# Quality of life and burden of women with premenstrual dysphoric disorder

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**Background**
Premenstrual dysphoric disorder (PMDD) is a severe form of premenstrual physical and psychological discomfort. The disorder is common and has a negative impact on mental health and quality of life of women suffering from PMDD.
**Aim**
This study was carried out to evaluate the quality of life of women with PMDD.
**Participants and methods**
In a comparative case–control study, 34 patients with PMDD and 34 healthy controls (matched for age, educational level, and social class) were included. All were within the reproductive period.
**Tools**
Both groups were subjected to the following psychometric tools: a semistructured interview, a structured clinical interview for the *Diagnostic and Statistical Manual of Mental Disorders*-fourth edition, the World Health Organization Quality Of Life instrument, the symptom checklist instrument, the psychological adjustment scale, and the Sheehan disability scale.
**Results**
Patients and control groups were matched for age ($P=0.46$), marital status ($P=0.35$), educational level ($P=0.87$), and socioeconomic status ($P=0.84$). The mean scores of psychological and social relationships domains on the World Health Organization Quality of Life (WHOQOL)-BREF were lower for patients compared with the healthy control participants. Differences were statistically significant for emotional, family, and social adjustment ($P<0.001$). There were statistically significant differences for somatization, obsessive-compulsive, depressive, and anxiety symptoms ($P<0.001$). The burden of PMDD was higher for the patient group compared with the healthy control participants ($P<0.001$). The family responsibilities domain was the most affected on the Sheehan disability scale.
**Conclusion**
Patients with PMDD have lower quality of life than healthy participants. They have maladjusted emotions, family relations, and social functioning. They experience higher somatization, obsessive-compulsive, depressive, and anxiety symptoms than normal participants. The burden of illness is high. Appropriate recognition of the disorder and its impact should lead to the treatment of women with PMDD. Effective treatments are available. They should reduce individual suffering and impact on families, society, and economy.

**Keywords:**
burden, premenstrual dysphoric disorder, quality of life

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## Introduction

Premenstrual dysphoric disorder (PMDD) is a severe form of premenstrual physical and psychological discomfort occurring 1 to 2 weeks before menstruation (Dante and Facchinetti, 2011). The symptoms usually disappear shortly after the onset of menses (Futterman and Rapkin, 2006; Campagne and Campagne, 2007).

The prevalence of PMDD, where premenstrual symptoms reach a level of severity that interferes with personal, social, and professional functioning, is about 3–8% (Cohen *et al.*, 2002; Halbreich *et al.*, 2003; Steiner *et al.*, 2003; Di Giulio and Reissing, 2006).

PMDD most likely has multiple determinants in the biological, physiological, and sociocultural domains (Stanton *et al.*, 2002).

Although the etiology of PMDD is unknown, the symptoms of dysphoria, including depression and anxiety, have been associated with serotonergic dysregulation (Ivezić *et al.*, 2010).

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Some potential risk factors for PMDD are the quality of interpersonal relationships and cooperation, self-esteem, expectation, and perception of premenstrual symptoms, stress, socioeconomic factors, biological factors, and lifestyle factors (Deuster *et al.*, 1999).

Matsumoto *et al.* (2007) suggested that altered functioning of the autonomic nervous system in the late luteal phase could be associated with diverse psychosomatic and behavioral symptoms appearing premenstrually.

Landen *et al.* (2004) have reported that PMDD may be associated with reduced vagal tone compared with controls and that this difference is most apparent in the nonsymptomatic follicular phase of the menstrual cycle.

PMDD, first called the late luteal phase dysphoric disorder, was included as a provisional diagnostic category in the appendices of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM)-III-R (American Psychiatric Association, 1987). It remained as an appendix in DSM-IV, after being renamed PMDD (American Psychiatric Association, 1994).

The most prevalent symptoms include irritability, mood lability, depression, anxiety, impulsivity, feeling of 'loss of control,' fatigue, decreased concentration, abdominal bloating fluid retention, breast swelling, and general aches (Kessel, 2000).

