

Premenstrual Symptoms among Chinese Female Undergraduates: Relationship with Stress and Mental Health

AM LEE BSocSc (HK), PhD (CHUK), Reg. Psychol

Department of Psychiatry, Faculty of Medicine, The University of Hong Kong, Hong Kong

R WEI MS FRCS, FRCSE, FACS, FHKAM (Surgery), FHKAM (Otorhinolaryngology)

Faculty of Medicine, The University of Hong Kong, Hong Kong

KF CHUNG MBBS, MEd W'gong, MRCPsych, FHKCPsych, FHKAM (Psychiatry)

Department of Psychiatry, Faculty of Medicine, The University of Hong Kong, Hong Kong

KT HUI

SK IP

HL LEUNG

HL LIU

SY LUI

YH NG

MF WONG

TC WONG

Faculty of Medicine, The University of Hong Kong, Hong Kong

Objective:

Premenstrual symptoms are associated with substantial distress and functional impairment. Although studies on premenstrual syndrome (PMS) are advancing at a rapid pace in the Western literature, little is known of the condition among Chinese women. Studies among Western women suggested that psychological factors play an important role in PMS. The present study examined premenstrual symptoms among Chinese female undergraduates in light of their relationship with stress and general mental health.

Methods:

A total of 279 Chinese female undergraduates were surveyed. Symptoms of PMS were assessed by the Chinese Perimenstrual Distress Questionnaire. Both the number and the severity of premenstrual symptoms were assessed. Stress and general mental health were measured by the Life Experience Survey and the General Health Questionnaire respectively.

Results:

Symptoms of PMS were common among Chinese female undergraduates. More than three-quarters (76%) of the respondents reported at least one premenstrual symptom. A total of 11.5% reported more than 15 symptoms. The most commonly reported symptoms were abdominal cramps, mood swing, irritability, fatigue, and losing temper easily. A weak but significant relationship was found between the total number and severity of premenstrual symptoms on the one hand, and stress and poor mental health on the other.

Conclusion:

Contrary to the traditional notion that PMS is a Western culture-bound phenomenon, symptoms of PMS were found to be common among Chinese female undergraduates. Both emotional and somatic symptoms were prominent, suggesting both similarities and differences from the situation in the West. In this cohort, premenstrual symptoms were associated with stress and poor mental health. However, their relationship is weak, suggesting that other factors are implicated in the development of premenstrual symptoms, and that the pathophysiology may be different from that among Western women.

HKJGOM 2005; 5:10-21

Keywords: Chinese; General Health Questionnaire; Mental health; Premenstrual symptoms; Premenstrual syndrome; Stress; Undergraduates

Correspondence to: Dr Antoinette M LEE, Department of Psychiatry, Queen Mary Hospital, Pokfulam, Hong Kong.

Tel: (852) 2855 3961

Fax: (852) 2855 1345

E-mail: amlee@hkucc.hku.hk

Introduction

Premenstrual syndrome (PMS) is characterised by the cyclical recurrence of a variable constellation of physical, psychological, and/or behavioural symptoms which appears in the luteal phase and subsides with the onset of menstrual flow¹⁻⁴. It is a debilitating condition, causing social and occupational impairment in the lives of affected women comparable to that associated with major depressive disorder, and with a burden of disease and disability adjusted life years lost on a par with major recognised disorders^{5,6}. Hence, the quality of life as well as economic implications of PMS should not be overlooked.

Findings from epidemiological studies in the West suggested that PMS is prevalent among women of reproductive age, with 3-9% of women having severe PMS⁷⁻¹⁰. The prevalence of specific PMS symptoms is even higher, with emotional symptoms being the most prevalent, affecting about 50% of women^{5,11}. About 50-80% of women report at least a few premenstrual symptoms⁵, and a significant proportion experience symptoms of moderate or severe intensity¹²⁻¹⁴.

