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HEALTH PSYCHOLOGY | RESEARCH ARTICLE

Correlates of premenstrual dysphoric disorder among female university students

Rizwana Roomaney^{1*} and Ashley Lourens¹

Abstract: We investigated dysmenorrhea, rumination, substance use and perceived stress as predictors of PMDD among women. We used a cross-sectional design and convenience sampling to recruit participants at a university in South Africa. A total of 1329 female students participated in the study. Data was collected using an online survey. Participants completed a demographic questionnaire, Premenstrual Screening Tool, Drug Use Disorders Identification Test, Adapted Ruminative Response Scale, Menstrual Symptom Questionnaire, and the Perceived Stress Scale. Descriptive analysis, correlations and logistic regression analysis were conducted using Statistical Package for the Social Sciences. A total of 135 participants screened positive for PMDD symptoms, indicating a prevalence rate of 10.2% for PMDD symptoms. The model predicted 90% of the cases correctly. Congestive dysmenorrhea, brooding, reflection and worry were identified as significant predictors of positive PMDD symptoms. Oral contraceptive use, spasmodic dysmenorrhea, perceived stress and drug use were not significant predictors. We recommend the development of a CBT based intervention targeting rumination in women with PMDD and education-based interventions regarding dysmenorrhea and PMDD among university students.

Subjects: Mental Health; Health Psychology; Sexual and Reproductive Health

Keywords: Premenstrual dysphoric disorder; premenstrual symptoms; menstruation; dysmenorrhea; rumination; female students

ABOUT THE AUTHORS

Dr Rizwana Roomaney is a research psychologist and lecturer in the Psychology Department at Stellenbosch University. She is an experienced lecturer and supervisor with an interest in health psychology, psychometry and research methodology. She is particularly interested in women's health and reproductive health and is primary investigator on several research projects. Dr Roomaney is part of several boards and committees and is the National delegate for South Africa at the European Health Psychology Society.

Ms Ashley Lourens hold an honours degree in psychology from Stellenbosch University. She has an interest in reproductive health and women's mental health, stemming from her own experiences with premenstrual dysphoric disorder. Ms Lourens currently works with families who have special needs and intends pursuing a career in clinical psychology.

PUBLIC INTEREST STATEMENT

Premenstrual dysphoric disorder (PMDD) is a mood disorder that occurs among women 6 to 10 days before menstruation (American Psychiatric Association, 2013). We surveyed 1329 female university students and found that 10.2% screened positive for PMDD symptoms. Furthermore, we found that congestive dysmenorrhea, brooding, reflection and worry were significant predictors of positive PMDD symptoms. We recommend the development of a CBT based intervention targeting rumination in women with PMDD and education-based interventions regarding dysmenorrhea and PMDD among university students.

1. Background

Premenstrual dysphoric disorder (PMDD) is a mood disorder understood to be triggered by hormonal changes that occur 6–10 days prior to menstruation (American Psychiatric Association, 2013). Estimates for the prevalence of PMDD range between 1.3% and 8% (American Psychiatric Association, 2013; Cunningham et al., 2009; Halbreich, 2003; Tschudin et al., 2010; Yonkers & Simoni, 2018). Symptoms may be related to mood and behaviour (e.g. irritability, depressed mood and tension) or be somatic in nature (e.g. breast tenderness and bloating) (Cunningham et al., 2009). PMDD symptoms negatively influence women's interpersonal and romantic relationships, work and academic performance and more (American Psychiatric Association, 2013; Halbreich, 2003; Hardy & Hardie, 2017; Matsumoto et al., 2013; Sharma & Gupta, 2016). Premenstrual disorders have a high comorbidity with anxiety and depressive disorders (Craner et al., 2014). Genetics factors, psychosocial factors and central nervous system sensitivity to reproductive hormones have been identified as contributors to PMDD (Hantsoo & Epperson, 2015).

Our aim was to identify predictors of PMDD among a sample of university students. The identification of significant predictors of PMDD may provide the impetus for the development of appropriate interventions. Furthermore, by studying this phenomenon among university students, we are able to gain a deeper understanding of PMDD relatively early in the reproductive lifespan on women, which can lead to early intervention. We investigated the correlation of several variables, namely dysmenorrhea, rumination, substance use and perceived stress as predictors of PMDD.

