***Original Research Article***

**Demographics and its Association with Pre-Menstrual Syndrome and Health Issues Experienced During Menstruation: A Cross-Sectional Study of Women of Gujarat, India**

**Abstract**

**Introduction**

Menstruation is a common phenomenon in every woman’s life. In their early reproductive life, a majority of young women experiences some degree of premenstrual difficulties. The objective of this research to explore the factors associated with psychological issues and physical issues faced by women, both in the days prior to menstruation and during menstruation.

**Methods**

A cross-sectional study was conducted in Gujarat, India. The sample was consisting of women in the age of 14 to 49 years, who are residing in Gujarat and those who were in their menstruating span of life at the time of the survey. The data are collected using a mix of self-administered and canvassing the schedules over online, telephonic, and offline modes.

**Results**

The results of the study reveal that a comparatively lower proportion of women experience these physical and psychological symptoms as PMS. The proportion of women experiencing these symptoms both as PMS and during menstruation are comparatively much lower. Women in the age 21 to 30 years are more affected by physical and psychological symptoms during menstruation. PMS tend to be getting milder with age. Marital status does not seem to influence psychological symptoms. Women who are never married are found to experience more of physical symptoms during menstruation. There is a direct relationship between PMS, either physical or psychological, and economic status. Lower the economic status, lesser are the PMS. Physical symptoms experienced during menstruation also show a similar pattern. The proportion of women experiencing psychological symptoms during menstruation are more in higher and lower-income groups, and less in middle-income groups.

**Conclusion**

This study has found young women from ages 12-20, were most affected by both physical illnesses such as headache, stomach-ache, fatigue, dizziness, giddiness, sweating, nausea/vomiting/diarrhoea, and fainting and psychological problems such as anxiety, confusion, forgetfulness, difficulty concentrating and depression before and during menstruation.

**Keywords:** Menstruation; India; Demographics; Gujrat

**Introduction**

The beginning of menstruation (menarche) in adolescence is a significant milestone indicating reproductive maturity and forms an intricate part of women’s physical and psychological health (1)(2).Premenstrual syndrome (PMS), encompasses a group of physical and psychological symptoms which start or intensify in the late luteal phase of the menstrual cycle and continue till the commencement of menstrual bleeding. Symptoms associated with PMS range from mild premenstrual molimina to severe and disabling. PMS presents with varying prevalence. It is estimated that about 75-80% of women experience at least one symptom of PMS with a worldwide mean prevalence of 47.8% (3–6).Premenstrual syndrome is also defined as a “collection of physical, cognitive, affective, and behavioural symptoms, which occur in the luteal phase of the menstrual cycle” and diminish with the start of menses(7). A more severe form of PMS is known as “Premenstrual Dysphoric Disorder (PMDD), which is an assemblage of behavioural and somatic symptoms and is categorised under depressive disorders(8). Although PMS typically affects a wider group of women, PMDD is reported in only 3-8% of women (9). While a definite cause of PMS remains unclear, it is considered as a multifactorial condition caused by hormonal, genetic and environmental influences(10).These conditions while not life-threatening can significantly reduce women’s quality of life and affect not only their mental health but also their work productivity and interpersonal relationships. Moreover, PMS patients have shown lower scores on the Work-related quality of life scale(11,12).

Preceding epidemiological literature highlights some consistent biological, social or behavioural risk factors for PMS. Younger age at menarche is believed to be consistent with increased number and severity of PMS, however, some studies suggest that symptoms peaked in the mid-30s (9). PMS in teenage complicates puberty and can negatively impact interpersonal relationships, education and productivity which in turn results in low self-esteem, dissatisfaction and insecurity (13). Premenstrual syndrome (PMS) has also been associated with psychopathology, equality, menstrual features, employment and environmental stressors(14). The severity of symptoms might also be affected by exercise, sleep quality, caffeine intake, BMI and exposure to stress. Moreover, working conditions, living situation, marital status and credit burden, and family history are likely to contribute to PMS (15).