There are at least three gaps in our understanding of PMS. First, most if not all of the major studies on PMS were conducted in the West, with very few data available in the existing PMS literature on non-Western women. Second, despite the psychosomatic nature of PMS, the majority of studies are focused mainly on the biomedical basis of PMS or the sociocultural construction of PMS. There are relatively few studies that examine PMS from a more psychological perspective. Finally, existing studies tend to focus narrowly on PMS as a diagnostic category. However, as some researchers have argued, the construct of PMS is ill-defined¹⁵⁻¹⁷. The term "syndrome" implies a group of symptoms that occur together to constitute a medical condition but a large and variable range of symptoms are associated with PMS and as yet, no core group of symptoms have been empirically identified. Examining PMS in a broader manner as "premenstrual symptoms or distress" is probably a more fruitful approach in advancing our understanding of the condition.

Studies of premenstrual problems among non-Western women are lacking. This perpetuates and reinforces the view that PMS is a Western culture-bound

syndrome, a view first put forward by Johnson⁸ and later reiterated by other researchers^{18,19}. However, preliminary studies conducted among Asian women showed that PMS may be common among Asian women, though the pattern of symptoms may differ from that depicted among Western women²⁰⁻²³. A study of 454 Chinese women in Beijing found the prevalence of PMS to be 30.4%²⁴. Another study of 66 healthy female clerical workers in Hong Kong showed that 92% reported some symptoms during the premenstrual phase. However, they were more likely to experience premenstrual fatigue and pain and less likely to experience premenstrual negative affect²¹. A study of Indian women also showed that somatic symptoms were more common than emotional ones²². However, apart from these sporadic studies, there is a general lack of knowledge of premenstrual problems among Chinese women, and studies in the relationship between premenstrual symptoms and psychological factors are particularly scarce. There is a need to accumulate knowledge on both the prevalence and symptom pattern of PMS among non-Western women, particularly Chinese women who make up a substantial proportion of the world's female population.

The study of PMS among Chinese women has been hampered by methodological problems. Most studies either used self-constructed scales or simply translated Western instruments into Chinese without vigorously testing the psychometric properties and the validity of these instruments. The Chinese Perimenstrual Distress Questionnaire (CPDQ)²⁵ was developed and validated for assessing premenstrual symptomatology among Chinese women. The present study uses this validated instrument to evaluate the prevalence and pattern of premenstrual symptoms among Chinese undergraduate females in Hong Kong.

PMS has traditionally been viewed as a problem of "hormonal imbalance" or abnormal levels of circulating female hormones. Despite years of medical research on PMS, the exact pathophysiology of PMS is still unclear. Hormonal studies of PMS yielded no consistent results^{26,27}. It is now generally accepted that PMS has multiple underlying causes, with biological, psychological and sociocultural factors interacting in causing symptoms in sufferers. Nevertheless, most systematic studies focus either on the biomedical or the sociocultural underpinnings of PMS. The most recent

development in the biomedical investigation of PMS highlights the role of serotonin, in particular, how normal menstrual cycle changes trigger abnormal serotonergic activity²⁶, and focuses on examining the efficacy of selective serotonin reuptake inhibitors²⁸. Sociocultural theorists, on the other hand, emphasise the social construction of PMS and how cultural beliefs shape the experience and manifestation of PMS across different societies¹⁹. Psychological studies of PMS are relatively less developed, and mainly examine the psychological symptoms of PMS rather than the relationship between PMS and psychological factors. A gap thus exists in the biopsychosocial understanding of PMS. A more psychological perspective is warranted.

In the limited psychological literature on PMS, stress is one of the more widely examined risk factors. Previous studies suggested that PMS is stress-related among Western women²⁹⁻³¹. A large-scale study of more than 800 females found that the prevalence of PMS was significantly greater in women who reported high levels of perceived stress in life²⁹. Indeed, it was found that when the women were classified into low, moderate, and high stress groups based on their self-report of perceived stress level, those in the high-stress group were 3.7 times more likely to have PMS than those in the low-stress group, after adjusting for the effects of a wide range of biological, lifestyle and psychological variables. Stress was found to be the most significant risk factor for PMS out of the wide range of variables examined. A smaller study replicated the significance of stress when premenstrual symptomatology instead of the diagnostic category of PMS was examined as the outcome measure³¹. Finally, in a study of 6000 military women, job stress was found to be the strongest risk factor for premenstrual symptoms among other demographic, medical, lifestyle and psychosocial variables³⁰. Those experiencing high job stress were 3 times more likely to report premenstrual symptoms than those with low job stress. Despite these robust findings among Western women, there are no data on the role of stress in PMS among Chinese women. It is unclear if PMS among Chinese women is also strongly stress-related.