1.1. Dysmenorrhea

Dysmenorrhea is the most common gynaecological disorder in women and refers symptoms, such as abdominal cramping and pain associated with menstruation (Harada, 2013; Iacovides et al., 2015). Physicians and researchers categorise dysmenorrhea as either primary (i.e. having no underlying pathology) or secondary (i.e. associated with underlying pathology such as endometriosis) (Harada, 2013). In their seminal work, Nelson and colleagues (Nelson et al., 1984) further differentiated between congestive and spasmodic dysmenorrhea. Congestive dysmenorrhea (CD) is associated with premenstrual syndrome and typically occurs for several days prior to menstruation, whereas spasmodic dysmenorrhea (SD) occurs during the first two days of menstruation. Moreover, CD is characterized by dull aching pains, feelings of heaviness, irritability, lethargy, constipation, whereas SD is characterised by acute, spasmodic pain, occurring primarily in the lower abdomen, lower back and inner thighs, diarrhoea, nausea and vomiting.

The prevalence of dysmenorrhea among university students is high. Research assessing the prevalence of these symptoms among university students in Uganda, Israel and Spain report prevalence rates ranging between 76% and 86% (Fernandez-Martinez et al., 2018; Nakame et al., 2018; Yacubovich et al., 2019).

Studies also indicate a relationship between dysmenorrhea, mental health and well-being. A recent systematic review found that few studies had investigated relationship between dysmenorrhea and most psychological disorders and called for future research to investigate relation between most psychological disorders with primary dysmenorrhea (Bajalan et al., 2019). Dysmenorrhea negatively impacted students' quality of life, university attendance, social participation, interpersonal relationships and participation in sports (Al-Jefout et al., 2015; Gagua et al., 2013; Sahin et al., 2018). We hypothesised that there would be a significant, positive relationship between symptoms of dysmenorrhea and PMDD.

1.2. Rumination

Rumination refers to the repetitive and passive focus on the causes, symptoms, meanings and consequences of depression and is considered a maladaptive strategy (Nolen-Hoeksema, 1991). Ruminative thinking is a strong risk factor for depression and anxiety (Aldao et al., 2010) and

features in several other disorders such as generalized anxiety disorder, eating disorders, and social anxiety (Ehring & Watkins, 2008; Nolen-Hoeksema & Watkins, 2011).

Rumination has been associated in PMS and PMDD. Premenstrual disorders and psychological disorders share similar characteristics such as irritability, loss of interest, social withdrawal etc. (S. Sigmon et al., 2012). According to the menstrual reactivity hypothesis, rumination may occur monthly due to expectation about changes associated with the menstrual cycle. Premenstrual symptoms are influenced by both physiological sensations and cognitive processes (S. T. Sigmon et al., 2009). Several studies implicate rumination as an important factor in the development and maintenance of PMS and PMDD (Craner et al., 2014; S. T. Sigmon et al., 2009).

1.3. Drug use

There is a high prevalence of substance use among patients with mood disorders (Tolliver & Anton, 2015). To complicate matters, substance use disorders and mood disorders commonly co-occur (Pettinati et al., 2013). For example, depressive symptoms were associated with drug use among female adolescents, indicating that female adolescents may resort to drug use to manage their symptoms (Magidson et al., 2017). Drug use may be adopted as a maladaptive coping strategy during distressing times such as the premenstrual phase of a woman's cycle. While some have hypothesised that alcohol consumption increases among women in the week prior to menstruation, a review of 13 studies failed to reach a conclusion due to methodological differences in the studies (Carroll et al., 2015). More research on this is therefore warranted. We hypothesised that drug use would be associated with symptoms of PMDD, as it may be used as a coping strategy.

1.4. Perceived stress

Finally, perceived stress may also play a role in developing and maintaining symptoms of PMDD. Perceived stress is defined as an individual's thoughts or feelings about the magnitude of stress that they experience either at one given point in time or over a given time period (Phillips, 2013). An integrative review of 48 studies demonstrated the complex relationship between stress and PMS/PMDD. The researchers concluded that stress was a predictor or risk factor for developing or worsening premenstrual symptoms, a consequence of premenstrual symptoms, correlated with premenstrual symptoms and was a possible moderator (Lee & Im, 2016)

Research on the relationship between PMDD and perceived stress is less substantial. However, the research does indicate a relationship between PMDD and perceived stress (Del Mar Fernández et al., 2019; Petersen et al., 2017). We hypothesized that perceived stress would predict PMDD in our sample.