Typical symptoms of PMS (or PMDD) include, but are not limited to, physical symptoms such as breast tenderness, back pain, bloating, joint or muscle pain, fatigue, change in appetite and weight gain. Psychological symptoms include but are not limited to, labile mood, irritability or anger, anxiety and depression(11) (16). PMS causes serious impairment of women’s daily routine affecting their physical, mental and social well-being. Behavioural symptoms experienced during PMS include poor problem-solving, inability to concentrate, forgetfulness, social withdrawal and confusion(17). Female students affected by PMS will have decreased academic performance because of disturbance in their psychomotor function and alteration of the cognitive-emotional processes (18,19). Moreover, lower academic achievement may contribute to higher levels of stress among these students, which may in turn aggravate the symptoms of PMS. This inverse relationship of PMS with academic performance is a cause of concern among students(20). Furthermore, women suffering from PMS report disruption in work productivity due to a greater number of workdays missed and an inability to carry out daily tasks effectively(21).

According to UNICEF, India has an adolescent population of 253 million (ages between 10-19 years), which constitutes the largest adolescent population in the world. Nearly 43% of adolescent girls drop out of school before completing secondary education, a part of which is due to the negative impact of menstruation (22). Menstruation and related complications are prevalent among adolescent girls in India. Socio-cultural and regional variations seem to affect menstrual complications. Myths and taboos associated with menstruation negatively impact the health of these women(23). The onset of menstruation is accompanied by an emphasis on secrecy, menstrual rules and cultural regulations along with physical distress and sanitation issues (24). Menstrual hygiene remains a problem in India for adolescent girls due to a lack of information about menstruation and a lack of sanitary facilities. Approximately 42% of girls in India do not have access to sanitary hygiene products and use primitive, unsanitary products as a result of which girls drop out of school (22,25). Furthermore, 64% of girls are reported to have at least one of the many menstrual issues, with inadequate hygiene and lack of care as the primary drivers of morbidity and other menstruation-related complications(26). The severity and recurrence of symptoms along with the resulting emotional distress or disruption in work, personal relationships and activities account for the morbidity associated with menstruation and PMS (27). Menstruation and PMS are a public health concern and our study aims to understand the association between demographics and PMS along with other menstrual issues.

**Methods**

This study employs a cross-sectional, descriptive research design to examine the objectives. The data are collected using a mix of self-administered and canvassing the schedules over online, telephonic, and offline modes.

This study was conducted in the state of Gujarat in India. Gujarat is a coastal state and shares an international border with Pakistan on its northern boundary. Gujarat has one of the strongest economic fundamentals among the states of India; it contributes 7.99% share to the GDP, 16.8% share of industrial output (the highest in India), with just 4.99% population of the country. Gujarat also has the lowest unemployment rate (28).

The sampling frame for this study is all the menstruating women in the age of 14 to 49 years living in Gujarat, at the time of survey. Pathak et al (29)observes that the average age of menarche is 13.76 years and Ahuja (30) observes that the average age of menopause is 46.2 years of Indian women and it is 51 years for the women from the western countries. This is the rationale for deciding the age-range of 14-49 years of women for the sampling frame. The reason for including only currently menstruating women is that the study focuses on getting insights into pre-menstrual syndromes and health issues faced during the menstruation cycle. Therefore, the responses of women who have already entered the menopause or those girls who have not reached menarche, despite being in the given age range, would not be relevant. Also, women in the menopausal phase would have different sets of health issues, which would differ from those women who are still in the menstruating phase. The question of menstruation-related health issues for the girls who have not yet entered their menarche does not arise. Therefore, the sampling frame is defined to consist of women in the age of 14 to 49 years, who are residing in Gujarat and those who were menstruating at the time of the survey.

