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## Original Research Article

## Effects of early age of menarche on the health of Indian middle-aged women: A survey study

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## ABSTRACT

**Background:** The age of menarche, which is a sign that a female has reached reproductive maturity, has a significant impact on the health of women. Numerous components, including nutritional status, socioeconomic status, diet, environment, sibling relationship, hereditary and genetic factors, religious group, ethnicity, psychological stress, migration, and chronic illness, have been postulated to influence the age of menarche. Opinions on these theories have varied, both for and against the theory. In a survey it was reported that women complaints joint pains /stiff shoulder and LBA. Risk of musculoskeletal problems and the perception of pain could increase with obesity.

**Aim:** To find the prevalence of physiological and psychological health problems in middle-aged females due to early menarche.

**Materials and Methods :** Women matching the study criteria and willing to participate in the survey were approached and informed consent was taken. An interview was conducted on either a physical or virtual mode by a trained therapist as per the check list designed for this study.

**Result:** The content of the checklist was validated with the help of experts in this study domain and subjected to statistical tests which yielded a Cronbach's score of 0.967. The participants response on this checklist was analyzed and a strong association of physical and psychological health issue was documented particularly among working women, multiparous women, and with type of delivery women had undergone during 1<sup>st</sup> pregnancy.

**Conclusion:** The present study documented significant findings with the early age of menarche and its association with physical and psychological health of the women.

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## 1. Introduction

Adolescence is the transitional stage between childhood and maturity. The onset of puberty is caused by the activation of complex neuroendocrine regulatory mechanisms, which releases pulsatile GnRH (gonadotropin-releasing-hormone) output.<sup>1</sup>

The age of menarche, which is an indication that a female has reached reproductive maturity, has a significant impact on the health of women.

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Numerous variables, which would include nutritional status, socioeconomic status, diet, environment, sibling relationships, hereditary and genetic factors, religion, ethnicity, psychological stress, migration, and chronic illness, have been theorised to influence the age of menarche, opinions for and against the theory have varied among clinicians and researchers. Both in industrialised and emerging nations, the average age at menarche has fallen, probably as a result of better nutrition and health.<sup>2</sup> Literature supports the fact that apart from the genetic influence, the age at menarche depends significantly on number of other variables, such as the female's living

conditions, body type, family size, BMI (body mass index), financial status, education, and social experience.<sup>3</sup> Girls from affluent and poor backgrounds experience considerable differences in the commencement of puberty (menarche). The HRQOL (health related quality of life) of middle aged women in South India is lower than the natural average and has an increased correlation with BMI.

Adolescence is characterised most visibly by emotional instability and imbalance. Additionally, several studies have indicated that adolescent emotional and mental issues get worse with age.<sup>4</sup> Women who reach menarche before the average age of 12 years are more likely to face psychosocial challenges, putting them at risk for diseases such as obesity, diabetes, cardiovascular disease, and breast cancer.<sup>5</sup> Early menarche has been implicated as a risk factor for dyslipidaemia, hypertension, and hyperglycaemia in a number of studies. The date of menarche has been associated with cardiovascular disease (CVD), which is assumed to be due, at least in part, to increased lifelong oestrogen consumption.<sup>6</sup>

Reproductive period duration is closely linked to age at menarche and menopausal age, which have been implicating various health consequences for women in later life. Relationship between menarche and menopause helps us understand the importance of effective prevention and management of health problems such as CVD, Osteoporosis, Breast cancer, type 2 DM (diabetes mellitus) etc.<sup>7</sup> When compared to women going through menopause at a later age, those going through early menopause for biological or artificial reasons experience symptoms of negative health effects that last longer. A significant portion of the Indian women who experience early menopause has negative effects on physical, psychological, and reproductive health in their middle-age.<sup>8</sup>

Women become victims of both physical and psychological health problem due to loss of reproductive potential and transition in to late midlife. Physical health problems include, cardio vascular issues, musculoskeletal issue consisting of joint pains, neurological association of limbs and joints, weight loss or gain, reproductive health issues, psychological health issues including loss of confidence, depression, forgetfulness, irritability, low concentration, panic attacks and anxiety.<sup>9</sup>

Menopausal age is an important biomarker of infertility and increase of various middle life diseases and health problems which can be prevented with timely interventions of lifestyle modification, menopausal hormone therapy, and nutrient supplementations such as calcium, vitamin D, & micronutrients. Techniques of physiotherapy help in the prevention and management of various consequences of early menarche which has been discussed. There is a misnomer that physiotherapy is used mainly for the management of orthopaedic problems, which underestimates the scope of the profession and practice.