2. Method

2.1. Design and procedures

We used a cross-sectional design and convenience sampling to recruit participants at a university in South Africa. After obtaining university ethical approval, emails were sent to all female students at the university inviting them to participate in the study by completing an online survey. The survey was hosted on the university's online data collection platform. Students interested in learning more about the study could be redirected to this website by clicking on a unique uniform resource locator (URL).

The first page contained information about the study, including the inclusion and exclusion criteria. The inclusion criteria were as follows: only female students; above the age of 18. Staff and male students were excluded from the study. Participants who consented were directed to the battery of measures. Students were incentivised to participate with a chance to win a spa voucher.

2.2. Measures

The battery of measures consisted of a demographic questionnaire and measures of dysmenorrhea, rumination, drug use and perceived stress.

2.2.1. Demographic questionnaire

The demographic questionnaire asked participants to report several personal characteristics including their age, year of study, age of menarche, previous diagnosis of PMDD, and oral contraceptive use.

2.2.2. Premenstrual symptoms screening tool

We used the Premenstrual Symptoms Screening Tool (PSST) to assess symptoms of PMDD (Steiner et al., 2003). The measure contains 19 items representing symptoms of PMDD (e.g. depressed mood, irritability) and responses are recorded on a Likert scale with four responses (“not at all”, “mild”, “moderate” and “severe”). The PSST is not a diagnostic tool for PMDD (Câmara et al., 2017) but can be used for screening. There are three criteria that must be met for a positive screening. First, a participant must select “severe” for at least one of the items indicating (1) irritability, (2) anxiety, (3) increased sensitivity to rejection, or (4) depressed mood. Second, a participants must select moderate to severe in a subset of 11 items. Finally, severe must be selected in a subset of 5 items. The PSST has demonstrated good reliability and validity in several studies (Câmara et al., 2017; Craner et al., 2014; Sassoon et al., 2011; Tschudin et al., 2010). In the present study the internal validity of the scale was high, with a Cronbach’s $\alpha = .94$.

2.2.3. Drug use disorders identification test

The DUDIT was used to assess drug use. DUDIT consists of 11 items that assess drug use using a Likert scale. Items related to substance use issues such as polydrug use, loss of control, guilt, etc. (Berman et al., 2004). High scores on the DUDIT indicate more drug use, whereas low scores on the measure indicate less drug use. In the present study, the DUDIT scale had a Cronbach’s $\alpha = .86$.

2.2.4. Adapted ruminative response scale

The Adapted Ruminative Response Scale (aRRS) measures ruminative style thinking using 13 items. It consists of three subscales, namely Brooding (6 items), Reflection (4 items) and Worry (3 items) (Rewston et al., 2007). Items are rating on a 4 point Likert scale with responses ranging from 1 (almost never) to 4 (almost always). High scores indicate more ruminative thinking than low scores. The aRRs showed high internal validity on all subscales, brooding had a Cronbach’s $\alpha = .86$; reflection had a Cronbach’s $\alpha = .85$ and worry had a Cronbach’s $\alpha = .85$.

2.2.5. Menstrual symptom questionnaire

The Menstrual Symptom Questionnaire (MSQ) was used to measure symptoms of dysmenorrhea (Negriff et al., 2009). It consists of 24 item items, clustered around two dimensions namely spasmodic (12 items) and congestive (12 items) dysmenorrhea (Chesney & Tasto, 1975). Items are rated on a 5-point Likert scale with responses ranging from never to always. Higher scores indicate more symptoms of dysmenorrhea than lower scores (Negriff et al., 2009). The MSQ demonstrated good internal consistency, with a Cronbach’s alphas of .84 for the spasmodic dysmenorrhea subscale and .86 for the congestive dysmenorrhea subscale.

2.2.6. Perceived Stress Scale (PSS)

The Perceived stress scale was used to measure psychological stress (Cohen et al., 1983). Test takers are asked to respond to the 10-items using a 5 point Likert scale. Items relate to issues such as control, anxiety and coping, etc. Five items are reverse scored and all items are tallied. Higher scores indicating greater perceived stress than lower scores (Roberti et al., 2006). PSS was the most commonly used measure of stress used in PMS/PMDD studies (Lee & Im, 2016). The PSS demonstrated strong reliability in this study, producing a Cronbach’s alpha of 0.86.

2.3. Data analysis

Data were downloaded from the online database and exported into Statistical Package for Social Sciences (SPSS), version 25 for analysis. We assessed the data to determine suitability for analysis and conducted initial analysis to determine the variables that were used in subsequent analysis.

