body mass index, menarche, premenstrual syndrome, pre menstrual dystrophic disorder, waist-hip ratio.

## INTRODUCTION

A woman's life is characterized by three different periods (viz) juvenile phase (or) childhood maturity before puberty or menarche child bearing years, which is characterized by regular menstrual cycle in each month and menopause (or) cessation of menstrual cycle. Menarche is the first menstrual flow in a woman and it varies among individuals, regions, races, socio-economic, cultural status and so on.

The terms 'menstruation' and 'menses' are derived from Latin "mensis" (month), which in turn relates to the Greek "mene" (moon) and to the roots of the English words month and moon. Menarche is the transitional phase in the reproductive period of a woman when a girl reaches maturity during puberty. The age of onset of menarche is multi-factorial in nature.

Earlier studies reveal that there is a slight difference in the mean menarche age in girls. However age at menarche is an important event which is related to the reproductive maturity of a woman and modified by determinants like heredity, diet and overall health, body mass index, socio-economic status and areas, lack of exercise and childhood obesity, blood group and so on. PMS and PMDD are cycle related problems which are common in almost all women in their fertile age.

The present study tries to (1) find out the differences in the age of onset of menarche in the study subjects and their mothers. (2) the role of socio-economic status on the onset of menarche. (3) the impact of BMI and WHR on the initiation of menarche (4) to analyse the menstrual cycle and its related abnormalities in the study subjects.

## MATERIALS AND METHODS

### Study area

The present study on menstrual cycle and its related abnormalities in college girls, has been carried out in Nagercoil, the district headquarters of Kanyakumari, Tamilnadu, the southern terminus of India. Kanyakumari is a tiny, fertile, number one literacy district with a land spread of 1684 Km<sup>2</sup> and lies between 77°5' of the eastern longitudes and 8°03' of the northern latitudes.

### Study subjects

The study includes medically fit 5000 city college girls who are hailing from urban, semi-urban and rural areas with different socio-economic background. Menstrual cycle characteristics are collected from the volunteers and fall under the age 17-22 yrs. The survey is conducted during the period April-Dec 2011, and the basic information is collected by using a standard questionnaire. Priority has been given to human values while collecting the data from the respondents.

Standard methods are used for the estimation of BMI<sup>14</sup> WHR<sup>14</sup> and blood group analysis<sup>15</sup>. Statistical analysis has been carried out with SPSS statistical package.

## RESULTS

The impact of socio-economic status, food habits and areas on menstrual cycle characteristics has been analyzed and the results are shown in table. 1. The mean age of the population, their mean menarche age and their mothers' are  $18.89 \pm 1.57$  yrs,  $13.14 \pm 1.18$  yrs,  $14.48 \pm 1.4$  yrs respectively. Out of 5000 subjects 34.7% has attained menarche between 10-12yrs, while the rest 65.3% girls reached menarche in their teen age. In subjects' mothers, a great majority of them (i.e.) 92.14% attained menarche in their teen age and only 7.86% reached menarche in their pre-teen age (i.e.) between 10-12 yrs.

The study includes 6.26% poor, 92.7% middle and 1.04% upper class subjects. In poor class 61.34% subjects' menarche age is found as 13-19 yrs and the rest 38.66% subjects' age is 10-12 yrs, while in middle class it is 13-19 yrs in 65.87% subjects and 10-12 yrs in 34.13% subjects, but in the upper class it is 10-12 yrs in 61.54% girls and 13-19 yrs for 38.46% girls.

It is well known from the study that 31.89% vegetarians and 34.88% mixed diet users' menarche age is 10-12 yrs, while 68.01% vegetarians and 65.12% mixed diet users reached menarche in their teen age.

The survey comprises 58.62% rural, 37.96% semi-urban and 3.42% urban respondents. The percentage distribution of rural, semi-urban and urban pre-teen menarche subjects are 31.18, 41.04, 35.67 respectively, while in the teen age menarche group it is 68.82, 59.96, 64.33 respectively.

The menarche age-wise distribution of the study subjects and their mothers are depicted in Fig.1. It reveals that the lowest menarche age of both the subjects and their mothers are 10 yrs and the highest age is 17 yrs in the subjects and 19 yrs in the mothers. A great majority of the subjects (32.2%) attained menarche at the age of 13 yrs, while it is 15 yrs (29.14%) in the mothers.