According to the American psychiatric association (DSM-IV), PMDD criteria require five or more of the following symptoms to be present premenstrually: depressed mood or dysphoria, anxiety or tension, affective lability, irritability, decreased interest in usual activities, concentration difficulties, marked lack of energy, marked changes in appetite, overeating or food cravings, hypersomnia or insomnia, feeling overwhelmed, and other physical symptoms, for example, breast tenderness, bloating. At least one of these symptoms must be a mood symptom, that is: depressed mood or dysphoria, anxiety or tension, affective lability, or irritability. In addition, certain phenomenal characteristics are required (present premenstrually, absent postmenstrually, causing premenstrual interference other than an exacerbation of another disorders). PMDD was confirmed if, throughout the entire week before menstruation, at least one of the four core symptoms (depressed mood, anxiety or tension, affective liability, anger, or irritability) was reported as severe, and at least four additional symptoms (for a total of five) as moderate to severe, and if they were absent in the week after menses (Halbreich *et al.*, 2007).

PMDD can lead to disruption in interpersonal relationships and role functioning. Recent studies of the burden of illness of PMDD have identified a high economic indirect cost, mostly from reduced productivity and effectiveness at work, in addition to disturbed parenting and marital relationships (Pearlstein and Steiner, 2008).

The impairment and lowered quality of life is similar to that of dysthymic disorder and is not much lower than major depressive disorder. Appropriate recognition of the disorder and its impact should lead to the treatment of more women with premenstrual syndrome (PMS) and PMDD (Halbreich *et al.*, 2003).

PMDD is commonly associated with other mood-related disorders such as major depression and causes significant life impairment (Sassoon *et al.*, 2011).

### Aim

This study was carried out to evaluate quality of life of women with PMDD.

## Participants and methods

This comparative case–control study was conducted at the psychiatry outpatient clinic of Zagazig University hospitals from April 2010 till September 2010. It included 34 female patients compared with 34 healthy women, recruited from among employees and visitors of the hospital.

All patients were diagnosed as having PMDD according to DSM-IV TR (American Psychiatric Association, 2000).

### Inclusion criteria

Good general health, euomenorrhea, lack of major uterine dysfunction, reproductive age (18–45), informed consent.

### Exclusion criteria

General medical illness (diabetes mellitus, hypothyroidism, anemia, seizure disorders, past or present history of other psychiatric disorder, use of oral contraceptives).

Both patients and controls were subjected to the application of case history of the psychiatry department of Zagazig university hospitals to obtain sociodemographic and relevant clinical data.

A structured clinical interview for DSM-IV axis-I disorders was used for all cases to confirm the diagnosis and also to screen the control participants for PMDD (First *et al.*, 1995).

The following psychometric tools were applied to both patients and controls:

(1) World Health Organization Quality Of Life (WHO-QOL)-BREF (The WHOQOL group, 1996): is a standardized comprehensive instrument for assessment of quality of life comprising of 26 items and was developed by WHO. The scale provides a measure of an individual's perception of quality of life for four domains: (a) physical health (seven items), (b) psychological health (six items), (c) social relationships (three items), and (4) environmental health (eight items). In addition, it also includes two questions of overall quality of life and general health factors. The domain scores are scaled in a positive direction (i.e. higher scores denote higher quality of life). The range of scores is 4–20 for each domain. The international consistency of WHOQOL-BREF ranged from 0.66 to 0.87 (Chronbach's $\alpha$ coefficient). The scale had been found to have good discriminant validity. It has good test–retest reliability and is

recommended for use in health surveys and to assess the efficacy of any intervention at suitable intervals according to the need of the study. The first transformation method converts scores to range between 4 and 20; the second transformation method converts domain scores to a 0–100 scale.

(2) Symptoms checklist-90-revised (SCL-90R) (Derogatis, 1983): this 90-item self-report instrument measures nine dimensions of psychological symptoms and yields three global indexes of distress. The measured dimensions are somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility phobia, paranoid ideation, and psychoticism. Participants were instructed to indicate how much distress each item on the SCL-90R had caused on a five-point scale ranging from (0 = not at all to 4 = extremely). In this study, we used the Arabic form (Al-Behairy, 1984). In this study, we used the somatization, obsessive-compulsive, depression, and anxiety subscales to assess these symptoms among the studied women.

(3) Psychological Adjustment scale (Shokeer, 2003): it consists of 80 items that measure four dimensions of adjustment: (a) emotional adjustment, (b) health adjustment, (c) family adjustment, and (4) social adjustment. Participants were tested on a three-point scale ranging from (0 = not at all to 2 = extremely).