2.3.1. Prevalence of PMDD symptoms

Scores on the PSST were calculated using the criteria described above. Each participant was scored as either having positive symptoms of PMDD or negative symptoms of PMDD. We then calculated the prevalence of PMDD symptoms in the sample.

2.3.2. Predictors of PMDD symptoms

After conducting an initial analysis we selected variables that were suitable for the logistic regression to determine predictors of PMDD. PMDD symptoms was classified as a binary outcome. We entered eight predictors in three separate blocks. In the first block we added medical or biological variables such as oral contraceptive use (binary; yes or no); spasmodic dysmenorrhea and congestive dysmenorrhea. In the second block we entered psychological variables such as perceived stress, brooding, reflection and worry. In the final block we entered a social variable, namely drug use. We assessed the model to determine the model fit and assessed the predictors to determine which were significant. P-values <.05 were referred to as statistically significant. We interpreted the confidence intervals. We also conducted an ANOVA to determine whether there were significant differences in the predictor variables between those with a positive PMDD screening and those with a negative PMDD screening.

3. Results

3.1. Sample

A total of 1329 female students participated in the study. Most of the participants were between the ages of 17–20 years old (38%) and 29% reported that menses began at age 13 (29%). Participants were asked about past psychological diagnosis of themselves and their family members. 25.4% reported that they had been diagnosed with a psychological disorder, and 41.2% reported that they had an immediate family member who was diagnosed with a psychological disorder. 34.4% reported using oral contraceptives and 16.7% reported using anti-depressant medication. Some students reported that they smoked cigarettes (17.5%) and the vast majority of participants (75.4%) indicated that they consumed alcohol. Table 1 contains detailed demographic information of participants.

The sample size criteria for a logistic regression were met as there were more than 400 participants in total and more than 10 observations per estimated parameter (Hair et al., 2010).

3.2. Prevalence of PMDD symptoms

A total of 135 participants screened positive for PMDD symptoms using the screening criteria set out in the PSST. This meant that the prevalence rate for PMDD symptoms was 10.2%.

3.3. Description of predictor variables

A description of the predictor variables can be found in Table 2. We found relatively low levels of drug use, low levels of rumination and moderate levels of stress and dysmenorrhea. The results of the ANOVA indicated significant differences between those with a positive PMDD screening and those with a negative PMDD screening on all predictor variables, excluding contraceptive use (where there was no difference between the groups). Table 3 contains the results of the ANOVA.

3.4. Results of logistic regression

The results of the logistic regression can be found in Table 4. The model was significant and predicted 90% of the cases correctly. Congestive dysmenorrhea, brooding, reflection and worry were identified as significant predictors of positive PMDD symptoms. Oral contraceptive use, spasmodic dysmenorrhea, perceived stress and drug use were not significant predictors. Increased likelihood of PMDD was associated with congestive dysmenorrhea (OR = 1.12, 95% CI = 1.07–1.17), brooding (OR = 1.14, 95%CI = 1.05–1/24), reflection (OR = 1.21, 95% CI = 1.08–1.34) and worry (OR = .87, 95%CI = .78–.98).

Table 1. Participant demographic variables

		Frequency (%)
Faculty	Agricultural sciences	87 (6.5)
	Arts and social sciences	301 (22.6)
	Economic and management sciences	235 (17.7)
	Education	61 (4.6)
	Engineering	95 (7.1)
	Law	76 (5.7)
	Medicine	239 (18.0)
	Science	218 (16.4)
	Military service	4(0.3)
	Theology	10 (0.8)
Missing	3 (0.2)	
Year of study	First	396 (29.8)
	Second	263 (19.8)
	Third	224 (16.9)
	Fourth	157 (11.8)
	Fifth	110 (8.3)
	Sixth	75 (5.6)
	Seventh	35 (2.6)
	Eighth	32 (2.4)
	Ninth	18 (1.4)
	Tenth	16 (1.2)
Missing	3 (0.2)	
Age group (years)	17–20	505 (38.0)
	21–23	442 (33.3)
	24–27	166 (12.5)
	28–31	77 (5.8)
	32–35	72 (5.4)
	36–39	12 (0.9)
	40+	52 (3.9)
Missing	3 (0.2)	
Age at menses (years)	≤11	260 (19.6)
	12	377 (28.4)
	13	385 (29)
	14	182 (13.7)
	15	70 (5.3)
	16	38 (2.9)
	17	6 (0.5)
	18+	8 (0.6)
	Missing	3 (0.2)