Table.2. indicates some measurable parameters in the study population. The study includes 1136 (22.72%) under weight, 2060 (41.2%) normal weight, 1702 (34.04%) over weight and 102 (3.88%) subjects. There are 304 preteen and 832 teen menarche subjects in the under weight category, 769 preteen and 1291 teen menarche individuals in the normal weight group, 631 preteen and 1071 teen menarche cases in the over weight and 31 preteen and 71 teen menarche individuals in the obese category.

There are 85 preteen and 109 teen menarche subjects in 0.81 – 0.85 WHR category, 166 preteen and 298 teen menarche subjects in 0.86 – 0.9 WHR group, 432 pre-teen and 470 teen menarche cases in 0.91 – 0.95 WHR section, 468 preteen and 777 teen menarche girls in 0.96 – 0.99 WHR group and 584 pre-teen and 1611 teen menarche subjects in > 1.0 WHR category.

The study group includes 995 'A' blood group subjects which includes 399 pre-teen and 596 teen menarche cases, 2010 'B' blood group individuals which comprises 595 preteen and 1415 teen menarche subjects, 398 'AB' blood group respondents which consists of 160 pre-teen and 238 teen age menarche girls and 1597 'O' blood group subjects, which includes 581 pre-teen and 1016 teen age menarche individuals.

The menstrual cycle abnormalities in the study subjects are given in table. 3. It is clear from the table that the minimum duration of the menstrual cycle is 2 days and the maximum duration is 11 days. There are 144 subjects with short cycles (duration of the cycle is  $\leq 2$  days), which includes 27 pre-teen menarche and 117

teen menarche girls. Out of 3425 respondents with normal cycles (cycle length is 3-5 days), 1133 subjects' menarche age is 10-12 yrs, and 2292 girls menarche age is 13-19 yrs. There are 575 pre-teen menarche and 856 teen menarche subjects with long menstrual cycles (cycle length is > 5 days).

Out of 4677 subjects with regular menstrual cycles, 1608 attained menarche in their pre-teen periods and 3069 subjects' menarche age is 13-19 years. 127 subjects who attained menarche in their pre-teen period and 196 girls who reached menarche in teen ages are having irregular cycles.

Premenstrual syndromes are noticed in 92 girls who attained menarche in their pre-teen periods and 573 subjects reached menarche in their teen ages. 144 pre-teen and 1018 teen age menarche subjects are having premenstrual dystrophic disorders.

## DISCUSSION

Menarche is an indicator of reproductive maturity, which starts at the end of puberty in girls. It varies from individual to individual, culture to culture, race to race, region to region and it also varies in different religion, socio-economic groups and so on. One report says the mean menarcheal ages of the mothers are higher than their daughters. Our study too supports this view. In our subjects the mean menarcheal age is  $13.14 \pm 1.18$  yrs, while it is  $14.48 \pm 1.4$  yrs in their mothers.

In the modern world a positive impact of socio-economic status on early menarche in girls are reported by many researchers. A positive correlation ( $r=1.0$ ) is noticed between our pre-teen and teen menarche subjects in different socio-economic categories.

The onset of menarche in girls is multi-factorial in nature. Previous studies emphasize the relationship between non-vegetarian diet and the early onset of menarche in girls. Our study also supports this view. A positive association between mixed diet and early menarche is noticed in the present study also. The impact of urbanization on early menarche is reported in some studies. In the present study our urban subjects are with lowest mean menarcheal age (12.9 yrs), than the semi-urban (13.02 yrs) and rural girls (13.5yrs).

BMI is found to be one of the most important predictors of early onset of menarche in girls. In the present study  $r$  for pre-teen BMI Vs teen menarcheal subjects is 0.96. A positive association between pre-teen WHR Vs teen ( $r = 0.87$ ) menarche subjects is found in our study. An earlier report shows a positive association between blood groups and menarche age. A strong association is found between our pre-teen and teen menarche subjects.

Eumenorrhea, the normal, regular menstruation usually lasts for 3-5 days. A great majority of our subjects (i.e) 68.5% are with normal cycles. Menorrhagia (or) hypermenorrhagia denotes prolonged menstrual period at regular intervals lasting longer than 7 days. Hypomenorrhagia is a regular normal short cycle lasting for less than 3 days. 28.62% and 2.88% subjects in the present study show long and short cycles respectively.

Studies reveal that PMS symptoms are more intense in 16-18 yrs<sup>28</sup>, and 18-20 yrs<sup>29</sup> old age groups. It is true in our study also. The prevalence of PMS is 35%<sup>30</sup>, 69.6%<sup>31</sup>, 85%<sup>32</sup>, and 96.6%<sup>33</sup> in different studies. In the present study it is around 23.24%. PMDD is a severe form of PMS afflicting 13% - 18% of women<sup>34</sup>. The percentage prevalence of PMDD in our subjects is about 13.3%. Both PMS and PMDD evoke severe degree of physical impairments in menstruating women.

