

## Comparison of Emotional Regulation During Controlling Neuroticism in Different Types of Premenstrual Syndrome in Students

### Abstract

**Background:** Premenstrual Syndrome (PMS) involves cyclical mood and physical symptoms tied to the menstrual cycle. Neuroticism is a fundamental personality trait characterized by a tendency toward experiencing negative emotions like grief, anxiety, anger, and guilt. Emotion regulation enables individuals to manage their feelings during such situations. This study aimed to compare emotional regulation during controlling neuroticism in different types of premenstrual syndrome in students. **Materials and Methods:** This descriptive cross-sectional study was conducted on 421 students from Qom University of Medical Sciences. The participants were selected dormitories, sports venues, health and treatment centers, and hospitals from April 2018 to the end of December 2019 using convenience sampling. Research instruments included three questionnaires to diagnose PMS: A Premenstrual Symptoms Screening Tool (PSST), an Emotion Regulation Questionnaire (ERQ), and NEO-Five Factor Inventory (NEO-FFI) questionnaire. The data were analyzed using analysis of variance (ANOVA), Pearson, and multiple regression. **Results:** ANOVA analysis indicated a significant relationship between PMS, emotional regulation ( $F_{3,25} = 2, p = 0.04$ ), and neuroticism control ( $F_{4,22} = 2, p = 0.01$ ). The results of multiple regression showed that the neuroticism controlling score had a significant effect on the score of those who had moderate PMS symptoms, emotion regulation, while neuroticism control in those with mild PMS symptoms had a significant impact and increased mild PMS by 0.03 and 0.01, respectively. **Conclusions:** The study found a strong link between emotional regulation and PMS. Also, the impact of controlling Neuroticism in reducing Premenstrual Dysphoric Disorder (PMDD) symptoms and recommending interventions was highlighted based on emotion regulation and neuroticism control.

**Keywords:** Emotional regulation, neuroticism, premenstrual dysphoric disorder, premenstrual syndrome

### Introduction

Premenstrual disorders, including Premenstrual Syndrome (PMS) and premenstrual dysphoric disorder (PMDD), are characterized by a group of mood and physical symptoms that occur predictably in the luteal phase of the menstrual cycle and go away after the onset of menstruation.<sup>[1,2]</sup> PMS is a common disorder in women in their reproductive age, which is indicated by at least one physical, mood, or behavioral symptom.<sup>[3]</sup> PMDD is a severe form of PMS with significant mood disorders. According to the latest diagnostic criteria, PMDD is categorized as a subgroup of mood disorders in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision (DSM-5-TR).<sup>[4]</sup>

Although PMS can affect women at any age, it is more common in the late 20s

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to early 40s.<sup>[5]</sup> The prevalence of PMS in women of reproductive age is 47.8% worldwide.<sup>[6]</sup> According to the latest review article in Iran, the general prevalence of this syndrome is 70.8%, and women in their reproductive age comprise 68.9% of university students.<sup>[7-9]</sup> Research has suggested that the majority of women who seek medical assistance for PMS are over 30 years of age and usually report symptoms for several years, affecting various aspects of their lives, including academic performance. However, few PMS studies have focused on this subject in young adulthood.<sup>[10]</sup> Regarding the severe form of symptoms in premenstrual disorders, the mechanisms through which PMDD causes mood disorders are not appropriately explained,<sup>[4]</sup> but psychological

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Amin Arabshahi<sup>1</sup>,  
Abolfazi  
Mohammad-Beigi<sup>2</sup>,  
Kimia Namazi<sup>3</sup>,  
Zahra Hedari<sup>4</sup>,  
Zabihollah  
Gharlipour<sup>3</sup>

<sup>1</sup>Department of Health Education and Health Promotion, Tarbiat Modares University, Tehran, <sup>2</sup>Department of Biostatistics and Epidemiology, Neuroscience Research Center, Qom University of Medical Sciences, Qom, <sup>3</sup>Department of Health Education and Promotion, Qom University of Medical Sciences, Qom, <sup>4</sup>Department of Clinical Psychology, Islamic Azad University, Qom, Iran

**Address for correspondence:**  
Dr. Zabihollah Gharlipour,  
Department of Health Education and Promotion, Qom University of Medical Sciences, Qom, Iran.  
E-mail: gharlipourz@yahoo.com

