Original Article

Awareness, Prevalence, and Coping Measures of Premenstrual Dysphoric Disorder Among Female University Students in Riyadh

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ABSTRACT

Background: Premenstrual dysphoric disorder (PMDD) is a debilitating form of premenstrual syndrome that significantly disrupts daily life. Given its profound impact on quality of life, understanding its prevalence and awareness is essential. This study aimed to assess the awareness, prevalence, and coping strategies related to PMDD among female university students in Riyadh, Saudi Arabia.
Methods: A cross-sectional study was conducted on 896 participants aged 18-25 years, recruited from various universities through convenience sampling. Data were collected via an online survey consisting of 25 items that included socio-demographic information, menstrual history, physical activity, diet, and PMDD symptoms assessed by the Premenstrual Symptoms Screening Tool (PSST). The survey also evaluated participants' awareness of PMDD and their coping measures. Ethical approval was obtained from the Princess Nourah Bint Abdulrahman University Institutional Review Board.
Results: In total, 39.9% of participants met the criteria for PMDD, with 43.1% being health college students. Notably, 58.5% reported prior knowledge of PMDD. Coping strategies included normalization and awareness was 36.4% and frequently recognizing physical and emotional changes was 37.5%.
Conclusion: PMDD is prevalent among the female university students in Riyadh, Saudi Arabia. Also, there is a notable level of awareness regarding PMDD among the participants. This underscores the need for enhanced health education and clinical recognition of PMDD in this population.

Keyword: Premenstrual dysphoric disorder; premenstrual syndrome; female college student.

Introduction

Menstruation and female sexuality are often subjects of stigma in many cultures [1]. This social stigma leads to a culture of silence surrounding menstrual health, causing many women to endure the negative implications of conditions like premenstrual dysphoric disorder (PMDD) without seeking help [2].

PMDD is a severe manifestation of premenstrual disorders that can have profound effects on women's overall quality of life. Failure to address PMDD can potentially escalate to depression or even suicidal tendencies in extreme cases [2]. In contrast to premenstrual syndrome (PMS), which affects over

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Half of women with mild emotional and physical symptoms occurring in the lead-up to menstruation. PMDD is defined by more intense and debilitating symptoms [3]. PMS typically results in discomfort that, while distressing, does not severely impair one's quality of life. In comparison, PMDD encompasses a range of physical, cognitive, behavioral, and psychological changes that arise during the luteal phase of the menstrual cycle and dissipate post-menstruation [4]. Common PMDD symptoms include difficulty concentrating, fatigue, appetite changes, disrupted sleep patterns, and various physical complaints like breast tenderness, headaches, and bloating [2]. The etiological factors for PMDD remain largely ambiguous, but research suggests a biopsychosocial framework influencing its manifestation [5]. Studies indicate that hormonal fluctuations during the menstrual cycle may heighten central nervous system sensitivity, resulting in symptomatology characteristic of PMDD [5]. Epidemiological studies revealed that 5%-8% of ovulating women experience moderate to severe premenstrual symptoms, with estimates suggesting as many as 20% of women of reproductive age may have clinically significant concerns [6]. Notably, the International Association for Premenstrual Disorders estimates a global prevalence of PMDD at approximately 5.5% among reproductive-age women [7]. Regionally, variations in PMDD prevalence are significant [3]. A study conducted in Egypt found that 21.1% of female university students experienced PMDD [5], while lower rates of 5.6% in Kuwait [8], and 16% in the UAE highlight the disparity across regions [9]. A study at Umm Al-Qura University in Makkah revealed a PMDD rate of 36.6% among 183 medical students [10]. Similarly, findings from King Faisal University indicated a prevalence of 12.5% [11]. This current study aims to investigate the awareness, prevalence, and coping mechanisms related to PMDD among female university students in Riyadh, Saudi Arabia.