Another line of investigation in the psychological study of PMS in the West focused on the general mental health of PMS sufferers. A systematic review of studies in

this area concluded that a significant relationship existed between premenstrual disorder and anxiety and mood problems³². A study of women with PMS found that 55% had scores on the General Health Questionnaire (GHQ) above the cut-off for psychiatric morbidity, indicating that PMS sufferers had high levels of psychological distress³³. Again, there are no data available on the relationship between PMS and poor mental health among Chinese women. Whether the same relationship holds for Chinese women remains an empirical question that is of great relevance, both to the cross-cultural comparison of PMS, and to the management of Chinese women with premenstrual problems.

The present study attempted to fill some of the aforementioned knowledge gaps by establishing the prevalence and pattern of premenstrual symptoms in a group of Chinese female undergraduates, and examining PMS in light of its relationship with stress and poor mental health. Instead of narrowly focusing on the diagnostic category of PMS, a broader focus on "premenstrual symptoms" is adopted.

Methods

Subjects

A total of 452 female undergraduates from a university in Hong Kong were recruited to participate in the study. All recruited respondents were ethnically Chinese and were able to understand written Chinese and to complete the questionnaires independently. The respondents were guaranteed confidentiality and anonymity. Written informed consent was obtained from all the respondents. The study was approved by the university's institutional review board.

Instruments

Each respondent was asked to complete a demographic and menstrual cycle characteristics data sheet, the CPDQ, the Life Experience Survey (LES), and the GHQ.

Premenstrual Symptoms

The CPDQ was used to measure the prevalence and severity of premenstrual symptoms. The CPDQ was developed as a culturally sensitive measure of premenstrual and menstrual symptoms among Chinese women and was validated among Hong

Kong Chinese women of diverse backgrounds²⁵. It included an initial pool of 69 items, with 48 items derived from the widely used Western-derived Moos Menstrual Distress Questionnaire^{34,35} and 21 culturally salient items generated from focus group interviews with Chinese women. Vigorous psychometric testing yielded a final version of 32 items that were found to represent the premenstrual experiences of Chinese women. The CPDQ demonstrated good psychometric properties in terms of reliability, factorial validity, construct validity, and convergent and discriminant validity²⁵. Respondents were asked to rate the presence and severity of each symptom on a 6-point scale from “1: no experience of symptom at all” to “6: symptoms present, very severe” for each of the three phases of menstruation: premenstrual, menstrual and intermenstrual in the past 6 months. Only the premenstrual and intermenstrual scores were analysed in the present study. The score of each premenstrual symptom was obtained by subtracting the intermenstrual score from the premenstrual score. A particular premenstrual symptom was deemed to be present when the value was greater than zero. Premenstrual scores were analysed in two ways: (1) total number of premenstrual symptoms experienced and (2) severity of premenstrual symptoms. There are four subscales in the CPDQ²⁵: Dysphoria (15 items), Somatic Distress (9 items), Cognitive Problem (3 items), and Arousal (5 items). The Dysphoria subscale measures negative mood states such as depressed mood, irritability and anxiety. The Somatic Distress subscale measures physical discomfort associated with PMS, including fatigue, abdominal cramps and backache. The Cognitive Problem subscale includes items reflecting a lack of clarity of mind, such as confusion and lowered judgment. The Arousal subscale measures more positive changes during the premenstrual period, including burst of energy and feelings of well-being. A mean score was obtained for each subscale to represent the severity of each of the four dimensions of premenstrual symptoms. As the Arousal subscale measured more positive premenstrual states, the total premenstrual symptom severity score was calculated by summing the score of the symptoms in the Dysphoria, Somatic Distress, and Cognitive Problem subscales only. Reliability in terms of internal consistency was high for all four subscales,

with Cronbach’s alphas ranging from 0.80 to 0.96.