4. Discussion

Estimated prevalence of PMDD range between 1.3% and 8% in previous studies (Cunningham et al., 2009; Halbreich, 2003; Tschudin et al., 2010; Yonkers & Simoni, 2018). These studies were conducted among women in the United States of America, China and Switzerland and PMDD was measured using DSM IV criteria, the DRSP and the PSST. Our prevalence rate of 10.2% was higher than studies using more robust assessment of PMDD but also much higher than Tschudin’s (2009) study, where the PSST was also used to assess PMDD and a prevalence rate of 3.1% was found. The high prevalence rate may indicate that university students are vulnerable to PMDD and that research, awareness campaigns and interventions should be targeted at this group of women.

Based on our literature review, we expected that all the variables would predict PMDD. However, oral contraceptive use, spasmodic dysmenorrhea, perceived stress and drug use were not significant predictors. It is important to understand why these variables failed to predict PMDD. Oral contraceptives are prescribed to treat PMS despite limited evidence regarding its efficacy (Yonkers & Simoni, 2018). Our findings indicate that broad contraceptive use was not associated with symptoms of PMDD but we recommend that further research be conducted that examines the relationship between

Table 2. Comparisons of means scores and standard deviations of spasmodic dysmenorrhea, congestive dysmenorrhea, brooding, reflection, worry, perceived stress and drug use for participants with PMDD symptoms and those without PMDD symptoms

	Mean	Std. Deviation	
Spasmodic dysmenorrhea	No PMDD	32.29	9.61
	PMDD	41.19	8.71
	Total	33.24	9.90
Congestive dysmenorrhea	No PMDD	29.95	9.23
	PMDD	41.81	7.68
	Total	31.21	9.78
Brooding	No PMDD	12.37	4.46
	PMDD	18.32	4.50
	Total	13.01	4.83
Reflection	No PMDD	8.72	3.29
	PMDD	12.73	2.95
	Total	9.15	3.48
Worry	No PMDD	6.81	2.58
	PMDD	8.60	2.70
	Total	7.00	2.65
Perceived stress	No PMDD	23.52	6.44
	PMDD	29.60	6.28
	Total	24.19	6.69
Drug use	No PMDD	1.29	2.98
	PMDD	3.20	6.53
	Total	1.50	3.57

different compositions of oral contraceptives and PMDD symptoms. Drug use was also not a significant predictor and we found low levels of drug use among participants, similar to the prevalence reported in studies among university students in SA and Venda (Ajao et al., 2014; Retief & Verster, 2016). The finding indicates that drug use does not play a role in PMDD and that it was not a popular coping strategy of the participants. Similarly, the finding that perceived stress did not predict PMDD adds value to the lack of research about the relationship between the two variables. However, the findings contradict those of (Del Mar Fernández et al., 2019) even though both studies used the PSST to assess perceived stress. Petersen et al. (2017) recommended cognitive behavioural therapy (CBT) for women with PMDD because their study found that stress was a predictor. Similarly, a recent meta-analysis found that psychosocial interventions such as coping skills training reduced the severity of PMS (Han, 2019). However, within the current sample, perceived stress was not a significant predictor and therefore CBT aimed at reducing perceived stress may not alleviate symptoms of PMDD.

The findings regarding dysmenorrhea are interesting because while congestive dysmenorrhea was associated with PMDD, spasmodic dysmenorrhea was not. We assessed dysmenorrhea using a validated measure and thus improved on the methodology used in previous studies among university students (Al-Jefout et al., 2015; Nakame et al., 2018; Yacubovich et al., 2019). Moreover, these studies did not differentiate between spasmodic and congestive dysmenorrhea. Our findings seem rational, considering that both PMDD and congestive dysmenorrhea occur prior to menstruation, whereas spasmodic dysmenorrhea is generally associated with the onset of menses. This somewhat novel finding allows us to understand how the timing of symptoms is associated with PMDD and indicates that interventions targeting congestive dysmenorrhea may be more effective in reducing PMDD symptoms than interventions aimed at spasmodic dysmenorrhea.