Methods

The study was conducted in Riyadh, Saudi Arabia, to define the prevalence and awareness of premenstrual dysphoric disorder (PMDD) among female university students. The research was conducted across multiple university campuses, including both public and private institutions. The study targeted female university students aged 18-25 years, who were enrolled in degree programs in Riyadh due to the common onset of PMDD symptoms during reproductive years. To determine the minimum sample size necessary for achieving a power of 80% and a confidence level of 95%, we employed the following formula for sample size calculation in studies involving proportions:

[n = \frac{Z^2 \cdot p \cdot (1 - p)} {E^2}]

In this equation, (n) represents the required sample size, (Z) is the Z-value corresponding to the desired confidence level (approximately 1.96 for 95% confidence), (p) is the estimated proportion of the population (with a conservative estimate of 0.5 applied when the true proportion is unknown), and (E) indicates the margin of error, typically set at 0.05 for this confidence level. Based on these calculations, an initial sample size of 610 participants was determined as necessary. To accommodate potential challenges such as non-responses and dropouts, the sample size was increased to 700 participants. This adjustment aimed to ensure the study's reliability and enhance the findings' generalizability to the broader population of female university students. We recruited a total of 896 female university students, further exceeding the original sample size target to enhance the statistical power of the analyses conducted, allowing for more robust and reliable conclusions. Also, larger sample size helps to mitigate the impact of outliers and variability in responses, resulting in more precise estimates. Participants were recruited using a convenience sampling method, which involved reaching out to relatives and friends of the researchers and inviting them to participate. The survey was hosted on Google Forms, facilitating widespread distribution and encouraging participation from a diverse group of female university students aged 18 to 25 across various universities in Riyadh. DSM-5 criteria was employed for diagnosing Premenstrual Dysphoric Disorder (PMDD) to systematically assess and evaluate participants' symptoms. A cohort of women was recruited based on self-reported menstrual cycles, and those exhibiting symptoms consistent with PMDD were identified for further analysis. Each participant completed a structured diagnostic interview that included a review of symptoms reflective of the DSM-5 criteria. Symptoms were assessed based on their occurrence during the luteal phase of the menstrual cycle, and presence of at least five qualifying symptoms was required for diagnosis. Participants also completed the Premenstrual Symptoms Screening Tool (PSST), which allowed for a quantitative scoring of symptom severity and its impact on daily functioning. Additionally, prospective daily ratings were utilized over two consecutive menstrual cycles to confirm the cyclic nature of the symptoms, ensuring that they substantially aligned

with the DSM-5 diagnostic requirements. Data was collected using a structured questionnaire designed to assess awareness of PMDD in female university students in Riyadh. The questionnaire covered socio-demographic data, obstetrics and gynecology (OBGYN)/menstrual history, physical activity and lifestyle, diet/nutrition, the Premenstrual Symptoms Screening Tool (PSST) [12] for PMDD, awareness of PMDD, and coping measures.

Ethical Considerations: Prior to participation, all students were provided with detailed information regarding the study's purpose, procedures, risks, and benefits. We emphasized their right to withdraw from the study at any time without any penalty. Confidentiality was strictly maintained, and personal identifiers were removed from data to protect participants' privacy. This transparent approach fostered trust and encouraged students to participate voluntarily. Ethical Approval: IRB Registration Number with KACST, KSA: HAP-01-R-059

Statistical Analysis

To analyze the collected data, we employed various statistical tests to assess the relationships and differences among variables. Descriptive statistics were first utilized to summarize the demographic characteristics of the participants. For comparisons between groups, we used t-tests and chi-square tests. Additionally, regression analysis was conducted to explore the predictive relationships among variables of interest, enabling us to draw meaningful conclusions from the data. The significance level set for our analyses was 0.05 (5%). This threshold is commonly accepted in social sciences and indicates that we would only reject the null hypothesis if the probability of observing our results, assuming the null hypothesis is true, was less than 5%. This level aimed to balance between Type I and Type II errors, ensuring the reliability of our findings. For data analysis, we utilized the Statistical Package for the Social Sciences (SPSS), a comprehensive software tool widely used in research for statistical testing and data management. SPSS facilitated the organization, analysis, and interpretation of the data efficiently, allowing us to conduct various statistical tests and generate reports that supported our research objectives.