Stress

Stress was measured by the LES. The LES consists of 50 major life events and assessed the occurrence and impact of the life events in the past year³⁶. For each of the 50 events, respondents were asked to indicate (i) if the event has occurred in the past year, and (ii) for events that have occurred in the past year, to rate the impact of the event using a 7-point scale, from most negative (-3) to most positive (+3). Each respondent had a positive LES score and a negative LES score, computed by adding all the scores of the positively and negatively rated stress items respectively. The advantage of using the LES to assess stress is that it measures both positive and negative impact due to recent life events and not just the occurrence of life events per se.

General Mental Health

The General Health Questionnaire (GHQ-12) is a widely used self-administered screening instrument to identify non-psychotic psychiatric disorders in a community setting³⁷. The validated Chinese version of the GHQ-12³⁸ was used in the present study. The 0-0-1-1 scoring method³⁹ was employed. Higher scores signified poorer mental health.

Statistical Analyses

Statistical analyses were conducted using the Statistical Package for Social Science (Windows version 12.0; SPSS Inc., Chicago, United States). Descriptive statistics were used for analysing the demographic and menstrual characteristics of the sample, and for examining the frequency and severity of premenstrual symptoms among the sample. Pearson correlation was used for preliminary analysis of the relationship between premenstrual symptoms and our variables of interest (LES scores and GHQ scores). Multiple regression analyses were conducted to investigate the extent to which LES and GHQ scores could predict various dimensions of premenstrual symptoms.

Results

Among a total of 452 students recruited, 312 questionnaires were returned, yielding a response rate of 69.2%. Thirty-three questionnaires had missing or invalid responses, yielding a final sample of 279. Age of

Table 1. Percentage of respondents reporting each premenstrual symptom (n=279)

	Premenstrual symptom	Frequency	%*
Factor 1: Dysphoria subscale			
3	Loneliness	45	16.5
6	Anxiety	69	25.1
12	Irritability	92	33.1
13	Mood swing	97	34.9
14	Depressed mood	83	29.9
15	Tension	65	23.4
17	Hypersomnia	61	21.9
18	Impulsivity	34	12.2
19	Anger	73	26.4
20	Fault-finding/Unpleasant	66	23.7
21	Impatience	83	30.1
22	Worry	70	25.4
23	Feeling of loss of control	46	16.7
24	Body dissatisfaction	49	17.9
26	Losing temper easily	83	30.4
Factor 2: Somatic Distress subscale			
2	Take naps, stay in bed	72	26.0
4	Abdominal cramps	124	44.9
5	Dizziness, faintness	46	16.7
7	Backache	61	22.1
10	Fatigue	90	32.8
11	Nausea, vomiting	17	6.1
25	Stomachache	81	29.6
27	Weakness	63	23.1
29	Paleness	47	17.3
Factor 3: Cognitive Problem subscale			
1	Confusion	39	14.3
9	Lowered judgment	30	10.8
16	Blurred vision, blindspots	15	5.5
Factor 4: Arousal subscale			
30	Excitement	9	3.3
31	Affectionate	23	8.4
32	Orderliness	12	4.4
33	Feelings of well-being	14	5.1
34	Bursts of energy, activity	12	4.4

* Percentages are calculated on the basis of valid cases for each premenstrual symptom which may not be the same as the sample size (n=279) for some cases

the respondents ranged from 18 to 33 years (mean=20.1 years, standard deviation [SD]=1.48 years). The mean age at menarche was 12.41 (SD=1.36) years. Of the respondents, 189 (68.7%) had regular menstrual cycles

while 86 (31.3%) had irregular cycles. Most (97.9%) of the respondents were not on contraceptive pills. Most of them were non-smokers (99.6%) and non-drinkers (92.8%).