(4) Sheehan disability scale (Sheehan *et al.*, 1996): was developed by Sheehan to assess functional impairment in three interrelated domains: work/school, social life and home life, or family responsibilities are impaired by his or her symptoms on a 10-point visual analogy scale. The numerical ratings of 0–10 can be translated into a percentage. The three items can also be summed into a single dimensional measure of global functional impairment that ranges from 0 (unimpaired) to 30 (highly impaired).

### Statistical analysis

Data were collected, revised, and analyzed statistically using SPSS (Statistical Package for Social Science, version 15, IBM, Chicago, IL, USA). Data were described by frequency and percentage for qualitative data, and mean and SD for quantitative data. The $\chi^2$-test was used to determine the relationship between two qualitative variables. Student's *t*-test was used for comparing quantitative variables. Probability level ($P<0.05$) was considered statistically significant.

## Results

Table 1 illustrates the characteristics of both patients with PMDD and the control participants. The study included 34 patients with PMDD and 34 control participants. Both groups had similar demographic and socioeconomic characteristics. The majority of the studied patients and control participants were married (61.8 and 64.7%, respectively), lived in an urban area (52.9 and 58.8%, respectively), and had received secondary school education (58.8 and 61.8%, respectively).

**Table 1 Characteristics of patients with premenstrual dysphoric disorder and the control participants**

| | PMDD ($N=34$) | Control ($N=34$) | Test of significance | |
|---|---|---|---|---|
| Variables | No (%) | No (%) | $\chi^2$ | *P*-value |
| Age | | | | |
| 18–30 | 16 (47.1) | 19 (55.9) | 0.53 | 0.46 |
| 31–45 | 18 (52.9) | 15 (44.1) | | |
| Marital status | | | | |
| Single | 11 (32.4) | 12 (35.3) | 2.07 | 0.35 |
| Married | 21 (61.8) | 22 (64.7) | | |
| Divorced | 2 (05.8) | 0 (0.0) | | |
| Residence | | | | |
| Urban | 18 (52.9) | 20 (58.8) | 0.24 | 0.62 |
| Rural | 16 (47.1) | 14 (41.2) | | |
| Educational level | | | | |
| Primary | 2 (5.9) | 3 (08.8) | 0.41 | 0.81 |
| Secondary | 20 (58.8) | 21 (61.8) | | |
| University | 12 (35.3) | 10 (29.4) | | |
| Employment status | | | | |
| Employed | 16 (47.0) | 23 (67.6) | 5.26 | 0.07 |
| Unemployed | 10 (29.4) | 3 (8.8) | | |
| Student | 6 (17.6) | 8 (23.6) | | |
| Type of work | | | | |
| Manual | 26 (76.5) | 25 (73.5) | 0.08 | 0.77 |
| White collar | 8 (23.5) | 9 (26.5) | | |
| Socioeconomic status | | | | |
| Low | 2 (5.9) | 3 (8.8) | 0.35 | 0.84 |
| Moderate | 24 (70.6) | 22 (64.7) | | |
| High | 8 (23.5) | 9 (26.5) | | |
| History of pregnancy | 20 (58.8) | 21 (61.7) | 0.06 | 0.8 |
| | Mean ± SD | Mean ± SD | *t* | *P*-value |
| Menarche (years) | 13.6 ± 3.2 | 12.9 ± 2.4 | 1.0 | 0.31 |
| Duration of menstrual cycle (days) | 26.1 ± 6.1 | 29.2 ± 5.3 | 1.5 | 0.11 |
| Duration of menstruation (days) | 6.9 ± 2.1 | 5.1 ± 1.6 | 3.97 | <0.001* |

PMDD, premenstrual dysphoric disorder.
*$P<0.05$ is statistically significant.

47.0% of the patients and 67.6% of the control participants were employed.

Majority of both groups were employed: 47.0% of the patients and 67.6% of the control participants. 58.8% of the patients and 61.7% of the control participants had a history of pregnancy. 70.6% of patients and 64.7% of control subjects were of moderate socioeconomic status.

