

ORIGINAL ARTICLE

ASSOCIATION OF GREEN TEA WITH PREMENSTRUAL SYNDROME
—AN OBSERVATIONAL STUDY IN YOUNG GIRLSSana Javaid, Sana Qanber Abbasi, Iqtadar Ali Rizvi*, Nazish Jamil,
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Background: Premenstrual syndrome (PMS) is a health problem worldwide and involves both physical and psychological/behavioural symptoms. The objective of this study was to find out any association between green tea intake and physical symptoms of PMS among young medical and dental female students. **Methods:** This cross-sectional observational study was conducted at University College of Medicine and Dentistry, University of Lahore. The study included 100 female medical and dental students, selected with convenience non-probability sampling technique, aged 18–26 years; 78 of them had premenstrual physical symptoms. Data were collected on a self-administered and preformed proforma. All participants were advised to take green tea (3 cups/day) for 3 months. The data were entered and analysed using SPSS-24. **Results:** Mean age of females suffering from physical symptoms of PMS was 22 ± 1.6 years and the mean weight was 60.5 ± 7.7 Kg. Abdominal bloating was the most common symptom affecting 48.7% of the PMS sufferers. The second most common symptom was acne in 32.1% of the subjects. After three months of green tea intake, the study participants were re-evaluated. There was a significant improvement in all physical symptoms of PMS ($p=0.001$). **Conclusion:** Consumption of green tea was associated with a decrease in the physical symptoms of PMS.

Keywords: Premenstrual syndrome, Physical symptoms, Green tea

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INTRODUCTION

Menstruation is defined as a natural physiological process that is experienced by women of reproductive age and is characterized by monthly shedding and repairs of the endometrium.¹ Regular menstruation is considered a sign of health in women of reproductive age. Premenstrual syndrome (PMS) is a health problem worldwide and involves both physical and psychological/behavioural symptoms. According to The American College of Obstetricians and Gynaecologists, PMS is defined as ‘The period which occurs approximately five days before menstruation and ends in a few days after menstruation starts and is accompanied by physical and psychological symptoms’.² It has been observed that almost 80–90% of the females experience PMS. In about 5% of women, PMS symptoms are so severe that these interfere with the social and personal life at home and work, and require medication.³

A definite understanding of the aetiology of PMS is still an unaccomplished challenge. Symptoms may be caused by rising and falling levels of oestrogen and progesterone. This may be due to increased sensitivity to changing hormonal levels during the menstrual cycle. Other suggested causes are genetic components, serotonin dysregulation, and lifestyle factors especially fatty diet, skipping breakfast, insufficient exercise, and lack of sleep.^{3,4}

Premenstrual syndrome affects young girls physically, psychologically, and emotionally, and

resolves upon the start of bleeding.⁵ Common physical symptoms of PMS includes abdominal bloating, hot flushes, dysmenorrhea, breast tenderness, weight gain, acne, headache, migraine, nausea, and vomiting.⁶

Green tea is a widely consumed beverage worldwide, especially in Asian countries like Japan, China, and Korea. Green tea has many health benefits including potent antioxidant, anti-inflammatory, anti-arthritis, antibacterial, antiviral effects, anti-carcinogenic and anti-arteriosclerotic effects owing to its flavonoids content. In a recent study, green tea catechins have been shown to have inhibitory effects on COX-2 activity and it is thus hypothesized that green tea may reduce prostaglandin levels, and thereby helps relieve the severity of dysmenorrhea of PMS.^{7,8} The current study was conducted to investigate the association between green tea intake and physical symptoms of PMS among young medical and dental female students.