The entire survey exercise is undertaken in four phases, spread over a period of six months: (1) in-depth interviews of gynaecologists and women doctors, (2) administering questionnaire on the respondents sampled from the sampling frame, (3) focus-group discussions (FGDs) and in-depth interviews of girls / women to get deeper insights into the hygiene practices and the reasons for adopting the same, and (4) in-depth interview of Accredited Social Health Activists (ASHA) / healthcare professionals to get their opinion on the extent of awareness and hygiene practices adopted by girls / women, and to triangulate the findings derived from the data collected through questionnaire. The data for pre-menstrual syndrome and menstrual health problems is collected in the second phase of the survey.

The questionnaire is designed, primarily based on responses received from the gynaecologists / women doctors, in the first phase of the survey. The insights derived from reviewing the existing literature on menstruation hygiene and practices were also incorporated in the questionnaire design. The questionnaire covers a plethora of issues associated with menstruation and menstrual hygiene, like awareness, beliefs and taboos, menstruation management practices, cost of menstruation management and menstrual health issues faced by women in the pre-menstrual days and during her menstruation cycle. The questionnaire is organized into 9 modules; module 1 is designed to capture the socioeconomic profile of the respondents, and module 5 seeks information on pre-menstrual syndrome and health issues faced during menstruation. The ethical approval for this research was obtained from the Indian Council of Social Science Research.

**Results**

The responses on physical symptoms include whether a woman experiences: headache, stomachache, muscle fatigue, general fatigue, dizziness, giddiness, sweating, nausea, fainting episodes, breast tenderness, and bloating. The responses on psychological symptoms include whether a woman experiences: anxiety, confusion, forgetfulness, irritability, mood swings, anger feats, difficulties in concentrating, and depression. She is asked to respond whether she has experienced any of these symptoms only as a Pre-Menstrual Syndrome (PMS)[[1]](#footnote-1) or only during menstruation, or both as PMS and during menstruation[[2]](#footnote-2).

Since she may experience more than one symptom either as a PMS, during menstruation, or as both – PMS and during menstruation, the responses are not mutually exclusive of each other. Therefore, while undertaking a Chi-square test of association of these symptoms with their age, marital status and house type, the simultaneity of occurrence of symptoms requires to be taken into consideration. Six multi-response sets[[3]](#footnote-3) are defined: (1) Physical symptoms experienced as PMS, (2) Psychological symptoms experienced as PMS, (3) Physical symptoms experienced during menstruation, (4) Psychological symptoms experienced during menstruation, (5) Physical symptoms experienced both as PMS and during menstruation, and (6) Psychological symptoms experienced both as PMS and during menstruation. Each of these six multi-response sets is cross-tabulated with age group, marital status and house type respectively. Chi-square tests for each of these six multi-response sets are undertaken separately with age group, marital status and house type[[4]](#footnote-4). The results of these Chi-square tests are shown in Table 1. The results of crosstabulations are aggregated to obtain weighted percentages of women in each of these six categories, organized by their age groups, marital status and the types of houses in which they live. These weighted percentages are represented as bar charts as shown in Figures 1, 2 and 3.

**Table 1: Multi-response Chi-Square Tests for Physical and Psychological Symptoms[[5]](#footnote-5) Experienced by Women as PMS, During Menstruation and Both (as PMS and During Menstruation)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | **Age Category** | **Marital Status** | **House Type** |
| **Pre-Menstrual Syndrome** |
| Physical Symptoms | χ2 | 90.269 | 27.633 | 115.901 |
| p-value | .000 | 0.187 | .000 |
| Psychological Symptoms | χ2 | 26.73 | 19.862 | 55.353 |
| p-value | 0.317 | 0.266 | .000 |
| **During Menstruation** |
| Physical Symptoms | χ2 | 95.582 | 103.166 | 127.646 |
| p-value | .000 | .000 | .000 |
| Psychological Symptoms | χ2 | 49.876 | 23.439 | 56.694 |
| p-value | 0.001 | 0.102 | .000 |
| **Both PMS and During Menstruation** |
| Physical Symptoms | χ2 | 77.689 | 44.36 | 63.341 |
| p-value | .000 | 0.003 | 0.001 |
| Psychological Symptoms | χ2 | 51.297 | 25.65 | 29.748 |
| p-value | 0.001 | 0.059 | 0.193 |