Table 3. ANOVA comparing participants with PMDD to those without PMDD

		Sum of Squares	df	Mean Square	F	Sig.
Oral contraceptive use	Between Groups	.131	1	.131	.578	.45
	Within Groups	297.806	1311	.227		
	Total	297.938	1312			
Spasmodic dysmenorrhea	Between Groups	9544.160	1	9544.160	105.353	.00
	Within Groups	114599.332	1265	90.592		
	Total	124143.492	1266			
Congestive dysmenorrhea	Between Groups	16983.064	1	16983.064	206.170	.00
	Within Groups	104203.399	1265	82.374		
	Total	121186.463	1266			
Brooding	Between Groups	4170.056	1	4170.056	209.240	.00
	Within Groups	24632.905	1236	19.930		
	Total	28802.960	1237			
Reflection	Between Groups	1900.319	1	1900.319	179.394	.00
	Within Groups	13082.312	1235	10.593		
	Total	14982.631	1236			
Worry	Between Groups	376.772	1	376.772	56.221	.00
	Within Groups	8283.225	1236	6.702		
	Total	8659.997	1237			
Perceived stress	Between Groups	3721.306	1	3721.306	90.312	.00
	Within Groups	41987.832	1019	41.205		
	Total	45709.138	1020			
Drug use	Between Groups	431.223	1	431.223	34.749	.00
	Within Groups	15487.248	1248	12.410		
	Total	15918.471	1249			

Table 4. Coefficients of the model predicting positive PMDD screening

Predictor	B	Wald	Sig.	Exp(B)	95% Confidence Interval	
					Lower	Upper
Oral contraception use	-.160	.397	.529	.852	.517	1.403
Spasmodic dysmenorrhea	-.006	.072	.789	.994	.954	1.036
Congestive dysmenorrhea	.115	25.764	.000	1.122	1.073	1.174
Brooding	.134	10.430	.001	1.143	1.054	1.239
Reflection	.191	10.839	.001	1.210	1.080	1.355
Worry	-.136	5.036	.025	.873	.775	.983
Perceived stress	.036	2.303	.129	1.037	.989	1.087
Drug use	.031	1.563	.211	1.031	.983	1.082
Constant	10.221	135.423	.000	.000		

Note: R² = .74 (Hosmer-Lemeshow), .20 (Cox-Snell), .40 (Nagelkerke), Model $\chi^2(8) = 219.82$, p = .000

Finally, all three components of rumination were significant predictors of PMDD and these findings lend support to previous studies with the same finding (Craner et al., 2014; S. T. Sigmon et al., 2009). Women with PMDD may focus on their PMDD symptoms and associated psychosocial implications. The findings indicate that participants may have relied on emotion focused coping strategies. Rumination interferes with instrumental behaviour and the adoption of problem-focused coping (Nolen-Hoeksema, 1991). We did not assess the use of problem-focused coping strategies in participants and recommend that this be done in future research among women with PMDD in order to assess the broad range of coping strategies that they use to cope with their symptoms. PMDD is not a commonly known condition and many women are undiagnosed. It is therefore not surprising that women resort to emotion-focused coping strategies such as rumination in order to manage their symptoms. Instead, it has been recommended that therapies that target rumination may enhance treatment outcomes (Watkins, 2015). For example, CBT can be used to challenge negative thoughts, thereby reducing rumination (Watkins, 2015). Further evidence for this was provided by a longitudinal randomized controlled trial in which it was demonstrated that an intervention aimed at reducing ruminative and excessive worry reduced symptoms of anxiety and depression and these effects were maintained at 3 and 12 month follow-ups (Topper et al., 2017).

In conclusion, our findings reveal a high prevalence of PMDD among university students. We recommend that awareness campaigns take place at university campuses in order to educate young women about the disorder. Education-based interventions during early adulthood may prove to be beneficial to women in future. We recommend that similar education-based interventions targeting dysmenorrhea also take place when women are at university. Information regarding normal and abnormal menstruation, indicators of possible pathology and coping strategies about dysmenorrhea may be of great value to young women. Furthermore dysmenorrhea is prevalent among university students but remains shrouded in secrecy resulting in little support for students. The development of support structures for young women at university may improve their academic performance. Finally, as rumination was a predictor of PMDD, we recommend the development of a CBT based intervention targeting rumination in women with PMDD.

4.1. Limitations

The study is not without limitations. First, the results are not generalizable due to the use of convenience sampling. The participants were self-selected and the high prevalence of PMDD in the current sample may in part be due to a lack of interest in the study from women who did not have symptoms of PMDD. Second, PMDD was assessed using the PSST, which is a screening and not a diagnostic tool. This too may play a role in the high prevalence of PMDD among the current sample.

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Data availability statement

Data can be made available upon request to the first author.

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