METHODOLOGY

This cross-sectional observational study was conducted at University College of Medicine & Dentistry, University of Lahore, from June 2020 to December 2020 after approval from the Ethical Committee. (IRB:UOL/1256/04/20). Non-probability convenience sampling technique was used to collect the data from 100 medical and dental students on a self-administered and preformed proforma which was validated before the data collection, (Cronbach’s Alpha=0.95). The subjects

who did not show premenstrual physical symptoms or had irregular menstrual cycles were excluded from the study, and 78 subjects aged 18–26 years who had premenstrual physical symptoms were included in the study. Informed consent was taken from all participants. All participants were advised to take green tea (3 cups/day)⁸ for 3 months. After 3 months, improvement in the physical premenstrual symptoms post-green tea intake was observed among 78 participants.

The data was entered and analysed using SPSS-24. Mean±SD was calculated for quantitative variables (age, and weight), and frequency with percentages was calculated for PMS physical symptoms. Chi-square test was applied to find out the association between green tea and physical symptoms of PMS, and $p \leq 0.05$ was taken as significant.

RESULTS

A total of 78 female subjects were included in the study. Majority (97%) of the study participants were unmarried. The mean age of the subjects suffering from physical symptoms of PMS was 22 ± 1.6 years and their mean weight was 60.5 ± 7.7 Kg (Table-1).

At the beginning of the study, before green tea intake was advised, 19.2% of the subjects had hot flushes and 21.8% had dysmenorrhea and breast tenderness. Abdominal bloating was the most common symptom affecting 48.7% of the PMS sufferers. The second most common symptom was acne which was observed in 32.1% of the students. Weight gain was complained by 17.9% subjects. Headache and migraine affected 27% and 15.4% of the females respectively. Nausea was seen in 19.2% and vomiting affected 9% of the participants.

After three months, the study participants were re-evaluated. There was a significant improvement in all physical symptoms of PMS among the study participants ($p=0.001$) as shown in Table-2.

Table-1: Distribution of age and weight (n=78)

Name of Variable	Minimum	Maximum	Mean±SD
Age (Years)	18	26	22.03±1.579
Weight (Kg)	42.00	80.00	60.4872±7.74218

Table-2: Association of premenstrual physical symptoms with pre- and post-green tea intake (n=78)

Premenstrual Symptoms	Before green tea intake (%)	After green tea intake (%)	p
Hot flushes	19.2	10.3	0.001*
Dysmenorrhea	21.8	11.5	
Abdominal bloating	48.7	25.6	
Breast pain	21.8	14.1	
Weight gain	17.9	9.0	
Acne	32.1	16.7	
Headache	27.0	10.3	
Migraine	15.4	11.5	
Nausea	19.2	10.3	
Vomiting	9.0	3.8	

*Significant

DISCUSSION

Premenstrual syndrome (PMS) is a disorder that affects a significant number of women all over the world. PMS is a cyclic phenomenon of somatic/physical and affective/behavioural symptoms occurring few days before menses interfering with work and lifestyle followed by a symptom-free period.⁹

In our study, the mean age of females suffering from PMS was 22 ± 1.6 years, ranging from 18 to 26 years. A study by Shehadeh *et al*, in Jordan on female university students reported the mean age of the study subjects as 22.8 ± 0.27 , ranging from 18–28 years, the same as in the present study. Also, most of the females in the study were single (91.7%) similar to the current study where 97% of the students were unmarried.¹⁰ According to a study on PMS by Thwin *et al*¹¹, in Malaysia the mean age of the students under study was 20.94 ± 0.92 years. The results coincide with our study in which the PMS symptoms were seen to be mostly affecting students in their 20's.