**Figure 1[[6]](#footnote-6): Percentage of Women Experiencing one or more of the Physical or Psychological Symptoms as PMS, During Menstruation or as Both Categorized by their Age-Group**

**Figure 2: Percentage of Women Experiencing one or more of the Physical or Psychological Symptoms as PMS, During Menstruation or as Both Categorized by their Marital Status**

**Figure 3: Percentage of Women Experiencing one or more of the Physical or Psychological Symptoms as PMS, During Menstruation or as Both Categorized by their House Type (Economic Status)**

**Physical Symptoms by Age-Group:** The results in Table 1 show that physical symptoms experienced by women irrespective of whether as PMS, during menstruation, or both as PMS and during menstruation have a statistically significant association with age-group. Figure 1 shows that one or more physical symptoms experienced as PMS by women reduce with age. However, physical symptoms experienced during menstruation are highest in the age-group of 21 to 30 years, followed by those in the age-group of 40 years and above. Among the women who experience physical symptoms both as PMS and during menstruation, the proportion is higher in 12 to 20 years and 31 to 40 years age-groups as compared to the other two age-groups.

**Psychological Symptoms by Age-Group:** The results in Table 1 reveal that psychological symptoms during PMS do not have a statistically significant association with Age-Group. However, psychological symptoms experienced by women during menstruation, as well as both as PMS and during menstruation have a statistically significant association with age-group. Figure 1 shows that psychological symptoms experienced by women during menstruation is the highest among the women in the age-group of 21 to 30 years. The is followed by the women in the age-group of 40 years and above, further followed by the one in 31 to 40 years. The lowest percentage are the women in 12 to 20 years of age-group. Women who experience psychological symptoms both as PMS and during menstruation are highest in the age-group of 40 years and above. Overall, the psychological symptoms experienced both as PMS and during menstruation show an inverse relationship with the age-group.

**Physical Symptoms by Marital Status:** Table 1 shows that there the association between women experiencing physical symptoms as PMS and their marital status is not statistically significant. However, the association is significant among women experiencing physical symptoms during menstruation, as well as women experiencing the same both as PMS and during menstruation with their marital status. Figure 2 shows that women who were never married experience the physical symptoms during menstruation, the most, followed by women who were ever married (but not with their partner / husband). The least percentage of women who experience physical symptoms during menstruation are the women who are currently married. Examining the pattern among the women experiencing physical symptoms both as PMS and during menstruation, the percentage is higher for currently married women, lower for those who were married but currently not with the partner / husband, and lowest for those who are never married.

**Psychological Symptoms by Marital Status:** The results presented in Table 1 show that there is no statistically significant association between psychological symptoms experienced by women either as PMS or during menstruation with their marital status. The association of women experiencing psychological symptoms both as PMS and during menstruation with their marital status is not statistically significant at 95% confidence level. However, it is significant at 90% confidence level. Therefore, detailed interpretation about the said association is undertaken from Figure 2, and it reveals that the proportion of women who were married but currently not living with partner are highest among those experiencing psychological symptoms both as PMS and during menstruation. The proportion of currently married and never married women experiencing the same are almost equal, yet comparatively lower than the women who were married but currently not with the partner / husband.

**Physical Symptoms by House Type (Economic Status):** The Chi-square values in Table 1 show that there is an association between physical symptoms experienced by women, either as PMS, or during menstruation or both as PMS and during menstruation with the house type. As discussed earlier, house type is used as a proxy to economic status. Figure 3 shows that women from middle income group, living in row houses and flats experience more physical symptoms, during the premenstrual days, as compared to those living in bungalows (high income group) and in kachcha houses (low-income group). The proportion of women experiencing physical symptoms during menstruation is highest among the ones who live in bungalows (high income group). This is followed by the ones living in flats (lower middle-income group). The least proportion of women to experience physical symptoms during menstruation are the one living in Kachcha houses, belonging to low income group. Among the women experiencing physical symptoms both as PMS and during menstruation, the proportion of women is more among the higher income group. There is an inverse relationship between percentage of women experiencing physical symptoms both as PMS and during menstruation and the economic status.