There is a limited understanding on the comprehensive therapeutic options available for addressing women health issues, though awareness about the profession is increasing in the recent years. We anticipate that the outcome of the current study would provide an insight about availability, attitude and awareness about physiotherapy towards the addressing of health issues among female population, thereby reducing morbidity and mortality and improve the overall HRQOL among the middle-aged female population.<sup>10,11</sup>

## 2. Materials and Methods

### 2.1. Study design

A survey study was conducted among population who met the selection criteria. Informed consent was signed by each participant in the study that was approved by the Institutional Ethics Committee (registered no: IEC/IRB/DSU/MPT/2022/010). Prior to the study, it was registered in an international clinical trials registry (ClinicalTrials.gov registration no: CTRI/2022/07/056042)

### 2.2. Participants

Women who met the study's eligibility requirements were contacted, and their interest in taking the survey was evaluated. A total sample of 456 participants aged around 37-42 were approached out of which 415 fall into inclusion criteria, and 41 fall into exclusion criteria. A trained therapist interviewed the patient via physical or virtual means using the specified checklist after obtaining written informed consent. Following the item generation and construction of the checklist through focus group discussion professionals were invited to be a part of the expert panel. The final panel consisted of 7 members of experienced gynaecologists and women health specialised physiotherapists. The survey checklist consists of demographic data and 25 questions under 3 sections of information viz., Period history, pregnancy history, and general health of the participating middle aged women. The checklist validation and reliability was done statistically with respect to relevance of the questions, clarity of the questions, easy comprehension of the questions, and representativeness of the questions. The data collection was done from selected residential areas, school, banks, and private office by convenient sampling method.

### 2.3. Data analysis

The data so obtained by conducting the research was systemically entered into excel sheet and data was compiled required table were generated. Data analysis was performed using SPSS (version 22). Descriptive were generated and for categorical variables ratios and proportions were used to summarize the data. Confidence level of 95% and