Results

The study included 896 participants, with an average age of 20.45±1.79 years. Most respondents were from Health Colleges (62.2%), while 37.8% were from non-Health Colleges. The majority of participants had never married (96.5%), with only 3.5% having been married. The average age of menarche was 12.63±1.59 years, and most participants reported having regular menstrual cycles (71.1%) and regular flow (78.1%), while 28.9% experienced irregular cycles and 14.8% reported heavy flow (Table 1). A total of approximately 40% of participants were found to have premenstrual dysphoric disorder (Figure 1). The most frequently reported severe symptoms were fatigue/lack of energy at 50%, followed by physical symptoms such as breast tenderness, headaches, joint/muscle pain, bloating, and weight gain at 50%, and depressed mood/feelings of hopelessness at 49%. On the other hand, the most commonly reported moderate symptoms included anger/irritability at nearly 29%, followed by physical symptoms such as breast tenderness, headaches, joint/muscle pain, bloating, and weight gain at about 28%, and decreased interest in work activities at approximately 28%. The most frequently reported mild symptoms were difficulty concentrating at 28%, followed by anxiety/tension at 26%, and insomnia at around 26%. The least frequently reported symptoms categorized as 'not at all' were insomnia at 38%, followed by feeling overwhelmed or out of control at approximately 32%, and overeating/food cravings at about 22% (Table 2). Regarding productivity and work efficiency, the majority of respondents reported mild interference at approximately 36%, followed by moderate, severe, and no interference. When examining relationships with coworkers, both mild interference and no interference were reported equally at about 32%. For family relationships, nearly 30% of the respondents indicated moderate interference, while social activities were reported to be moderately affected by around 31% of participants. In terms of severe interference with home responsibilities, a significant portion of participants, about 27%, reported this impact, followed by approximately 25% citing interference in family relationships. Additionally, around 22% reported interference in social activities, nearly 21% noted impacts on work efficiency, and about 13% expressed interference in their relationships with coworkers (Table 3). In (Table 4), 58.5% of the participants found to be aware and knowledgeable about PMDD. On the contrary, 41.5% were unaware of PMDD. (Table 5) shows the association between experiencing PMDD and the demographic characteristics of the respondents. A significant difference between students having PMDD and being a Health Colleges and student not having health college nor PMDD was found ($p= 0.02$). Another significant difference between students having PMDD and student not having PMDD regarding flow of

menstruation (p= 0.05) was found. (Table 6) shows that the only significant difference between students having PMDD and student not having PMDD was found regarding flow of menstruation (P = 0.04), 78.9% (N=105). (Table 7) in terms of avoidance strategies, approximately 25% of respondents felt that avoidance did not apply to them, while about 29% sometimes utilized avoidance. Among women, around 29% occasionally avoided upsetting situations, and approximately 17% did so rarely. Regarding cognitive strategies, nearly 28% reported not challenging negative thoughts, while about 26% indicated that they do so sometimes. When it comes to mood swings, around 27% of women sometimes accepted them, while about 20% accepted them rarely. Additionally, roughly 33% viewed premenstrual changes as temporary, whereas only about 11% did not. In terms of normalization, approximately 35% found it normal to feel different premenstrually, and about 36% noticed physical changes, while around 9% were unaware of them. For emotional sensitivity, about 36% considered increased emotions to be normal, while approximately 9% did not. Similarly, around 38% recognized emotional changes, and about 37% perceived premenstrual changes as typical for women. Furthermore, approximately 35% acknowledged that other women share similar experiences, compared to about 7% who did not. Respondents reported various support and expression strategies, with around 27% often recognizing how to support themselves, while about 12% did not. Additionally, approximately 25% indicated that they do not express their feelings through emotional reactions, while about 23% sometimes do. Regarding social and physical adjustments, around 27% sometimes limited social activities, and about 29% sometimes focused less on others' needs. In terms of exercise, approximately 54% did not increase their activity during the premenstrual period, and about 49% did not reduce their intake of sugary foods. Furthermore, around 26% reported not engaging in relaxation activities such as massage or reading, while about 38% lacked confidence in expressing their needs or feelings, with approximately 18% sometimes feeling confident.

