Arch Womens Ment Health (2010) 13:535–537
DOI 10.1007/s00737-010-0181-3

SHORT COMMUNICATION

Prevalence of premenstrual syndrome and premenstrual dysphoric disorder in Japanese high school students

Takashi Takeda · Shoko Koga · Nobuo Yaegashi

Received: 7 January 2010 / Accepted: 9 September 2010 / Published online: 21 September 2010

Abstract To determine the prevalence and the impact of premenstrual symptoms among Japanese adolescent girls, a total of 618 high school students were assessed. Of them, 64.6% were found to suffer from premenstrual symptoms, which is lower than that in adult women. On the other hand, the rates of prevalence of moderate to severe PMS and PMDD in girls were higher than those in adult women. Premenstrual symptoms could have significant consequences by interfering with the daily functioning of adolescent girls.

Keywords PMS · PMDD · Japanese girls · High school students

Introduction

Premenstrual syndrome (PMS) is a cluster of mood, behavioral, and physical symptoms that occur during late luteal phase of the menstrual cycle and are relieved after the onset of menstruation (Yonkers et al. 2008). Epidemiologic surveys have estimated that the frequency of premenstrual symptoms is quite high (80–90%) and that in about 5% of women, the symptoms are so severe that they interfere with personal or social relationships or work (Angst et al. 2001). Such a severe form of PMS is classified as premenstrual dysphoric disorder (PMDD) according to the Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV; Hurt et al. 1992; American Psychiatric Association 1994). The causes of PMS and PMDD have not been clearly elucidated but have been suggested to include hormonal changes, neurotransmitters, diet, stress, and lifestyle (Grady-Weliky 2003).

In a theoretical sense, PMS and PMDD could occur after the onset of menarche. PMS and PMDD symptoms could interfere with school and home life. Most epidemiological studies of PMS and PMDD have been carried out on adult females and the data on adolescent females is limited to PMS (Derman et al. 2004; Vichnin et al. 2006; Nur et al. 2007). This study was carried out to investigate the prevalence and impact of PMS and PMDD in Japanese senior high school students.

Methods

The study was carried out in accordance with the principles outlined in the Declaration of Helsinki. Our institutional review board at Tohoku University approved the study.

Study population

A school-based survey was conducted in October 2009 using a sample of Japanese female students who went to a public high school in Sendai, an industrial city in Japan. We

T. Takeda (✉)
Department of Traditional Asian Medicine,
Tohoku University Graduate School of Medicine,
1-1 Seiryo-machi, Aoba,
Sendai 980-8574, Japan
e-mail: take@med.tohoku.ac.jp

S. Koga
Gynecology Clinic Koga,
5-12 Kasiwagi, Aoba,
Sendai 980-0933, Japan

N. Yaegashi
Department of Obstetrics and Gynecology,
Tohoku University Graduate School of Medicine,
1-1 Seiryo-machi, Aoba,
Sendai 980-8574, Japan

recruited female high school students who had regular menstrual cycles (22–35 days) and were able to provide informed consent.

Questionnaire

We used the Premenstrual Symptoms Questionnaire (PSQ) for the screening of premenstrual symptoms, which was developed in our previous study (Takeda et al. 2006). The PSQ translates DSM-IV criteria into a rating scale with degrees of severity described in Japanese and is essentially identical to the Premenstrual Symptoms Screening Tool (Steiner et al. 2003). The PSQ asked, "Within the last three months have you experienced the following premenstrual symptoms starting during the week before menses and remitting a few days after the onset of menses?" The premenstrual symptoms listed on the PSQ are 'Depressed mood', 'Anxiety or tension', 'Tearful', 'Anger or irritability', 'Decreased interest in work, home or social activities', 'Difficulty concentrating', 'Fatigue or lack of energy', 'Overeating or food cravings', 'Insomnia or hypersomnia', 'Feeling overwhelmed', and 'Physical symptoms such as tender breasts, feeling of bloating, headache, joint or muscle pain, weight gain'. The PSQ also asked whether such premenstrual symptoms interfered with 'Work efficiency or productivity, home responsibility', 'Social life activities', or 'Relationships with coworkers or family'. The PSQ asked women to rate the severity of premenstrual symptoms as 'not at all', 'mild', 'moderate', or 'severe'. We divided girls with premenstrual symptoms into three groups: 'PMDD', 'Moderate to Severe PMS', and 'No/Mild PMS' according to the criteria reported previously (Steiner et al. 2003; Takeda et al. 2006).