**CONCLUSION**

Menstruation and its related abnormalities is a neglected area of research, which needs more attention to analyse the cycle's related issues, to understand the problem in socio-economic, cultural, regional, national and global level to promote awareness about menstruation and the related ailments which are unsolved miseries in the reproductive age of a woman. The study concludes that the girls' menarcheal age is lower than their mothers' and a group of factors such as diet, area, socio-economic status, BMI, WHR and blood group are noticed as some prime determinants to this biological event. Studies on menstrual cycle are not satisfactory to minimize the everlasting problems associated with this unavoidable event in a woman.

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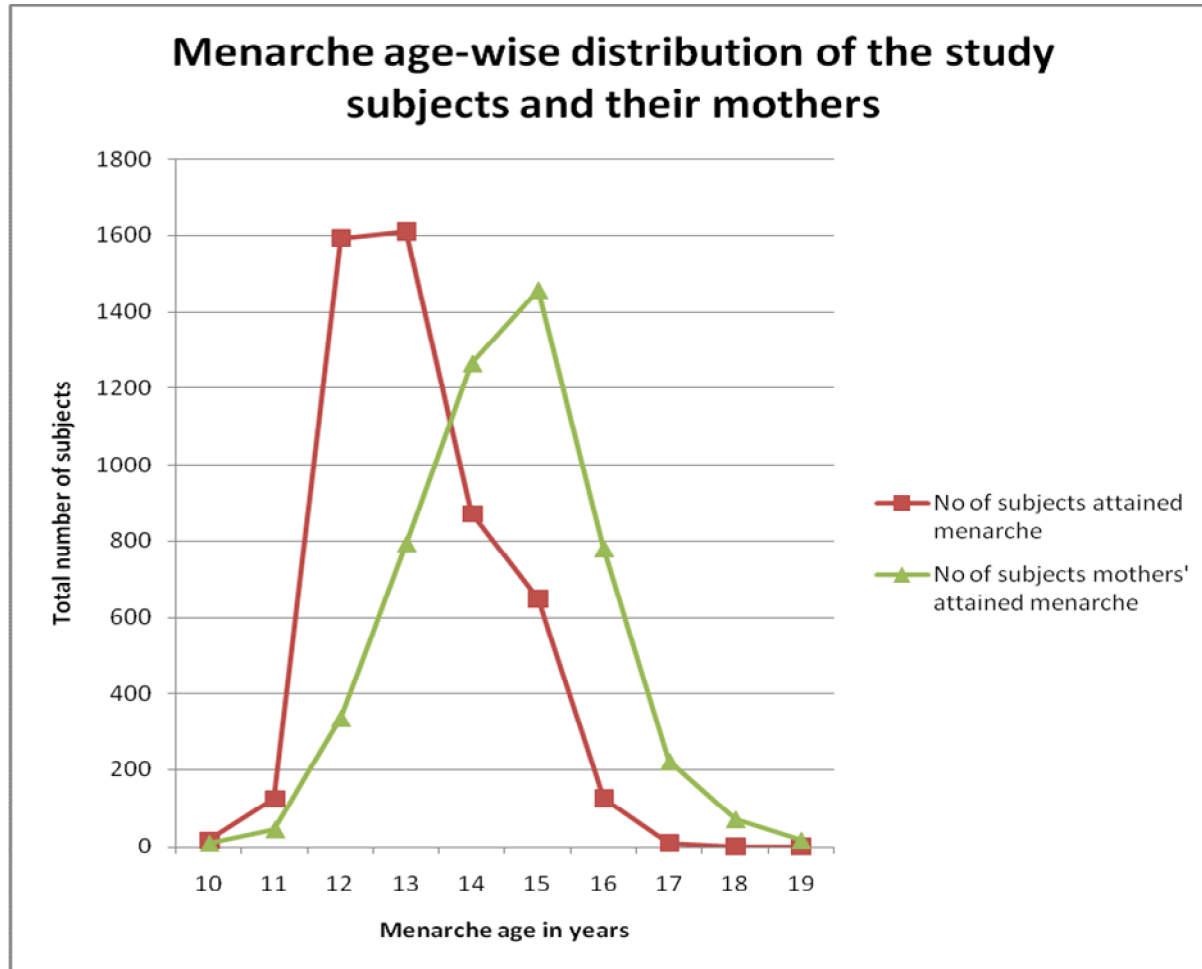


Fig.1. illustrates the menarche age-wise distribution of the study subjects and their mothers.