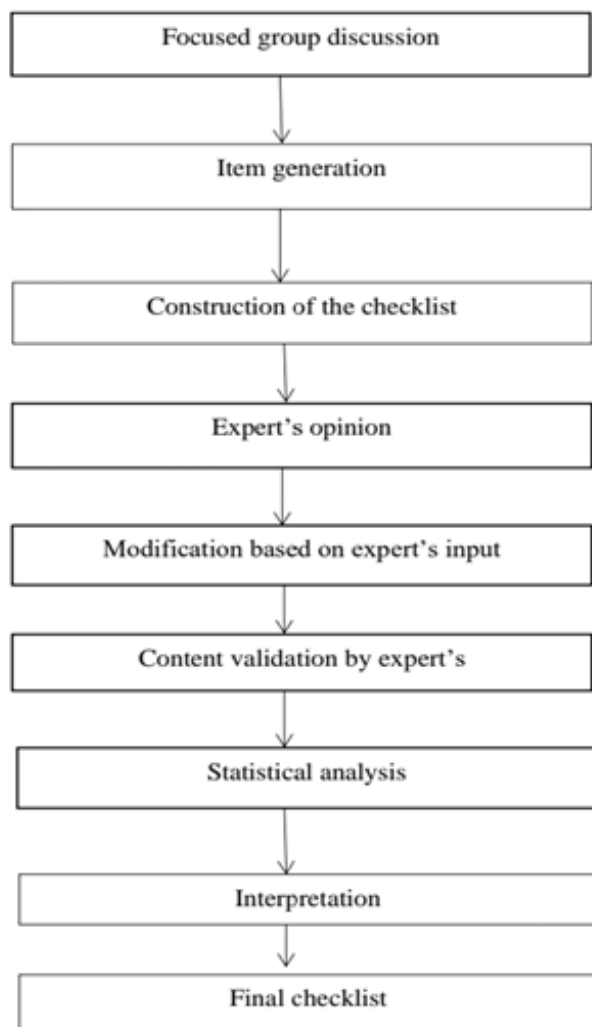


Chart 1: Flow chart methodology

significance level of 5% was fixed for drawing inference. To find the association between early menarche and physical problems or to find out early menarche and psychological problems. Spearman's Rank order correlation coefficient test was used.

### 3. Results

The mean score of physical health of respondents with three children is  $22.45 \pm 5.84$  and their psychological mean score is  $11.83 \pm 3.80$ . A p value of (0.0071) signifies the issues with physical health and number of children.

A p value of (0.0139) signifies the issues between the type of delivery and physical issues.

A p value of (0.0001) and (0.0181) suggests that there is a significant issue with physical and psychological health in the working women. A p value of signifies that there is issue with in the working women.

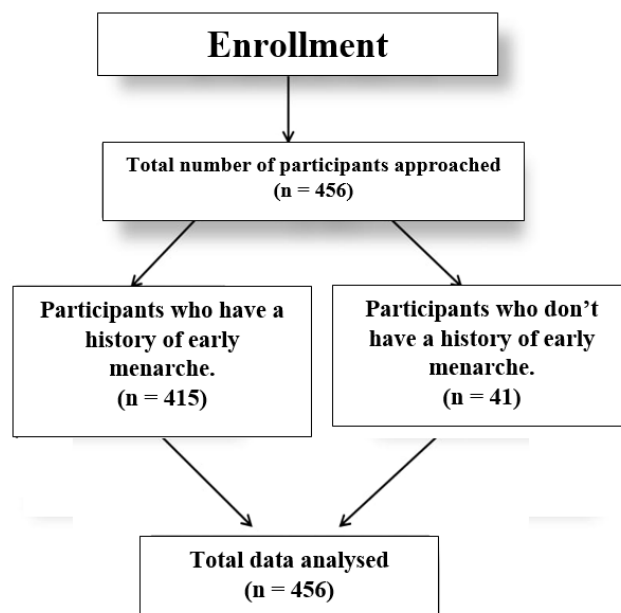


Chart 2: Enrollment chart

**Table 1:** Comparison of number of children groups with mean physical health and psychological health scores by one way ANOVA test

Number of children group	Physical health		Psychological health	
	Mean	SD	Mean	SD
None	28.13	5.06	14.88	4.32
One	23.90	5.04	12.29	3.59
Two	22.70	5.54	11.92	3.88
Three	22.45	5.84	11.83	3.80
F-value	4.0788		1.8354	
p-value	0.0071*		0.1399	

\*p<0.05

**Table 2:** Comparison of type of delivery in 1<sup>st</sup> pregnancy with mean physical health and psychological health scores by one way ANOVA test

Type of delivery in 1 <sup>st</sup> marriage	Physical health		Psychological health	
	Mean	SD	Mean	SD
None	28.13	5.06	14.88	4.32
LSCS	23.47	5.01	11.95	3.70
NVD	22.77	5.75	12.12	3.84
F-value	4.3184		2.3146	
p-value	0.0139*		0.1000	

\*p<0.05

**Table 3:** Comparison of occupations with mean physical health and psychological health scores by independent t test

Occupations	Physical health		Psychological health	
	Mean	SD	Mean	SD
Working	23.87	5.30	12.38	3.71
Not Working	21.72	5.50	11.48	3.90
Total	23.19	5.45	12.09	3.79
t-value	15.8530		5.6293	
p-value	0.0001*		0.0181*	

\*p&lt;0.05

**Table 4:** Comparison of occupations with mean physical health and psychological health scores by independent t test

Correlation between	Correlation coefficient r-value	t-value	p-value
Physical health and Psychological health	0.7357	23.1449	0.0001*

\*p&lt;0.05

The correlation coefficient r value is 0.7357 indicates a moderate to strong relation /association because the value is closer to 1. A p value of (0.0001) signifies there is a strong association of physiological and psychological health components.