Frequency and Severity of Premenstrual Symptoms

The frequencies and percent frequencies of each premenstrual symptom are presented in Table 1. Among the various premenstrual symptoms, abdominal cramps was most frequently reported (44.9%), followed by mood swing (34.9%), irritability (33.1%), fatigue (32.8%), and losing temper easily (30.4%). In general, symptoms in the Dysphoria and Somatic Distress subscales were more frequently reported than those in the Cognitive Problem and Arousal subscales.

The majority of respondents (76%) reported at least one premenstrual symptom. A total of 91 (32.6%) respondents had less than five symptoms, 89 (31.9%) had 5 to 15 symptoms, and 32 (11.5%) had more than 15 symptoms. Only 67 (24.0%) respondents reported no premenstrual symptom. The mean number of symptoms was 6.35 (SD=6.98).

The Dysphoria (mean=0.37, SD=0.59) and Somatic Distress subscales (mean=0.37, SD=0.56) had the highest mean subscale scores, followed by the Cognitive Problem subscale (mean=0.12, SD=0.33). The Arousal subscale had the lowest mean subscale score (mean= -0.08, SD=0.48). The mean total premenstrual symptom severity score was 0.34 (SD=0.50). There was no significant correlation between age and total premenstrual symptom severity score, nor was there any significant correlation between age and the four mean subscale scores. Age at menarche was weakly but significantly correlated with the Cognitive Problem ($r=0.16, p<0.05$) and Arousal ($r= -0.16, p<0.05$) subscales but not with the Dysphoria and Somatic

Distress subscales or total premenstrual symptom severity score. T-tests showed no significant differences in severity of premenstrual symptoms (whether in terms of total premenstrual symptom severity score or mean subscale scores) between those with regular cycles and those with irregular cycles. Hence, only age at menarche was controlled for in subsequent analyses.

Stress and General Mental Health

For the LES, 39.6% of the respondents reported positive stress events and 49.8% had negative stress events in the past year. The mean positive LES (positive stress) score was 1.58 (SD=2.90) while the mean negative LES (negative stress) score was -2.15 (SD=3.15). The mean total stress score was -0.66 (SD=3.70), showing that on average, respondents experienced a mild negative stress in the past year. The mean GHQ score in this sample was 2.67 (SD=2.93).

Relationship among Premenstrual Symptoms, Stress and General Mental Health

Pearson correlation analyses showing the relationship of LES and GHQ scores with the number of premenstrual symptoms and severity of premenstrual symptoms are presented in Table 2 and Table 3 respectively. Negative LES score was significantly correlated with total number of premenstrual symptoms ($r= -0.14, p<0.05$), and with total number of premenstrual Dysphoria symptoms ($r= -0.13, p<0.05$) and premenstrual Somatic Distress ($r= -0.15, p<0.05$) symptoms. Positive LES score, however, was not correlated with the total number of premenstrual symptoms or number of symptoms in any of the four subscales.

Table 2. Correlation matrix showing relationship between number of premenstrual symptoms and negative and positive life event stress, and General Health Questionnaire (GHQ) scores

	Negative LES*	Positive LES	GHQ
Total number of premenstrual symptoms	-0.1413 [†]	0.0605	0.1435 [†]
Total number of Dysphoria symptoms	-0.1284 [†]	0.0556	0.1263 [†]
Total number of Somatic Distress symptoms	-0.1478 [†]	0.0810	0.1158
Total number of Cognitive Problem symptoms	-0.1189	-0.0060	0.1353 [†]
Total number of Arousal symptoms	0.0130	-0.0178	0.1095

* LES denotes Life Experiences Survey

[†] $p<0.05$

Table 3. Correlation matrix showing relationship between severity of premenstrual symptoms and negative and positive life event stress, and General Health Questionnaire (GHQ) scores

	Negative LES*	Positive LES	GHQ
Total premenstrual symptom severity score	-0.1379 [†]	0.1019	0.1850 [‡]
Mean Dysphoria subscale score	-0.1241 [†]	0.1012	0.1846 [‡]
Mean Somatic Distress subscale score	-0.1269 [†]	0.0906	0.1435 [†]
Mean Cognitive Problem subscale score	-0.0954	0.0018	0.1260 [†]
Mean Arousal subscale score	0.0928	-0.0447	0.0308