In the present study, the mean weight of the subjects was 60.5 ± 7.7 Kg. Before the start of green tea intake, 17.9% of the students reported pre-menstrual weight gain. Mumtaz *et al*¹² observed pre-menstrual weight gain in 80.73% young adolescent girls which is a much higher percentage than that observed in our study. After 3 months of green tea intake in a quantity of 3 cups/day, the weight gain was complained by 9% of the subjects indicating a significant improvement ($p=0.00$). A study by Ashfaq *et al*¹³ concluded that PMS is significantly associated with weight status of females especially adolescents and maintaining a healthy weight may be a key to prevent PMS symptoms. Recently, the scientific evidence regarding the anti-obesity effects of green tea has been increasing. The anti-obesity effects of green tea have been attributed to its biological constituents, green tea catechins (GTC) with the highest activity reported in catechin-epigallocatechin-3-gallate (EGCG). A large number of interventional clinical studies and cellular and experimental studies support the weight-reducing effects of green tea. Other anti-obesity mechanisms of green tea include enhanced cellular production of reactive oxygen species and potent antioxidant effects mediated through prooxidant effects of EGCG which suppress genetic and enzymatic expressions of adipogenesis and lipogenesis and stimulate lipolysis.¹⁴ The weight reduction post-green tea reported by our subjects is strongly supported by the scientific evidence of anti-obesity effects of green tea.

Premenstrual syndrome is a myriad of symptoms during the days before menstruation. The present study investigated the common physical symptoms of PMS among young college students. Our study reported abdominal bloating as the most common symptom affecting 48.7% of the PMS sufferers. The

second most common symptom was acne which was observed in 32.1% of the students. A study by Mumtaz *et al*¹² on PMS in young ladies belonging to Karachi, showed that 90.65% of the young ladies suffered from abdominal bloating and felt distended stomach and extremely inflated belly. During and before the menstrual phase, girls take more fatty and salty foods which may explain abdominal distension and fluid retention. Another study by Chumpalova *et al*¹⁵ on females from Bulgaria showed that the most common somatic symptoms were abdominal bloating, breast tenderness, headache, and weight gain. Mandal *et al*¹⁶ reported in their study conducted in West Bengal that abdominal distension and headache affected almost 40% of adolescent females. Matsumoto *et al*¹⁷ found skin problems, body aches, painful breasts, and weight gain as the most common physical symptoms of PMS. The results of these studies are similar to the current study. Badkur *et al*¹⁸ reported in their study on PMS among female students of colleges that the most common physical symptom of PMS encountered in college students was headache affecting 77.5% of the girls. Bakhsh *et al*¹⁹ showed that regarding physical symptoms of PMS, generalized body aches were the most common and severe symptom experienced by 19.3% of the females. A study on high school students by Buddhabunayakan *et al*²⁰ found that the most common and frequent symptom of PMS was breast tenderness affecting 74.4% of the girls. These results are in contrast to the present study.

The current study observed the effects of green tea intake on physical symptoms of PMS among medical and nursing students. In a cross-sectional study by Abu Alwafa *et al*²¹ on the prevalence of premenstrual symptoms in university students, a significant relationship was observed between herbal tea intake during menstruation and physical symptoms of PMS. Participants who did not take herbal tea suffered more from physical symptoms than those who drank it. The results are consistent with the results of our study. Another recent cross-sectional study in China on the association of green tea drinking and dysmenorrhea among reproductive-age women in Shanghai was found to have a lower prevalence of dysmenorrhea with consumption of green tea. It was hypothesized that green tea may inhibit COX-2 activity and decrease prostaglandin levels, thereby relieve the severity of cramps during menstruation.⁸ This study supports the results of the current study.

The epidemiological evidence of green tea consumption and physical symptoms of PMs is scanty. Our study gives a new insight into the possible role of green tea intake in improving physical symptoms of PMS. However, cohort studies and randomized control trials are required to confirm our findings.

CONCLUSION

Consumption of green tea is associated with a decline in the physical symptoms of PMS. Educating the young generation about physical and psychological symptoms of PMS and their impacts on personal and social behaviours should be made mandatory at school and college levels and girls should be encouraged to take healthy diet and green tea along with an increase in physical activity to lessen the severity of PMS.

LIMITATIONS

Our sample size was small. Large sample size would provide more authentic representative results. The sample collection was confined to one college only; multiple centers/provinces may help to evaluate data from responses in terms of regional and cultural aspects.

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