#### 4. Discussion

The average menarcheal age in Indian women was documented as 13±1.1 years.<sup>12</sup> The age of menarche plays a major role as an indicator for sexual maturation and other factors i.e., family size, environmental and genetic conditions, BMI and level of education. Early menstrual age is associated with a high risk of the disease conditions, namely, uterine leiomyomata, endometrial cancer, breast cancer, and obesity; besides having an influence on reproductive performance, age of initial sexual activity, age of first pregnancy, and likelihood of additional miscarriages.<sup>12</sup> The present study focuses on the association of early menarche with physical health as well as with psychological health in Indian middle aged women. We included middle aged women between 37-42 years of age<sup>13-15</sup> to exclude the less opted conceiving age of pregnancy phase as well as women in their pre phase of menopausal symptoms and menopause. According to Trupthi Meher et al. prevalence rate of early menopause was way higher in southern India. Factors like education, age, smoking status, place of residents, early menarche, age at 1<sup>st</sup> pregnancy, any hormonal contraception, BMI, were found to be associated with pre mature menopause in India.<sup>8</sup> Many factors mentioned here were evident in our study as well, and we anticipate early menopause among the women

participated in the survey, the majority (N=415) of who reported early menarche. However, the investigation of the age at menopause was out of the scope of this study. Due to the enormous changes taking place in the reproductive health & phase of life in a female, there are a wide range of hormonal changes and imbalances taking place. These imbalances adversely contribute towards physical and mental health. According to Ikika T Suritani et.al, low back pain was the most frequently encountered issue among their study population comprising of middle aged women. The authors also stated that there was an increase in pain with progression of age. Since age is proportional to menopause it may be anticipated that rapid changes in the hormonal circulation may have an influence on the rising intensity of the pain. The study also reveals an impact on rising BMI and the rising difficulty in the daily activities causing joint pain and disability in middle-aged women. Hence, there is a decline in physical health and function with increasing BMI and age in the middle-aged women.<sup>16</sup>

Our study has similar findings and a statistically significant joint pain and LBA (low back ache) values in spite of the lower average age group. It may be noted that the majority of our responders have revealed early menarcheal age and the association between the two may not be ruled out. George Peat et al stated that there was specific association of lower limb joint dysfunction with decreasing physical function. Moreover, the severity of pain and disability in each joint site was found to increase as the number of painful sites increased.<sup>17</sup> Similar to this, we have also documented responses supporting a significant involvement of multiple joints. Among our respondents, 86% had pain in the knees, 71% complained pain over toes and foot region, 53.07% of them had low back pain, 58% had heel pain, and 41.8% had experienced physical trauma. Our study is in consensus with that of Shobana Ramasamy et al., who have documented morbid obesity and a below average HRQOL scores in middle age women. Similar findings were observed in our study too. We documented the association between number of children and the type of delivery in first pregnancy with mean scores of physiological and psychological health. The results revealed a positive association between the two. Also, we found that both physical health and psychological health were adversely affected in working women. With a Karl Pearson's correlation coefficient value  $r = 0.7357$ , we could establish a significant association between physiological and psychological health components. Specific geographical areas are taken for data collection and hence, may not be generalised. The current study could not assess other major health conditions like ischemia, and other major systemic diseases. Keeping in mind the contents of the survey form/ checklist we in our study comprised population of minimum schooling of 10<sup>th</sup> standard, there are major women not falling into this

bracket, the assessment in this section of population was not possible.

## 5. Conclusion

This checklist may be used in the future studies to assess physiological and psychological health issues faced by middle aged Indian women, given the ease of administration and shorter time required to respond to it. This survey form may specifically be helpful to cater to a larger women population at the community level.

## 6. Sources of Funding

None.


## 7. Conflict of Interest


None.


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