* LES denotes Life Experiences Survey

[†] $p < 0.05$

[‡] $p < 0.01$

With respect to the relationship between LES scores and severity of premenstrual symptoms, negative LES score was significantly associated with total premenstrual symptom severity score ($r = -0.14$, $p < 0.05$), mean Dysphoria subscale score ($r = -0.12$, $p < 0.05$), and mean Somatic Distress subscale score ($r = -0.13$, $p < 0.05$). Again, positive LES score was not associated with total premenstrual symptom severity score or any of the four mean subscale scores.

GHQ score was significantly correlated with total number of premenstrual symptoms ($r = 0.14$, $p < 0.05$), and with total number of premenstrual Dysphoria symptoms ($r = 0.13$, $p < 0.05$) and premenstrual Cognitive Problem symptoms ($r = 0.14$, $p < 0.05$). Significant positive correlations were also found between GHQ score and total premenstrual symptom severity score ($r = 0.19$, $p < 0.01$), and between GHQ score and mean Dysphoria subscale score ($r = 0.18$, $p < 0.01$), mean Somatic Distress subscale score ($r = 0.13$, $p < 0.05$), and mean Cognitive Problem subscale score ($r = 0.13$, $p < 0.05$).

GHQ score was significantly correlated with negative LES score ($r = -0.23$, $p < 0.001$), showing that higher stress levels brought about by negative life events were associated with poorer mental health. GHQ was moderately but significantly related to positive LES ($r = -0.16$, $p < 0.01$), signifying that those who experience less positive stress tended to have poorer mental health.

Given the intercorrelations among GHQ, negative LES and positive LES scores, a series of multiple regression analyses were conducted in order to examine the relative predictive power of LES scores and GHQ score on various dimensions of premenstrual symptoms. Negative LES score, positive LES score, and GHQ score were entered as predictor variables. Total number of premenstrual symptoms and number of premenstrual symptoms in each of the four subscales were entered as the dependent variables. Table 4 shows the results of these multiple regression analyses. Table 5 shows the results of analyses with severity of premenstrual symptoms (total premenstrual symptom severity score and the four mean

Table 4. Summary of multiple regression analyses results showing significant predictors of total number of premenstrual symptoms

Outcome measures	Significant predictor(s)*	R ²	Standardised beta	<i>t</i>	<i>p</i>
Total No. of premenstrual symptoms	Negative LES	0.019	-0.14	-2.337	0.020
No. of Dysphoria symptoms	GHQ	0.015	0.12	2.040	0.042
No. of Somatic Distress symptoms	Negative LES	0.020	-0.14	-2.386	0.018
No. of Cognitive Problem symptoms	No significant predictor				
No. of Arousal symptoms	No significant predictor				

* LES denotes Life Experiences Survey, and GHQ General Health Questionnaire

Table 5. Summary of multiple regression analyses results showing significant predictors of severity of premenstrual symptoms

Outcome measures	Significant predictor(s)*	R ²	Standardised beta	t	p
Total premenstrual symptom severity	GHQ	0.033	0.18	3.082	0.002
Mean of Dysphoria score	GHQ	0.033	0.18	3.056	0.002
Mean of Somatic Distress score	GHQ	0.019	0.15	2.467	0.014
Mean Cognitive Problem score	No significant predictor				
Mean Arousal Score	No significant predictor				

* GHQ denotes General Health Questionnaire

subscale scores) as the dependent variables.

For number of premenstrual symptoms, it was found that negative LES score was the only significant predictor of total number of premenstrual symptoms ($\beta = -0.14$, $t = -2.337$, $p < 0.05$) and number of premenstrual Somatic Distress symptoms ($\beta = -0.14$, $t = -2.386$, $p < 0.05$) while GHQ score was the only significant predictor of number of premenstrual Dysphoria symptoms ($\beta = 0.12$, $t = 2.040$, $p < 0.05$). It should, however, be noted that the percentages of variance explained were very small, being 1.9%, 2.0%, and 1.5% for total number of premenstrual symptoms ($R^2 = 0.019$, $F = 5.460$, $p < 0.05$), number of premenstrual Somatic Distress symptoms ($R^2 = 0.020$, $F = 5.693$, $p < 0.05$), and number of premenstrual Dysphoria symptoms ($R^2 = 0.015$, $F = 4.161$, $p < 0.05$) respectively. None of the three predictors examined could significantly predict number of Cognitive Problem and Arousal symptoms.