Discussion

In our study, the prevalence of PMDD among female university students in Riyadh, Saudi Arabia was found to be 39.9% (N=360), (explained in results and methodology) as determined by the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V). Further examination of the prevalence of PMDD in other Saudi universities reveals a varied landscape. For instance, in King Faisal University prevalence was 12.5% [11], while in Um Al-Qura University prevalence rate was 36.6% [10]. In contrast, in Tabuk University a notably high prevalence was reported, 57.3% [13]. Internationally, a study conducted in Egypt with a sample of 755 students revealed a PMDD prevalence rate was 21.1% [5]. Additionally, lower prevalence rates have been documented in neighboring countries, with Kuwait reporting 5.6% [8], and the UAE 16.4% [9]. (The references were edited) In India and South Africa, the prevalence rates were both reported at 10.2% [14, 15]. These variations highlight the need for further research to understand the factors contributing to the differing prevalence rates across regions. Interestingly, our study revealed that 43.1% (N=240) of the participants who screened positive for PMDD were health college students. Previous studies focusing on medical students have produced varying results. For example, a study in India involving 661 participants found a PMDD prevalence of 4.43% [16]. Other studies from India reported rates of 11.11% [17], 12% [18], and 37%. [19]. A study conducted in Nepal reported a prevalence of 3.8% among medical students [20]. While sample size differences could account for some of the discrepancies, the elevated prevalence among Health College students may be attributed to the heightened psychosocial stress associated with the healthcare profession [21]. Moreover, our findings indicated that 48.9% of participants with heavy menstrual flow exhibited symptoms consistent with PMDD, with a statistically significant relationship (P value 0.05). This observation aligns with research conducted by Abdeta et al. [22], which found that female students experiencing heavy menstrual flow had 2.53 times higher odds of having PMDD compared to those with minimal menstrual flow. The correlation suggests that heavy menstrual flow may predispose individuals to premenstrual symptoms, potentially due to its interference with daily activities and the stress it may induce. In terms of awareness, our study found that over half of the participants (58.5%, N=524) were aware with PMDD, while 41.5% (N=372) had unaware of the disorder. In our study, 36.4% (N=326) reported being often aware of their physical changes, while 37.5% (N=336) acknowledged emotional fluctuations during the premenstrual period. Furthermore, 34.8% (N=312) of respondents frequently perceived these changes as normal, with 36.2% (N=324) specifically recognizing heightened emotional sensitivity as a typical premenstrual

Table 1: The demographic and health related data of the studied female university students in Riyadh, Saudi Arabia.

Variable		NO.	Frequency
Marital status	Never married	865	96.5
	Ever married	31	3.5
College	Health	557	62.2
	Non-health	339	37.8
Physical status	Insufficient	691	77.1
	Sufficient	205	22.9
Diet	Excellent	40	4.5
	Good	195	21.8
	Fair	269	30.0
	bad	392	43.7
Menarche			
Regularity of cycle	Regular	637	71.1
	Irregular	259	28.9
Flow	Heavy	133	14.8
	Regular	700	78.1
	Low	63	7.0
Age (20.45 ± 1.79)			
Age of Menarche (12.63 ± 1.59)			

Table 2: Premenstrual Dysphoric Disorder (PMDD) female university students' symptoms screening in Riyadh, Saudi Arabia.