Table 2 Prevalence rates of 'No/Mild PMS', 'Moderate to Severe PMS', and 'PMDD'

Grade	No/mild PMS	Moderate to severe PMS	PMDD
1st year, no. (%) n=200	187 (93.5)	12 (6.0)	1 (0.5)
2nd year, no. (%) n=195	164 (84.1)	23 (11.8)	8 (4.1)
3rd year, no. (%) n=223	178 (79.8)	38 (17.0)	7 (3.1)
Total, no. (%) n=618	529 (85.6)	73 (11.8)	16 (2.6)

Results

A total of 728 female students were studied and 660 completed the PSQ. Forty-two were dropped from the analysis because of incomplete data. We analyzed the data of 618 girls aged 15 to 19 years (average, 16.7±0.95 (SD) years).

The rate of prevalence of each premenstrual symptom is shown in Table 1. More than half reported 'Anxiety or tension' (59.9%), 'Anger or irritability' (54.0%), 'Difficulty concentrating' (55.7%), and 'Fatigue or lack of energy' (64.6%). Premenstrual symptoms impaired 'Work efficiency or productivity, home responsibility' (48.9%), 'Social life activities' (19.4%), and 'Relationships with coworkers or family' (19.1%). As many as 64.6% of them experience more than one symptom, but this result is low compared with the prevalence that we previously reported in 1,152 Japanese adult women (95.0%; P<0.0001 by chi-square test; Takeda et al. 2006). The most prominent feature of premenstrual symptoms in adolescent girls is that the rate of

Table 1 Prevalence rates of premenstrual symptoms with various degrees of severity

	Not at all	Mild	Moderate	Severe
Depressed mood, no. (%)	341 (55.2)	162 (26.2)	80 (12.9)	35 (5.7)
Anxiety or tension, no. (%)	248 (40.1)	221 (35.8)	108 (17.5)	41 (6.6)
Tearful, no. (%)	373 (60.4)	139 (22.5)	70 (11.3)	36 (5.8)
Anger or irritability, no. (%)	284 (46.0)	200 (32.4)	101 (16.3)	33 (5.3)
Decreased interest in work, home, or social activities, no. (%)	465 (75.2)	108 (17.5)	39 (6.31)	6 (0.97)
Difficulty concentrating, no. (%)	274 (44.3)	249 (40.3)	65 (10.5)	30 (4.9)
Fatigue or lack of energy, no. (%)	219 (35.4)	243 (39.3)	113 (18.3)	43 (7.0)
Overeating or food cravings, no. (%)	330 (53.4)	155 (25.1)	95 (15.4)	38 (6.2)
Insomnia or hypersomnia, no. (%)	346 (56.0)	141 (22.8)	91 (14.7)	40 (6.5)
Feeling overwhelmed, no. (%)	466 (75.4)	97 (15.7)	45 (7.3)	10 (1.62)
Physical symptoms, no. (%)	321 (51.9)	164 (26.5)	96 (15.5)	37 (6.0)
Work efficiency or productivity, home responsibility, no. (%)	316 (51.1)	214 (34.6)	63 (10.2)	25 (4.1)
Social life activities, no. (%)	498 (80.6)	87 (14.1)	23 (3.7)	10 (1.6)
Relationships with coworkers or family, no. (%)	500 (80.9)	93 (15.1)	21 (3.4)	4 (0.65)

n=618

prevalence of physical symptoms is much lower than that of adult women (48.1% vs. 81.2%, $P<0.0001$ by chi-square test; Takeda et al. 2006).