A different pattern was observed for severity of premenstrual symptoms, with GHQ score being the only significant predictor of total premenstrual symptom severity score ($\beta = 0.18$, $t = 3.082$, $p < 0.01$), mean Dysphoria subscale score ($\beta = 0.18$, $t = 3.056$, $p < 0.01$), and mean Somatic Distress subscale score ($\beta = 0.15$, $t = 2.467$, $p < 0.05$). Again, the percentages of variance explained were very small, with only 3.3% of total premenstrual symptom severity score ($R^2 = 0.033$, $F = 9.499$, $p < 0.01$), 3.3% of mean Dysphoria subscale score ($R^2 = 0.033$, $F = 9.340$, $p < 0.01$), and 1.9% of mean Somatic Distress subscale score ($R^2 = 0.019$, $F = 6.084$, $p < 0.05$) being explained by GHQ score. None of the 3 predictors examined could significantly predict mean Cognitive Problem and Arousal subscale scores. The overall pattern shows that poor mental health as well as stress are of

limited value in predicting premenstrual problems.

Discussion

Our study showed that premenstrual problems are common among Chinese female undergraduates in Hong Kong. This is reflected by the fact that 76% of Chinese female undergraduates surveyed reported varying degrees of premenstrual symptomatology. Indeed, only 24% were free of premenstrual symptoms. On average, Chinese female undergraduates had about six premenstrual symptoms. This substantiated previous findings on the existence of premenstrual problems among Chinese females^{21,23}, and challenged the previous assumption in the literature that premenstrual problems are by and large a Western phenomenon^{8,19}. More than one-tenth of Chinese female undergraduates had more than 15 symptoms. The fact that such a considerable proportion of undergraduate females reported a large number of premenstrual symptoms calls for concern.

Dysphoria and Somatic Distress symptoms were most commonly reported. The most frequent symptom was abdominal cramps, followed by mood swing, irritability and fatigue. This is only partially in line with the findings of a previous study done in Hong Kong a decade ago on Chinese women which found that fatigue and pain featured most highly among the reported premenstrual symptoms with emotional symptoms being relatively less frequently reported. In our study, fatigue was also found to be one of the most common premenstrual symptoms but emotional symptoms also featured very prominently as the most frequently reported symptoms.

As premenstrual experiences are socially and culturally shaped¹⁹, and Hong Kong society has been

dramatically transformed over the past decade due to globalisation and westernisation, the difference in results may represent a change in experiences that are socially mediated as Hong Kong women rapidly assimilate Western values and cultural ideas. Another possibility is that the previous study used an unvalidated translation of the Moos Menstrual Distress Questionnaire while a culturally sensitive and validated measure of premenstrual symptoms was used in our study, hence our study could more accurately reflect the premenstrual problems experienced by Chinese females in Hong Kong. It appears from the findings of our study that the picture is becoming closer in resemblance to the situation in the West, with emotional symptoms especially mood swing, irritability, losing temper easily and depressed mood being highly prominent^{7,40}. However, cultural distinctiveness does exist. For example, fatigue was commonly reported among Chinese women but infrequently reported by Western women⁴¹.

The overall pattern of premenstrual symptoms demonstrated in the present study was that both emotional and somatic symptoms were common. On the other hand, cognitive problems and positive experiences in the form of Arousal symptoms were much less common. That emotional symptom featured so prominently as some of the most commonly reported premenstrual symptoms in our study is in contrast to the widely held notion among previous cross-cultural researchers that Chinese people are not as psychologically-minded as their Western counterparts, and are therefore inclined to “somatise” their distress. The high frequency of emotional forms of premenstrual symptoms reported did not support such an argument.