	PMDD symptoms	Not at all	Mild	Moderate	Severe
1	Anger/irritability Marked affective	93	210	259	334
		(10.4%)	(23.4%)	(28.9%)	(37.3%)
2	Anxiety/tension	132	234	243	287
		(14.7%)	(26.1%)	(27.1%)	(32%)
3	Tearful/increased sensitivity to rejection	106	132	236	422
		(11.8%)	(14.7%)	(26.3%)	(47.1%)
4	Depressed mood/feelings of hopelessness	80	148	228	440
		(8.9%)	(16.5%)	(25.4%)	(49.1%)
5	Decreased interest in work activities	101	192	250	353
		(11.3%)	(21.4%)	(27.9%)	(39.4%)
6	Decreased interest in-home activities	99	190	228	379
		(11%)	(21.2%)	(25.4%)	(42.3%)
7	Decreased interest in social activities	105	200	245	346
		(11.7%)	(22.3%)	(27.3%)	(38.6%)
8	Difficulty concentrating	192	246	234	224
		(21.4%)	(27.5%)	(26.1%)	(25%)
9	Fatigue/lack of energy	51	165	231	449
		(5.7%)	(18.4%)	(25.8%)	(50.1%)
10	Overeating/food cravings	196	216	213	271
		(21.9%)	(24.1%)	(23.8%)	(30.2%)
11	Insomnia	336	231	161	168
		(37.5%)	(25.8%)	(18%)	(18.8%)
12	Hypersomnia (needing more sleep)	127	166	218	385
		(14.2%)	(18.5%)	(24.3%)	(43%)

13	Feeling overwhelmed or out of control	289	200	180	227
		(32.3%)	(22.3%)	(20.1%)	(25.3%)
14	Physical symptoms e.g., breast tenderness, headaches, joint/muscle pain, bloating, weight gain	64	132	252	448
		(7.1%)	(14.7%)	(28.1%)	(50%)

Table 3: The relation between premenstrual dysphoric disorder (PMDD) symptoms severity and daily activities of the female university students in Riyadh, Saudi Arabia.

	Daily activities	Not at all	Mildly	Moderately	Severely
A	Your work efficiency or productivity	120 (13.4%)	320 (35.7%)	267 (29.8%)	189 (21.1%)
B	Your relationships with co-workers	283 (31.6%)	283 (31.6%)	215 (24%)	115 (12.8%)
C	Your relationships with your family	155 (17.3%)	249 (27.8%)	264 (29.5%)	228 (25.4%)
D	your social activities	147 (16.4%)	272 (30.4%)	279 (31.1%)	198 (22.1%)
E	Your home responsibilities	145 (16.2%)	258 (28.8%)	252 (28.1%)	241 (26.9%)

Table 4: Awareness of premenstrual dysphoric disorder (PMDD) among female university students in Riyadh, Saudi Arabia.

Awareness	**No.**	**%**
Aware	524	58.5%
Unaware	372	41.5%

Table 5: The association between the socio-demographic, physical status, diet, and menstrual data of the studied female university students with and without PMS in Riyadh, Saudi Arabia.

Variable		Not. PMDD N. (%)	PMDD N. (%)	P value
Marital status	Never married	521 (60.2)	344 (39.8)	0.19
	Ever married	15 (48.4)	16 (51.6)	
College	Health	317 (56.9)	240 (43.1)	0.02*
	Non-health	219 (64.6)	120 (35.4)	
Physical status	Insufficient	410 (59.3)	281 (40.7)	0.59
	Sufficient	126 (61.5)	79 (38.5)	
Diet	Excellent	28 (70)	12 (30)	0.21
	Good	122 (62.6)	73 (37.4)	
	Fair	165 (61.3)	104 (38.7)	
	bad	221 (56.4)	171 (43.6)	
Regularity of cycle	Regular	392 (61.5)	245 (38.5)	0.10
	Irregular	144 (55.6)	115 (44.4)	
Flow of the menarche	Heavy	68 (51.1)	65 (48.9)	0.05*
	Regular	433 (61.9)	267 (38.1)	
	Low	35 (55.6)	28 (44.4)	
		Not. PMDD	PMDD	
Age (20.45 ± 1.79)				0.34
Age of Menarche (12.63 ± 1.59)				0.81

Table 6: The association between the socio-demographic, physical status, diet, and menstrual data among female university students with and without PMS in Riyadh, Saudi Arabia.