The 'PMDD' group consisted of 16 girls (2.6%), the 'Moderate to Severe PMS' group 73 girls (11.8%) and the 'No/Mild PMS' group 529 girls (85.6%; Table 2). In our previous report about the Japanese adult population, the 'PMDD' group consisted of 14 women (1.2%), the 'Moderate to Severe PMS' group 75 women (5.3%), and the 'No/Mild PMS' group 1,063 women (93.5%; Takeda et al. 2006). The rates of PMDD and moderate to severe PMS in our population were significantly higher than those in the adult population ($P<0.0001$ by Mann–Whitney's U test). The rates of prevalence of PMDD and moderate to severe PMS were increased according to ascending grade ($P<0.0001$, rs=0.46 by Spearman's correlation coefficient by rank test; Table 2) and to the age ($P<0.001$, rs=0.45 by Spearman's correlation coefficient by rank test; data not shown).

Discussion

The precise causes of the difference in the prevalence of PMDD and moderate to severe PMS between adolescent and adult women are unknown, but we can suggest several possible explanations. Adolescence is a unique time in human development both psychologically and physiologically. It is an important and vulnerable period between childhood and adulthood. Despite this, accurate information about reproductive health is lacking in adolescent girls. Lack of knowledge about the cause and treatment of PMS may contribute to the high rate prevalence of severe PMS in adolescent girls. Moreover, Japanese high school students are under a great deal of stress due to the long hours of studying for entrance examinations of high-ranking universities. This may also explain the increase of prevalence of severe PMS according to ascending grade.

One major limitation of our study was that we screened PMDD retrospectively. The diagnosis of PMDD by the DSM-IV criteria requires prospective daily charting, which has to be completed over a period of at least two consecutive cycles. In a retrospective design study about PMDD, women are likely to recall the worst episode in the past, so our questionnaire may have overestimated PMDD frequency. However, prospective daily charting is difficult for large samples. Daily rating may also be an impediment to study involvement. It has been reported that in an epidemiological study, 30% of women refused to participate in data collection and only 50% of the women completed two cycles of daily ratings (Sternfeld et al. 2002). On the other hand, we could enroll 91% of women using retrospective questionnaire and moreover 94% of them completed the questionnaire. Retrospective screening of PMDD research should be considered as a useful technique to screen PMDD women (Steiner et al. 2003). Another limitation of this study is the lack of assessment of an underlying psychiatric disorder, which could distort the perception and/or the reporting of PMS symptoms.

Acknowledgments We thank Iwako Unno and Miho Hayasaka for their help with this study, and the women who participated.

References

American Psychiatric Association (1994) Diagnostic and statistical manual of mental disorders, fourth edition (DSM-IV). American Psychiatric Press, Washington, DC, pp 715–718

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

Derman O, Kanbur NO, Tokur TE, Kutluk T (2004) Premenstrual syndrome and associated symptoms in adolescent girls. Eur J Obstet Gynecol Reprod Biol 116(2):201–206

Grady-Weliky TA (2003) Clinical practice. Premenstrual dysphoric disorder. N Engl J Med 348:433–438

Hurt SW, Schnurr PP, Severino SK, Freeman EW, Gise LH, Rivera-Tovar A, Steege JF (1992) Late luteal phase dysphoric disorder in 670 women evaluated for premenstrual complaints. Am J Psychiatry 149:525–530

Nur MM, Romano ME, Siqueira LM (2007) Premenstrual dysphoric disorder in an adolescent female. J Pediatr Adolesc Gynecol 20:201–204

Steiner M, Macdougall M, Brown E (2003) The premenstrual symptoms screening tool (PSST) for clinicians. Arch Women Ment Health 6:203–209

Sternfeld B, Swindle R, Chawla A et al (2002) Severity of premenstrual symptoms in a health maintenance organization population. Obstet Gynecol 99:1014–1024

Takeda T, Tasaka K, Sakata M, Murata Y (2006) Prevalence of premenstrual syndrome and premenstrual dysphoric disorder in Japanese women. Arch Women Ment Health 9:209–212

Vichnin M, Freeman EW, Lin H, Hillman J, Bui S (2006) Premenstrual syndrome (PMS) in adolescents: severity and impairment. J Pediatr Adolesc Gynecol 19(6):397–402

Yonkers KA, O'Brien PM, Eriksson E (2008) Premenstrual syndrome. Lancet 371:1200–1210