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factors like depression and anxiety disorders have an essential role in maintaining PMDD throughout life.<sup>[11]</sup> Women suffering from PMS and PMDD are more likely to have suicidal intentions or attempts.<sup>[12]</sup> Studies have shown that women have more problems regulating their emotions.<sup>[13]</sup> Emotion regulation helps individuals manage and control their emotions during threatening situations and after a crisis.<sup>[14]</sup> Therefore, cognitive emotion regulation strategies can effectively control the symptoms.<sup>[15]</sup> The strong association between neuroticism and depression and anxiety symptoms suggests that neuroticism is positively correlated with PMDD.<sup>[11,16]</sup> Neuroticism is defined as a tendency toward experiencing negative feelings like grief, anxiety, anger, and guilt,<sup>[17]</sup> which makes it a risk factor for a wide variety of psychological disorders.<sup>[18]</sup>

A study discovered that the executive function of women suffering from PMDD in the late luteal phase was disrupted. In addition, executive function is positively correlated with emotion regulation.<sup>[19]</sup> Another study indicated that “low interest” and “difficulty concentrating” were significantly associated with neuroticism. Irritability/anger and anxiety did not demonstrate a significant relationship. The remaining affective symptomatology was also not associated with the trait despite the affective symptom requirement in DSM-5-TR for PMDD diagnosis.<sup>[20]</sup> Moreover, another study explored the neural basis of the relationship between neuroticism and emotion regulation in healthy young adults, the results of which showed that individuals with higher neuroticism have a weaker ability to regulate emotion.<sup>[21]</sup> According to a study conducted in Taiwan, premenstrual syndrome is common among college students, and lifestyle, psychiatric complications, and poor sleep quality may play a role in this disorder.<sup>[22]</sup>

Many studies have been conducted on PMS, but the studies comparing emotional regulation and controlling neuroticism in different types of premenstrual syndrome are sparse. Some studies have also been limited by a small number of participants and lack of controlling other potential confounders related to PMDD symptoms or emotional regulation.<sup>[23]</sup> Finding a sufficiently large and diverse sample of women who experience these specific issues can be difficult, which is necessary for robust research findings. The interaction between neuroticism, emotional regulation, and premenstrual syndrome involves complex psychological and physiological processes that may be challenging to measure and study. Designing studies that accurately capture the nuances of emotional regulation and neuroticism during different phases of the menstrual cycle can be methodologically challenging. Furthermore, designing studies that accurately capture the nuances of emotional regulation and neuroticism during different phases of the menstrual cycle can be methodologically challenging. In this study, neuroticism is viewed as a controlling factor. In addition, in a recent study on Qom medical students,<sup>[23]</sup> the incidence of PMS and PMDD

was 38.6% and 8%, respectively. This finding was related to different psychological symptoms and complications including decreased interest in daily activities, depression mood, fatigue/lack of energy, and difficulty concentrating. As such, this study aimed to compare emotional regulation during controlling neuroticism in different types of premenstrual syndrome in students.

## Materials and Methods

This descriptive cross-sectional study was conducted from April 2020 to the end of December 2022. The target population comprised all students at Qom University of Medical Sciences, Iran, selected using convenience sampling. Students were recruited from dormitories, sports facilities, educational settings, hospitals, and other healthcare centers. Those meeting the inclusion criteria were invited to complete questionnaires and participate in the study.

Based on the prevalence of 52% for PMS in Ramezani Tehra and Robab Allameh,<sup>[24]</sup> considering a type 1 error of 0.05 and a statistical precision of 0.05, the minimum required sample size was calculated to be 383 participants. To account for a potential 10% attrition rate, the final sample size was set at 421 participants.

**Inclusion and Exclusion Criteria:** The inclusion criteria were regular menstruation, being unmarried, absence of physical or psychological disorders, no use of hormonal drugs, and no experience of stressful events in the three months preceding the study. The exclusion criteria included unwillingness to continue participation, failure to complete the questionnaire, or incomplete responses.