**Psychological Symptoms by House Type (Economic Status):** Table 1 shows that there is a statistically significant association between psychological symptoms experienced only as PMS and only during menstruation with the economic status of women. The association between psychological symptoms experienced by women both as PMS and during menstruation with their economic status is not statistically significant. Figure 3 shows that women belonging to the upper middle-income group, living in row houses, show more psychological symptoms in premenstrual days as compared to women from other income groups. Also, the percentage of women experiencing psychological symptoms during menstruation shows a direct association with economic status. Women from higher income groups are more likely to experience psychological symptoms during menstruation as compared to the ones from the middle and lower-income groups.

Additionally, the bar charts in Figures 1, 2 and 3 show that most women experience physical and psychological symptoms during menstruation, and a relatively lower percentage of women experience these symptoms in the premenstrual days. Women who experience these symptoms – either physical or psychological – both, in premenstrual days and during menstruation, are much less as compared to those experiencing only PMS and only during menstruation.

**Discussion**

The present study was conducted on women between ages 14-49, living in Gujarat, India and experiencing some physical and psychological factors associated with menstruation, which affects their well-being. According to the results of this study, women in the age group of 12-20 years’ experience higher physical and psychological symptoms of PMS. However, during menstruation, women aged 21-30 years showed a higher trend in symptoms experienced. When considering the symptoms experienced by these women both pre and during menstruation, the trend is similar in all age groups. Age has been a controversial variable in its association with PMS and menstruation. According to Sternfeld et al (9) there exists an inverse association between age and symptom severity. In a study conducted by Oraby et al., (2016), younger age was reported to be associated with severe PMS compared to older age(15). According to Ramezanpour et al., (2015), the severity of PMS increased with age(31). Tarannum et al., (2021) also reported a 2.19 times higher occurrence of PMS in late adolescence (15-19 years) (32). However, according to AbdelQadir et al., (2022), no significant association was found between the age of patients and the prevalence of PMS (11).

Our study also concluded no statistically significant association between physical and psychological symptoms experienced by women and their marital status. However, our study shows women who were never married experience more severe physical and psychological symptoms during menstruation. This is in agreement with a study conducted by Farahmand et al (33)which reports that the severity of PMS was higher among unmarried students compared to their married counterparts. Similarly, Tschudin et al., (2010) also reported a higher prevalence of PMS in non-married women(34). However, Halbreich et al., (2003) report lower severity of PMS symptoms in unmarried women due to their physiological and psychological ability in coping with multiple roles (35).

Furthermore, socio-economic status is found to be statistically significant in our study. The severity of physical symptoms has an inverse relationship with economic status. Women belonging to higher-income groups reported more severe physical and psychological symptoms than lower and middle-income groups. This can be supported by a study conducted by Gollenberg et al., (2010) which states that women working in a more professional environment can recognise their symptoms better, leading to a higher reporting rate (36). However, Farahmand et al., (2017), reported significantly higher severity of PMS among women with lower economic status (33). Similar contradiction was found in a study conducted by Hamaideh et al., (2013), which reported higher prevalence of PMS among women from low-income backgrounds than those from higher income background (37). In contrast, a study conducted by Desai et al., (2018), explains possible association of high socio-economic status with menstrual problems owing to a sedentary lifestyle and higher junk food intake (38).