They were matched as regards age ($\chi^2 = 0.53$, $P = 0.46$), marital status ($\chi^2 = 2.07$, $P = 0.35$), residence ($\chi^2 = 0.24$, $P = 0.62$), educational level ($\chi^2 = 0.41$, $P = 0.81$), employment status ($\chi^2 = 5.26$, $P = 0.07$), and type of work ($\chi^2 = 0.08$, $P = 0.77$).

Socioeconomic status ($\chi^2 = 0.35$, $P = 0.84$) and history of pregnancy ($\chi^2 = 0.06$, $P = 0.8$).

No statistically significant difference was found between the PMDD group and the control group regarding menarche ($P = 0.31$) and the duration of the menstrual cycle ($P = 0.11$), whereas there was a statistically significant difference between the two groups regarding the duration of menstruation (days) ($P = 0.001$).

Table 2 illustrates the mean and SD of WHOQOL-BREF applied to the studied groups. There was no statistically significant difference between PMDD and control groups as regards the physical domain of WHOQOL-BREF ($t = 0.73$,

**Table 2 World Health Organization Quality Of Life-BREF: comparison between premenstrual dysphoric disorder and control groups**

| Domain | PMDD group (No=34) Mean±SD | Control group (No=34) Mean±SD | *t* | *P*-value |
|---|---|---|---|---|
| Physical domain[a] | 53.4±8.1 | 55.2±9.8 | 0.73 | 0.6 |
| Psychological domain[a] | 44.6±9.3 | 71.5±13.2 | 9.5 | <0.001* |
| Social relationships[a] | 55.8±8.7 | 67.2±12.1 | 4.46 | <0.001* |
| Environment[a] | 52.8±8.1 | 51.7±9.3 | 0.52 | 0.5 |

PMDD, premenstrual dysphoric disorder.
[a]Score range from 0 to 100.
*$P<0.05$ is statistically significant.

$P=0.6$). There was a statistically significant difference between the PMDD group and the control group regarding the psychological domain ($t=9.5$, $P<0.001$). Also, there was a highly statistically significant difference between the two groups regarding social relationship ($t=4.46$, $P<0.001$), whereas no statistically significant difference was found between the two groups regarding the environmental domain. The social relationships domain was the most affected domain between the four domains of WHOQOL-BREF.

Table 3 shows the mean and SD of the psychological adjustment scale applied to the PMDD and the control groups. There was a highly statistically significant difference between the two groups regarding emotional adjustment ($t=19.23$, $P<0.001$), whereas no statistically significant difference was detected between the two groups regarding the health adjustment domain ($t=1.38$, $P>0.05$). There was a statistically significant difference between the two groups regarding family adjustment ($t=10.31$, $P<0.001$) and social adjustment ($t=10.92$, $P<0.001$).

Table 4 shows the mean and SD of the SCL-90R scale applied to the PMDD group and the control group. We used somatization, obsessive-compulsive, depression, and anxiety domains to assess the symptoms of these groups among the studied women.

We found highly statistically significant differences between the two groups regarding somatization ($t=24.91$, $P<0.001$), the obsessive-compulsive domain ($t=8.69$, $P<0.001$), the depression domain ($t=18.25$, $P<0.001$), and the anxiety domain ($t=22.6$, $P<0.001$). The depression domain was the most affected domain.

Table 5 shows the mean and SD of the Sheehan disability scale applied to the PMDD and the control groups. Highly statistically significant differences were found between the two groups regarding work ($t=7.44$, $P<0.001$), social/leisure activities ($t=3.18$, $P<0.001$), and family responsibilities ($t=12.09$, $P<0.001$). The most affected area of functioning was family responsibilities.

**Table 3 Psychological adjustment scale: comparison between premenstrual dysphoric disorder and control groups**

| Domain | PMDD group (No=34) Mean±SD | Control group (No=34) Mean±SD | *t* | *P*-value |
|---|---|---|---|---|
| Emotional adjustment[a] | 15.3±4.1 | 38.2±5.6 | 19.23 | <0.001* |
| Health adjustment[a] | 14.4±5.4 | 16.4±6.4 | 1.38 | >0.05 |
| Family adjustment[a] | 11.7±6.8 | 30.4±8.1 | 10.31 | <0.001* |
| Social adjustment[a] | 12.1±4.3 | 31.3±9.3 | 10.93 | <0.001* |

PMDD, premenstrual dysphoric disorder.
[a]score range from 0 to 40.
*$P<0.05$ is statistically significant.