The data collection tool is the questionnaire, which is comprised of four parts:

The data collection tool used in this study is a questionnaire consisting of four parts. The first part includes demographic questions covering age, field of education, menstrual age, bleeding time duration, and menstruation time duration. The second part is the Emotion Regulation Questionnaire (ERQ), developed by Gross and John,<sup>[25]</sup> comprising ten items with two subscales: re-evaluation (six items) and suppression (four items). Responses are rated on a 7-point Likert scale from strong disagreement<sup>[1]</sup> to strong agreement.<sup>[7]</sup> Scores between 1 and 10 indicate weak emotional regulation, scores between 10 and 40 indicate moderate levels, and scores above 40 indicate strong emotional regulation. The Cronbach's alpha for reliability averaged 0.79 for reappraisal and 0.73 for suppression, and this scale has been normalized in Iranian culture, with reported Cronbach's alpha values of 0.83 and 0.79, respectively.<sup>[26]</sup> The third part is the Premenstrual Symptoms Screening Tool (PSST) by Steiner *et al.* (2003), used to diagnose PMS. This tool consists of 19 items, including 14 questions about PMS symptoms (mood, behavioral, and somatic) and five questions assessing the interference of these symptoms with daily functioning. The scoring is

based on DSM-IV criteria, and participants are categorized into three groups: Healthy or suffering from mild PMS, moderate-to-severe PMS, and PMDD. Yen *et al.*<sup>[27]</sup> conducted a similar study, reporting Cronbach's alpha values of 0.95 for PMS symptoms and 0.92 for functional impact. The Persian version of this questionnaire has been officially licensed by Hariri *et al.*<sup>[28]</sup> reported a Cronbach's alpha of 0.93 and a content validity of 0.8 among Tehran students. The total score of all 19 items ranges from 0 to 57, with scores of 0-19 indicating mild PMS, 19-28 indicating moderate PMS, and above 28 indicating severe PMS. The fourth part is the NEO Five Factor Personality Inventory (NEO-FFI), a 60-item questionnaire introduced by McCrae and Costa (1985) that assesses five personality domains: neuroticism, extraversion, openness, agreeableness, and conscientiousness. In this study, only the 12 items related to neuroticism were used, scored on a five-option Likert scale ranging from completely disagree to completely agree, with some items being reverse-scored. This questionnaire is suitable for individuals aged 17 and above, and higher scores indicate higher levels of the trait. Previous research by McCrae and Costa on 208 American students reported validity coefficients between 0.83 and 0.75, while a six-year longitudinal study found coefficients ranging from 0.68 to 0.83 for neuroticism, extraversion, and openness. For agreeableness and conscientiousness, validity coefficients over two years were 0.79 and 0.63, respectively. In a study by Rena *et al.*,<sup>[29]</sup> conducted on 2,000 students from Tabriz and Shiraz universities and affiliated medical universities, the correlation coefficient of the five traits ranged from 0.56 to 0.87. Based on the scoring scale, a questionnaire score between 1 and 60 indicates weak neuroticism, between 60 and 180 indicates moderate neuroticism, and above 180 indicates severe neuroticism.

The data were analyzed using IBM SPSS Statistics, version 22 (IBM Corp., Armonk, NY, USA). The prevalence of PMS and PMDD was assessed based on the score gained in the PSST questionnaire. Then, the students were categorized into three groups: weak, intermediate, and severe. After that, the emotion regulation and neuroticism scores in the three groups were analyzed using ANOVA, Pearson correlation coefficient, and multiple regression.

### Ethical considerations

This study was approved on 2020-07-21 by the Committee of Ethics of Qom's University of Medical Sciences under the code IR.MUQ.RESEARCH.REC.1399.150. Ethical considerations were taken into account by explaining the study's goal to the participants who were voluntarily participating in the study. Each participant was assigned a code to remain anonymous in this study, respecting the confidentiality principle. The students who were willing to participate completed the questionnaire after signing an informed consent form.

## Results

The assessment of the participants shows that the average age was 22.45 (4.01) years [Table 1].

The PMS symptoms were weak in 26.6% (112 people), moderate in 34% (143), and severe in 39.4% (166).

The ANOVA test showed that the field of study positively correlates to emotion regulation regarding the correlation between the field of study and emotion regulation and control neuroticism ( $F_{4,08} = 4, p = 0.003$ ). In addition, the ANOVA test indicated a positive correlation between PMS and emotion regulation ( $F_{3,25} = 2, p = 0.04$ ) and neuroticism control ( $F_{4,22} = 2, p = 0.01$ ), while the average score for emotion regulation and neuroticism control was lower in people suffering from severe PMS [Table 2].