**Conclusion**

This study was conducted to highlight and understand the predictors which affect the physical and psychological wellbeing of women, prior to and during menstruation. The study included data collected from women in the age of 14-49 years, living in Gujarat and were menstruating at the time of data collection. The data was collected from selected women (across different age groups, socioeconomic background and different marital status), gynaecologists and Accredited Social Health Activists/ healthcare professionals. The results obtained from the data have shown that there are several factors which affect the physical and psychological wellbeing of the women. The results of the study reveal that most women experience physical and psychological symptoms during menstruation. A comparatively lower proportion of women experience these symptoms as PMS. The proportion of women experiencing these symptoms both as PMS and during menstruation are comparatively much lower. The study further shows that physical symptoms showed a strong association with age. Women in the age 21 to 30 years are more affected by physical and psychological symptoms during menstruation. Women affected by these symptoms as PMS show an inverse relationship with age. PMS seems to be getting milder with age. The results of the study show that marital status does not seem to influence psychological symptoms. Marital status does not show any association with physical symptoms, except during menstruation. Women who are never married are found to experience more of physical symptoms as compared to those who are currently married or were married but currently not with the partner / husband. House type, a proxy for economic status, seem to have influence on the physical and psychological symptoms. There is a direct relationship between PMS, either physical or psychological, and economic status. Lower the economic status, lesser are the PMS. Physical symptoms experienced during menstruation also show a similar pattern. Psychological symptoms experienced during menstruation show a quadratic relationship. The proportion of women experiencing psychological symptoms during menstruation are more in higher and lower-income groups, and less in middle-income groups. This study was aimed to develop and understanding about the factors associated with menstrual health of women, and how they should be considered while thinking about women’s well-being at home, in the work environment and the society in general.

**Prior Evidence:**

The beginning of menstruation represents a significant milestone in the reproductive maturity of a woman. Although menstruation is a part of natural growth and development, it is often associated with physical and psychological symptoms that constitute the Pre-menstrual syndrome (PMS). The literature highlights consistent social, biological, and behavioural risk factors for PMS including but not limited to age, education, exposure to stress, BMI etc. Menstruation and related complications are prevalent among adolescent girls in India. In India, the onset of menstruation is accompanied by a feeling of shame, inadequate hygiene and lack of knowledge and care which are the drivers of increased morbidity in India. Menstruation and related complications are a major Public Health concern in India and are under-researched.

**Evidence Added by This Study :**

This study demonstrates that almost all the women who participated in the study experienced at least one of the physical and psychological symptoms of PMS. The physical symptoms were found to be significantly associated with age; however, no significant association was reported between PMS symptoms and marital status. Socioeconomic status was found to be directly correlated to both physical and psychological symptoms of PMS. The study strengthens the argument of PMS having a multi-factorial aetiology and the impact of social, biological, and environmental factors on PMS and related complications.

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1. Typically, PMS is experienced between a week to 10 days before the onset of the menstrual cycle each month [30]. [↑](#footnote-ref-1)
2. These three categories are labelled as PMS, DM and ‘Both’. If she specifies that she experiences headache as PMS, then 1 is marked for headache in the column for PMS and 0 for DM and ‘Both’. Similarly, if she responds that she experiences stomach ache during menstruation, then 1 is marked for stomach ache in the column for DM and 0 for PMS and ‘Both’. Thus, if she responds to having muscle fatigue both as PMS and during menstruation, a 1 is marked for muscle fatigue in the column for ‘Both’ and 0 in PMS and DM. A similar protocol is followed for all the physical and psychological symptoms. [↑](#footnote-ref-2)
3. Multiresponse sets take into consideration the simultaneity of responses. [↑](#footnote-ref-3)
4. House type is a proxy for economic status of the family. Houses are categorized as Bungalow, Row House, Flat and Kachcha house indicating high income group, upper-middle income group, lower-middle income group and low-income group respectively. [↑](#footnote-ref-4)
5. The terms ‘physical symptoms’ and ‘psychological symptoms’ to be interpreted as ‘one or more physical symptoms’ and ‘one or more psychological symptoms’ respectively. [↑](#footnote-ref-5)
6. PMS = Pre-Menstrual Syndrome, DM = During Menstruation (for all the Figures 1, 2 and 3) [↑](#footnote-ref-6)