**Table 4 Symptoms checklist-90R scale: comparison between premenstrual dysphoric disorder and control groups**

| Domain | PMDD group (No=34) Mean±SD | Control group (No=34) Mean±SD | *t* | *P*-value |
|---|---|---|---|---|
| Somatization[a] | 28.7±3.1 | 12.2±2.3 | 24.91 | <0.001* |
| Obssesive-compulsive[b] | 18.4±5.3 | 9.9±2.1 | 8.69 | <0.001* |
| Depression[c] | 31.2±6.4 | 8.8±3.2 | 18.25 | <0.001* |
| Anxiety[d] | 21.6±3.4 | 6.1±2.1 | 22.6 | <0.001* |

PMDD, premenstrual dysphoric disorder.
[a]Score range from 0 to 48.
[b]Score range from 0 to 40.
[c]Score range from 0 to 52
[d]Score range from 0 to 40.
*$P<0.05$ is statistically significant.

**Table 5 Sheehan disability scale: comparison between premenstrual dysphoric disorder and control groups**

| Domain | PMDD group (No=34) Mean±SD | Control group (No=34) Mean±SD | *t* | *P*-value |
|---|---|---|---|---|
| Work | 7.31±2.3 | 3.5±1.9 | 7.44 | <0.001* |
| Social/leisure activities | 6.34±2.4 | 4.6±1.2 | 3.18 | <0.001* |
| Family responsibilities | 9.12±3.1 | 2.3±1.1 | 12.09 | <0.001* |
| Total score | 22.77±5.1 | 10.4±3.1 | 12.11 | <0.001* |

The total score ranges from 0 (unimpaired) to 30 (highly impaired).
PMDD, premenstrual dysphoric disorder.
*$P<0.05$ is statistically significant.

## Discussion

Five percent of menstruating women meet the criteria for PMDD and about 20% of them have 'subthreshold PMDD' or severe PMS. Thus, in each menstrual cycle, 1 in 4 women has emotional, behavioral, and physical premenstrual symptoms that can lead to disruption in interpersonal relationships and role functioning (Pearlstein and Steiner, 2008).

Our study revealed that the quality of life of women with PMDD was severely affected as there were statistically significant differences between the two groups regarding domains of psychological and social relationships. This finding is in agreement with other studies. Women with confirmed PMS and PMDD reported significantly lower quality of life, increased absenteeism from work, decreased work productivity, impaired relationships with others, and increased visits to health providers (Borenstein *et al.*, 2003; Steiner *et al.*, 2003; Dean and Borenstein, 2004; Kornstein *et al.*, 2005). The impairment

and lowered quality of life for PMDD is similar to that of dysthymic disorder and is not much lower than major depressive disorder (Halbreich *et al.*, 2003).

The length of menstruation was reported to be associated with PMDD in studies by Adewuya *et al.* (2008) and Kaur *et al.* (2004). This result is in agreement with our results as there was a statistically significant difference between the PMDD group and the control group ($t = 3.97$, $P < 0.001$). This factor may lead to impairment of quality of life.

Emotional, family, and social adjustment were assessed using the psychological adjustment scale. We found a highly statistically significant difference between the two groups ($P < 0.001$). This maladjustment is in agreement with many studies. Anxiety, irritability, and mood lability are associated with functional impairment (Bloch *et al.*, 1997; Angst *et al.*, 2001; Pearlstein and Steiner 2008; Ivezić *et al.*, 2010).

PMDD causes marked social impairment during the last half of the menstrual cycle (Kaur *et al.*, 2004).

We found a highly statistically significant difference between the two groups regarding somatization symptoms of the SCL-90R scale ($t = 24.91$, $P < 0.001$). This result is in agreement with those of Halbreich *et al.* (2007), who reported that some cultures emphasize somatic rather than emotional premenstrual symptoms.