The Pearson correlation coefficient indicated a positive correlation between age in assessing the relation of demographic variables ( $r = 0.09, (p = 0.04)$ ), bleeding period ( $r = 0.17, (p < 0.001)$ ), and controlling neuroticism. Besides, this test showed a significant correlation between emotional regulation and control of neuroticism ( $r = 0.11, (p = 0.02)$ ) [Table 3].

The multiple regression showed that the score for emotional regulation and neuroticism control in those who had mild PMS symptoms had a significant effect, and each caused mild PMS to increase by 0.03 and 0.01, respectively ( $p < 0.05$ ) [Table 4].

## Discussion

This study aimed to compare emotional regulation during controlling neuroticism in students with different types of Premenstrual Syndrome (PMS). The findings of this study reveal that there is a significant relationship between PMS and emotional regulation. Milder PMS symptoms are observed in those who manage their emotions effectively. This study suggests that students with mild PMS exhibit better control over neuroticism. Additionally, a significant correlation was found between emotional regulation and the control of neuroticism. The current research results are consistent with those of other studies. In one study, it was reported that a positive correlation exists between women's difficulties in emotional regulation and the severity of their PMS symptoms, which aligns with the current study's findings.<sup>[13]</sup> Similarly, another research hypothesized that women with PMDD show more difficulty with emotional

**Table 1: Mean and standard deviations of demographic variables**

Demographic variables	Mean (SD)
Age	22.45 (4.01)
Menstrual age	12.8 (1.80)
Bleeding time being	5.52 (1.84)
Time for a menstruation cycle	27.51 (5.33)

SD=Standard deviation

**Table 2: The correlation between the field of study, Premenstrual Syndrome (PMS), emotion regulation, and neuroticism control (n=421)**

Demographic variables	Sample	Number M(SD)	Emotion regulation				Neuroticism control			
			Mean (SD)	F	df	p	Mean (SD)	F	df	p
Field of education	Undergraduate	305 (72.4)	194.39 (18.78)	4.08	4	p=0.003**	40.71 (17.81)	0.41	4	p=0.799
	Graduate	33 (7.8)	202.66 (19.11)				42.09 (5.56)			
	Ph.D.	5 (1.2)	169.40 (27.64)				40.60 (7.02)			
	Medical student	53 (12.6)	195.24 (18.51)				41.50 (7.29)			
	Dentistry student	25 (5.9)	190.32 (18.28)				39.92 (10.87)			
PMS	Mild	112 (26.6)	196.64 (20.0)	4.22	2	p=0.015*	42.08 (6.16)	3.25	2	p=0.040*
	Moderate	143 (34)	197.02 (17.32)				41.23 (7.54)			
	Severe	166 (39.4)	194.61 (19.13)				39.75 (8.79)			

\*Correlation is significant at the 0.05 level. \*\*Correlation is significant at the 0.01 level. \*\*\*Correlation is significant at the 0.001 level  
PMS=Premenstrual syndrome, SD=Standard deviation

**Table 3: Correlation coefficient and a significant relationship between neuroticism control, emotion regulation, and demographic variables**

	Values	Age	Menstrual age	Bleeding time duration	Menstruation time duration
Neuroticism control	p	0.04*	0.30	<0.001***	0.56
	R	0.09	0.05	0.17	0.02
Emotion regulation	p	0.77	0.89	0.86	0.43
	R	0.14	-0.00	0.00	0.03

\*Correlation is significant at the 0.05 level. \*\*Correlation is significant at the 0.01 level. \*\*\*Correlation is significant at the 0.001 level

**Table 4: The results of multiple regression for factors related to Premenstrual Syndrome (PMS)**

Column	Variable	Non-standardized beta	Standard deviation	p	Beta coefficient	Confidence interval	
						Upper limit	Lower limit
Mild	Parameter						
	Neuroticism control	0.01	0.00	0.047*	1.01	1.02	1
	Emotion regulation	0.03	0.01	0.027*	1.03	1.07	1
Moderate	Parameter						
	Neuroticism control	0.01	0.00	0.013**	1.01	1.02	1.00
	Emotion regulation	0.02	0.01	0.161	0.02	1.05	0.99