Variable		No PMS N. %	PMS N. %	P value
Marital status	Never married	267 (30.9)	598 (69.1)	0.17
	Ever married	6 (19.4)	25 (80.6)	
College	Health	167 (30)	390 (70)	0.69
	Non-health	106 (31.3)	233 (68.7)	
Physical status	Insufficient	202 (29.2)	489 (70.8)	0.14
	Sufficient	71 (34.6)	134 (65.4)	
Diet	Excellent	16 (40)	24 (60)	0.06
	Good	70 (35.9)	125 (64.1)	
	Fair	83 (30.9)	186 (69.1)	
	bad	104 (26.5)	288 (73.5)	
Regularity of cycle	Regular	203 (31.9)	434 (68.1)	0.15
	Irregular	70 (27)	189 (73)	
Flow of the menarche	Heavy	28 (21.1)	105 (78.9)	0.04*
	Regular	226 (32.3)	474 (67.7)	
	Low	19 (30.2)	44 (69.8)	
Age (20.45 ± 1.79)				0.65
Age of Menarche (12.63 ± 1.59)				0.11

Table 7: Coping strategies used by female students during the premenstrual period.

What you do in the premenstrual period.	**Doesn't apply to me**		**It rarely applies to me**		**Applies to me sometimes**		**Applies to me often**		**Mostly applies to me**	
	N	%	N	%	N	%	N	%	N	%
1. Avoid situations, people or conversations that could make me angry e.g., avoid dealing with Family matters.	224	25.0%	153	17.1%	255	28.5%	162	18.1%	102	11.4%
2. Avoid situations in which I know I will feel upset.	154	17.2%	148	16.5%	261	29.1%	211	23.5%	122	13.6%
3. Challenge my negative thoughts.	247	27.6%	213	23.8%	231	25.8%	143	16.0%	62	6.9%
4. Accept my mood swings.	147	16.4%	180	20.1%	243	27.1%	222	24.8%	104	11.6%
5. Realize that premenstrual changes are temporary.	95	10.6%	121	13.5%	172	19.2%	293	32.7%	215	24.0%
6. Think it's normal to feel different during pre-menstruation.	98	10.9%	108	12.1%	186	20.8%	312	34.8%	192	21.4%
7. Aware of physical changes.	82	9.2%	101	11.3%	180	20.1%	326	36.4%	207	23.1%
8. Think it's normal to be more emotional or sensitive around the premenstrual period.	79	8.8%	99	11.0%	155	17.3%	324	36.2%	239	26.7%
9. Realize my emotional changes.	75	8.4%	110	12.3%	162	18.1%	336	37.5%	213	23.8%
10. Believe that the changes I experience before period are a normal part of the woman's experience.	76	8.5%	93	10.4%	153	17.1%	335	37.4%	239	26.7%
11. Know other women are going through this.	62	6.9%	87	9.7%	144	16.1%	312	34.8%	291	32.5%

12. Think its normal for my physical needs to be different.	68	7.6%	97	10.8%	161	18.0%	325	36.3%	245	27.3%
13. Realize what I need to do to support myself.	106	11.8%	175	19.5%	228	25.4%	238	26.6%	149	16.6%
14. Express my feelings through emotional reactions.	228	25.4%	205	22.9%	209	23.3%	157	17.5%	97	10.8%
15. Limit my social activities.	157	17.5%	211	23.5%	237	26.5%	188	21.0%	103	11.5%
16. Focus less on the needs of others.	198	22.1%	200	22.3%	256	28.6%	167	18.6%	75	8.4%
17. Exercise more.	479	53.5%	211	23.5%	126	14.1%	61	6.8%	19	2.1%
18. Eat less sugary foods.	443	49.4%	184	20.5%	160	17.9%	74	8.3%	35	3.9%
19. Spend my time doing things that help relax (e.g., massage and reading books)	236	26.3%	190	21.2%	219	24.4%	171	19.1%	80	8.9%
20. Feel confident telling people what I Need or how I feel.	337	37.6%	188	21.0%	162	18.1%	140	15.6%	69	7.7%