Obsessive-compulsive symptoms were found to be higher in patients with PMDD compared with control participants ($P < 0.001$). Sasson and his colleagues found that obsessive-compulsive personality disorder was the most common character pathology in the PMS (18%). We also found that depressive symptoms were present with a statistically significant difference in women with PMDD compared with control participants ($t = 18.25$, $P < 0.001$). This result is in agreement with studies by Kessel (2000) and Halbreich *et al.* (2007). Major depressive disorder is one of the most common axis I psychiatric disorders that may be concurrent and exacerbated premenstrually (Wittchen *et al.*, 2002).

The current study found that anxiety symptoms were more prevalent in patients than in control participants ($t = 22.6$, $P < 0.001$). Generalized anxiety disorder is one of the most common axis I psychiatric disorders that exacerbate premenstrually (Hsiao *et al.*, 2004; Kim *et al.*, 2004).

The Sheehan disability scale was used to assess the burden of PMDD among the studied patients. There was a statistically significant difference between the two groups regarding work, social/leisure activities, and family responsibilities ($P < 0.001$). The burden of illness of PMDD results from the severity of symptoms, the chronicity of the disorder, and impairments in work, relationships, and activities (Freeman, 2005; Di Giulio and Reissing, 2006).

## Conclusion and recommendation

PMDD is common and has an adverse impact on mental health and quality of life of women suffering from this disorder. In conclusion, the present study indicates that PMDD patients have lower quality of life than healthy controls. They have maladjusted emotions, family relations, and social functioning. Also, they have higher scores of somatization, obsessive-compulsive, depressive, and anxiety symptoms than healthy controls. The burden of illness was high mostly as a result of reduced productivity and effectiveness at work and disturbed parenting and marital relationships. Thus, appropriate recognition of the disorder and its impact should lead to treatment of more women with PMDD. Efficacious treatments are available. They should reduce individual suffering and impact on families, society, and economy.

## Acknowledgements

### Conflicts of interest

There are no conflicts of interest.

## References

Adewuya AO, Loto OM, Adewumi TA (2008). Premenstrual dysphoric disorder amongst Nigerian University students: prevalence, comorbid conditions and correlates. Arch Women Ment Health 11:13–18.

Al-Behairy AA (1984). *Symptom Checklist-90 (SCL-90R) Arabic form*. Cairo, Egypt: Al-Nahda Al-Messria Library; 1984.

American Psychiatric Association (1987). *Diagnostic and statistical manual of mental disorders*. 3rd ed. Washington, DC: American Psychiatric Association; 1987.

American Psychiatric Association (1994). *Diagnostic and statistical manual of mental disorders (DSM-IV)*. 4th ed. Washington, DC: American Psychiatric Association; 1994.

American Psychiatric Association (2000). *Diagnostic and statistical manual of mental disorders*. 4th ed. Washington: American Psychiatric Publication; 2000.

Angst J, Sellaro R, Merikangas KR, Endicott J (2001). The epidemiology of perimenstrual psychological symptoms. Acta Psychiatr Scand 104: 110–116.

Bloch M, Schmidt PJ, Rubinow DR (1997). Premenstrual syndrome: evidence for symptom stability across cycles. Am J Psychiatry 154:1741–1746.

Borenstein JE, Dean BB, Endicott J, Wong J, Brown C, Dickerson V, *et al* (2003). Health and economic impact of the premenstrual syndrome. J Reprod Med 48:515–524.

Campagne DM, Campagne G (2007). The premenstrual syndrome revisited. Eur J Obstet Gynecol Reprod Biol 130:4–17.

Cohen LS, Soares CN, Otto MW, Sweeney BH, Liberman RF, Harlow BL (2002). Prevalence and predictors of premenstrual dysphoric disorder (PMDD) in older premenopausal women. The Harvard Study of Moods and Cycles. J Affect Disord 70:125–132.

Dante G, Facchinetti F (2011). Herbal treatments for alleviating premenstrual symptoms: a systematic review. J Psychosom Obstet Gynecol 32:51.

Dean BB, Borenstein JE (2004). A prospective assessment investigating the relationship between work productivity and impairment with premenstrual syndrome. J Occup Environ Med 46:649–656.

Derogatis LR (1983). *SCL-90-R administration, scoring, procedures manual-II*. Towson, MD: Clinical Psychometric Research; 1983.

Deuster PA, Adera T, South Paul J (1999). Biological, social and behavioral factors associated with premenstrual syndrome. Arch Fam Med 8:122–128.