Basis: Severe PMS. \*Correlation is significant at the 0.05 level. \*\*Correlation is significant at the 0.01 level. \*\*\*Correlation is significant at the 0.001 level PMS=Premenstrual syndrome

regulation. Their results confirmed more emotional regulation deficits in the PMDD and PMS groups compared to those who did not have PMDD and PMS criteria, which is in line with the results of the present study.<sup>[30]</sup> The present study also noted that students with mild PMS scored higher on controlling the effects of neuroticism. These results of the present study are consistent with the results of another study that evaluates the relationship between PMS and some mental health variables (Neuroticism) and shows that women with PMS had significantly higher neuroticism scores.<sup>[31]</sup>

However, the results of the present study are contrary to those of another study, showing that neuroticism does not affect emotional regulation, as neurotic females experienced fluctuations in their emotional regulation success throughout their menstrual cycle.<sup>[32]</sup> Furthermore in another study,<sup>[33]</sup> participants with and without PMS did not significantly differ in their self-reported spontaneous

use of emotion-regulation strategies. This suggests that emotion regulation may not be strongly associated with the presence of PMS Emotion Dysregulation of Women with premenstrual syndrome. Moreover, based on the results of a study, the five symptoms of irritability, Affective Lability, Feeling Overwhelmed, Depression and Anxiety from the psychological symptoms of premenstrual syndrome had no significant relationship with neurotic personality traits.<sup>[20]</sup> The results of all three of these studies run counter to those of the present research. This discrepancy may be attributed to the limitations of the present study or the smaller sample size of three studies compared to the present one. Conversely, Researchers in another similar study found that adaptive emotion regulation strategies negatively correlated with neuroticism, indicating that individuals with higher neuroticism may rely on less effective emotion regulation strategies, thus supporting the results of the current study.<sup>[34]</sup> Along the same lines, another similar study revealed that neuroticism significantly predicted negative

emotional regulation, further supporting the present study.<sup>[35]</sup> Emotional regulation appears to play a critical role in the experience of PMS. Effective emotional regulation is associated with greater positive affect and well-being, potentially reducing PMS-related distress. Conversely, difficulties in emotional regulation, such as the inability to properly recognize and manage negative emotions during the premenstrual period, can lead to more severe PMS symptoms, distress, and dysfunction. Individuals with higher neuroticism may struggle more with emotional regulation, potentially leading to impulsive behaviors rather than avoidance due to problematic emotion regulation patterns. The current study found a strong link between emotional regulation and PMS, highlighting the importance of controlling neuroticism in reducing PMDD symptoms. It is suggested that medical sciences students in Qom might better manage and regulate their emotions due to effective coping mechanisms, including religious practices and community support, such as reading the Quran, attending religious ceremonies, and the overall religious environment of the university and city of Qom. This indicates that interventions aimed at improving emotional regulation skills and controlling neuroticism could be beneficial for women with PMS and PMDD.

This study has several limitations. First, the descriptive-analytical and cross-sectional nature of the research prevents establishing causal relationships between variables, and thus, the findings should be interpreted with caution. Second, the use of non-probability sampling may limit the generalizability of the results to the broader population, as the study was conducted solely among students of Qom University of Medical Sciences. This may introduce a potential bias influenced by the specific cultural and social environment of the participants. Third, the sample size and target population may not fully capture important aspects of the relationship between emotional regulation, neuroticism, and PMS. Future studies can address these limitations by incorporating random sampling methods and including diverse populations with different educational levels and age groups.

Despite these limitations, this study has notable strengths. One of its key strengths is the sufficient sample size, which enhances the robustness of its findings. Additionally, the study provides a comparative analysis of emotional regulation and neuroticism control across different types of PMS, contributing valuable insights to the literature.

## Conclusion

Based on the findings of the current study, there was a significant relationship between emotion regulation, neuroticism, and PMS control. The multiple regression results showed that the neuroticism controlling score significantly affected the score of those who had moderate PMS symptoms, and emotion regulation and neuroticism control in those with mild PMS symptoms had a significant

impact. Since PMS can lead to adverse effects on people's quality of life, psychologists and psychiatrists should provide the necessary training to improve this syndrome in regulating emotions and controlling the impact of neurosis. The results of this study emphasized the need for health education programs about PMS in all educational organizations by healthcare specialists, where health education programs aimed to improve the level of female students' knowledge about the psychological factors of emotion regulation and neuroticism control in schools and universities. This study calls for the necessity for politicians to have PMS in mind as one of the routine healthcare factors for women.

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## Conflicts of interest

Nothing to declare.

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