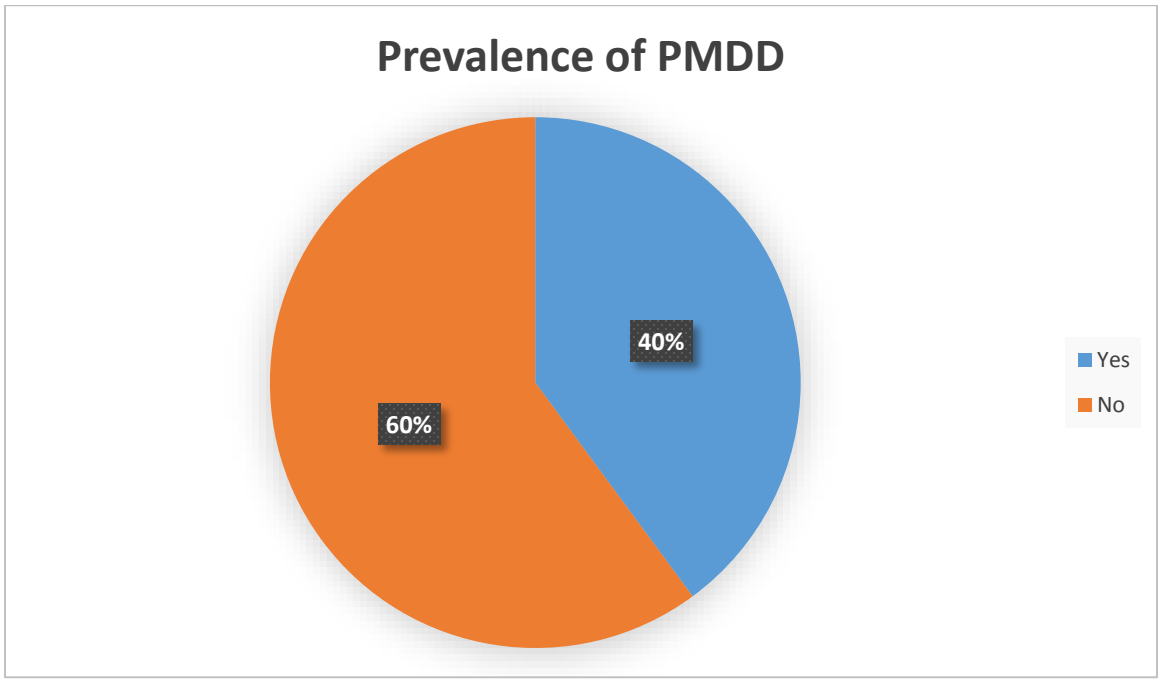

Figure 1: Prevalence of PMDD among study participants.

Experience. In addition, avoidance of conflict and stressful situations emerged as a notable coping mechanism. So, 28.5% (N=255) of participants indicated that they sometimes employed this strategy, while 29.1% (N=261) avoided known upsetting situations, and 17.2% (N=154) reported rarely using this approach. These findings align with a study from Turkey, which similarly identified normalization and stress avoidance as effective coping strategies for premenstrual symptoms [23].

Strength and limitation: The current study contributes valuable insights into the prevalence, awareness, and coping strategies associated with premenstrual dysphoric disorder (PMDD) in Saudi Arabia. However, it focusses on female college students in Riyadh, Saudi Arabia, which presents limitations regarding the generalizability of its findings to all females' group and those in childbearing period. Future research should aim to encompass a broader demographic of females to better estimate PMDD prevalence and coping mechanisms across various populations. Expanding the scope of these studies will enhance understanding and inform targeted interventions to support women experiencing premenstrual symptoms effectively.

Conclusion

According to this study results, PMDD is prevalent (39.9%) among the studied female university students in Riyadh, Saudi Arabia, as they met the criteria for PMDD. Also, there is considerable awareness (58.5%) of PMDD among the participants. However, despite the large number of female students who fit the PMDD diagnostic criteria. Ther is a significant need to pay attention on the importance of recognition and formal clinical diagnosis. Also, there is an underscoring the need for increased clinical awareness and diagnostic efforts to ensure those suffering from PMDD receive appropriate medical attention and support.

Conflict of Interest

None

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None

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