Variables	Menarche age (yrs)		Total
	10-12 (pre-teen)	13-19 (teen)	
Number: girls	1735(34.7)	3265(65.3)	5000(100)
Girls mothers	393(7.86)	4607(92.14)	5000(100)
<b>Economic status</b>			
(a) Poor class	121(38.66)	192(61.34)	313(6.26)
(b) Middle class	1582(34.13)	3053(65.87)	4635(92.7)
(c) Upper class	32(61.54)	20(38.46)	52(1.04)
<b>Food habits</b>			
a) Vegetarian diet	96(31.89)	205(68.01)	301(6.02)
b) Mixed diet	1639(34.88)	3060(65.12)	4699(93.98)
<b>Habitation</b>			
(a) Rural	914(31.18)	2017(68.82)	2931(58.62)
(b) Semi-urban	760(40.04)	1138(59.96)	1898(37.96)
(c) urban	61(35.67)	110(64.33)	171(3.42)

(Figures in parentheses are percentage values)

Table.1. denotes some of the prominent variables in the study groups. (n=5000 subjects)

Correlation: Pre-teen Vs teen = -1; Economic status = .99  
 Food habits = 1; Habitation = 0.95



Variables	Menarche age (yrs)		Total
	10-12 (pre-teen)	13-19 (teen)	
<b>Blood Group(s)</b>			
A	399(40.1)	596(59.9)	995(19.9)
B	595(29.6)	1415(70.4)	2010(40.2)
AB	160(40.2)	238(59.8)	398(7.96)
O	581(36.38)	1016(63.62)	1597(31.94)
<b>BMI :</b>			
< 18.5	304(26.76)	832(73.24)	1136(22.72)
18.5 – 24.99	769(37.33)	1291(62.67)	2060(41.2)
25 – 29.99	631(37.07)	1071(62.93)	1702(34.04)
>30	31(30.39)	71(69.61)	102(2.04)
<b>WHR :</b>			
0.81 – 0.85	85(43.81)	109(56.19)	194(3.88)
0.86 – 0.90	166(35.78)	298(64.22)	464(9.28)
0.91 – 0.95	432(47.89)	470(52.11)	902(18.04)
0.96 – 0.99	468(37.59)	777(62.41)	1245(24.9)
>1.0	584(26.6)	1611(73.4)	2195(43.9)

(Figures in parentheses are percentage values)

**Table.2. indicates some measurable parameters in the study population. (n=5000 subjects)**

**Correlation: Blood groups: preteen Vs teen = 0.94;**

**BMI: pre-teen Vs teen =0.96;**

**WHR: pre-teen Vs teen =0.87**

Parameters/Variables	Menarche age (yrs)		Total
	10-12 (pre-teen)	13-19 (teen)	
<b>Duration (days):</b> 2	27(18.75)	117(81.25)	144(2.88)
3	681(37.77)	1122(62.23)	1803(36.06)
4	263(32.23)	553(67.77)	816(16.32)
5	189(23.45)	617(76.55)	806(16.12)
6	173(36.97)	295(63.03)	468(9.36)
7	183(43.68)	236(56.32)	419(8.38)
8	128(56.39)	99(43.61)	227(4.54)
9	30(16.48)	152(83.52)	182(3.64)
10	40(41.67)	56(58.33)	96(1.92)
11	21(53.85)	18(46.15)	39(0.78)
<b>Cycles :</b> Short	27(18.75)	117(81.25)	144(2.88)
Normal	1133(33.08)	2292(66.92)	3425(68.5)
Long	575(40.18)	856(59.82)	1431(28.62)
<b>Periods :</b> Regular	1608(34.38)	3069(65.62)	4677(93.54)
Irregular	127(39.32)	196(60.68)	323(6.46)
PMS	344(29.6)	818(70.4)	1162(23.24)
PMD	92(13.83)	573(86.17)	665(13.3)

(Figures in parentheses are percentage values)

**Table. 3. reveals the menstrual cycle abnormalities in the study subjects.(n=5000 subjects)**

**Correlation:**

**Duration: Pre-teen Vs teen =0.94;  
Duration Vs pre-teen= -0.55; duration Vs teen = -0.64**

**Cycles: Pre-teen Vs teen = 0.98**