Di Giulio G, Reissing ED (2006). Premenstrual dysphoric disorder: prevalence, diagnostic considerations and controversies. J Psychosom Obstet Gynecol 27:201–210.

First MB, Spitzer RL, Gibbon M, Williams JBW (1995). *Structured clinical interview for DSM-IV Axis I disorders (SCID-I)*. New York: Biometrics Research Department, New York Psychiatric Institute; 1995.

Freeman EW (2005). Effects of antidepressants on quality of life in women with premenstrual dysphoric disorder. Pharmacoeconomics 23:433–444.

Futterman LA, Rapkin AJ (2006). Diagnosis of premenstrual disorders. J Reprod Med 51 (4 Suppl): 349–358.

Halbreich U, Borenstein J, Pearlstein T, Kahn LS (2003). The prevalence, impairment, impact and burden of premenstrual dysphoric disorder (PMS/PMDD). Psychoneuroendocrinology 28 (Suppl 3): 1–23.

Halbreich U, Backstrom T, Eriksson E, O'brien S, Calil H, Ceskova E, *et al* (2007). Clinical diagnostic criteria for premenstrual syndrome and

guidelines for their quantification for research studies. Gynecol Endocrinol 23:123–130.

Hsiao MC, Hsiao CC, Liu CY (2004). Premenstrual symptoms and premenstrual exacerbation in patients with psychiatric disorders. Psychiatry Clin Neurosci 58:186–190.

Ivezić SS, Jukić MK, Tikvica A, Baldani DP (2010). Diagnostic and therapeutic algorithm for the treatment of premenstrual dysphoric disorder. Acta Medica Croatica 64:183–190.

Kaur G, Gonsalves L, Thacker HL (2004). Premenstrual dysphoric disorder: a review for the treating practitioner. Cleveland Clin J Med 71:303–305.

Kessel B (2000). Premenstrual syndrome. Advances in diagnosis and treatment. Obstet Gynecol Clin North Am 27:625–639.

Kim DR, Gyulai L, Freeman EW, Morrison MF, Baldassano C, Dube B (2004). Premenstrual dysphoric disorder and psychiatric co-morbidity. Arch Womens' Ment Health 7:37–47.

Kornstein SG, Harvey AT, Rush AJ, Wisniewski SR, Trivedi MH, Svikis DS, *et al* (2005). Self-reported premenstrual exacerbation of depressive symptoms in patients seeking treatment for major depression. Psychol Med 35: 683–692.

Landen M, Wennerblom B, Tygesen H, Modigh K, Sorvik K, Ysander C, *et al* (2004). Heart rate variability in premenstrual dysphoric disorder. Psychoneuroendocrinology 29:733–740.

Matsumoto T, Ushiroyama T, Kimura T, Hayashi T, Moritani T (2007). Altered autonomic nervous system activity as a potential etiological factor of premenstrual syndrome and premenstrual dysphoric disorder. Biopsychosocial Med 1, art. no. 24.

Pearlstein T, Steiner M (2008). Premenstrual dysphoric disorder: burden of illness and treatment update. J Psychiatry Neurosci 33:291–301.

Sassoon SA, Colrain IM, Baker FC (2011). Personality disorders in women with severe premenstrual syndrome. Arch Women's Ment Health 14:257–64.

Sheehan DV, Harnett Sheehan K, Raj BA (1996). The measurement of disability. Int Clin Psychopharmacol 11 (Suppl 3): 89–95.

Shokeer MZ (2003). *Psychological adjustment scale*. Cairo, Egypt: Al-Nahda Al-Messria; 2003.

Stanton AL, Lobel M, Sears S, DeLuca RS (2002). Psychosocial aspects of selected issues in women's reproductive health: current status and future directions. J Consult Clin Psychol 70:751–770.

Steiner M, Macdougall M, Brown E (2003). The Premenstrual Symptoms Screening Tool (PSST) for clinicians. Arch Women's Ment Health 6:203–209.

The WHOQOL Group (1996). *WHOQOL-BREF: introduction, administration, scoring and generic version of the assessment-field trial version*. Geneva: WHO; 1996.

Wittchen HU, Becker E, Lieb R, Krause P (2002). Prevalence, incidence and stability of premenstrual dysphoric disorder in the community. Psychol Med 32:119–132.