Within the domain of premenstrual Dysphoria symptoms, a range of emotional symptoms were reported. Among these, irritability and mood swing were the most prevalent. Depressed mood, though also common, was less commonly reported than irritability and mood swing. This is consistent with findings of recent studies in the West which found that irritability and affective lability are more common than depressed mood or anxiety^{42,43}. Such concordant findings have implications for our further understanding of PMS, and for appreciating the cross-cultural similarities in premenstrual experiences.

Studies conducted in the West found a strong reciprocal relationship between stress and PMS, with stress being one of the most significant predictors of premenstrual symptoms²⁹⁻³¹. Our study also demonstrated a generally significant relationship among Chinese women. However, our findings added to our further understanding of the relationship between stress and premenstrual symptoms by providing additional insight into the complex relationships involved. In examining the predictive power of stress on premenstrual symptoms, we showed that while stress caused by negative life events was associated with the total number of premenstrual symptoms and premenstrual somatic distress, stress caused by positive life events was not related to any dimension of premenstrual symptoms. Such findings pointed to the multidimensional nature of stress, and showed that the relationship between stress and premenstrual problems needs to be examined in more specific details. Life events, when perceived positively, are not associated with premenstrual symptoms. Those that are perceived negatively, however, do predict premenstrual symptoms.

When the effects of both stress and poor mental health were considered in multiple regression analyses, poor mental health was found to be a significant predictor of the severity of premenstrual dysphoria and somatic distress and overall premenstrual symptoms, as well as the total number of premenstrual dysphoria symptoms. Negative stress, on the other hand, was a significant predictor of the total number of premenstrual symptoms and the number of premenstrual somatic distress. Judging from this, it seems that poor mental health is a better predictor of the severity of premenstrual symptoms than stress, while stress is a better predictor of number of premenstrual symptoms. When an individual is under great stress, she may experience more premenstrual symptoms though not necessarily more severe ones. This may be because an individual tends to be more vigilant of physical and psychological changes when under stress, and hence notice and report more symptoms. Severity of symptoms, on the other hand, is related to general mental health. Putting it differently, one may argue that the severity of premenstrual problems may reflect an individual's general mental health status. However, the exact mechanisms by which premenstrual symptoms, stress, and poor mental health are related certainly need further study.

Neither stress nor poor mental health was associated with arousal symptoms. This suggests that arousal symptoms are different in nature from other dimensions of premenstrual symptoms. To a lesser extent, premenstrual cognitive problems are also not very strongly associated with stress and poor mental health. The Cognitive Problem subscale was weakly correlated with GHQ scores in correlational analyses but failed to be predicted by GHQ scores at all in multiple regression. Although premenstrual cognitive problems may be tied loosely to poor mental health, their relationship is definitely not strong. This points to the multidimensional nature of premenstrual problems. There are likely different aspects of premenstrual problems, with different pathways leading to these different forms of premenstrual symptomatology. Aggregating them indiscriminately as PMS is probably an overly simplistic way of understanding premenstrual problems. It is more fruitful to study different forms of premenstrual symptoms separately. Much work is also needed to elucidate the factors that contribute to the occurrence of each of the different forms of premenstrual problems. Such knowledge will aid our understanding of the etiology of the different forms of premenstrual symptoms, and ultimately, in finding efficacious treatment for different forms of premenstrual problems.

Despite the generally similar pattern of premenstrual symptoms reported in the West and in our sample, the relationship between premenstrual symptoms and stress and poor mental health in our sample seems to be very different from what we know among Western women. Both stress and poor mental health are of limited value in predicting either number or severity of premenstrual problem among Chinese women as they could only explain about 2-3% of the variance in premenstrual scores. This suggests that other psychological or medical variables are probably responsible for causing premenstrual symptoms among Chinese women. This is in contrast to the picture in the West, in which stress and poor mental health were found to be among the strongest predictors of premenstrual problems. That they were found to be of limited use in our study for understanding and predicting premenstrual symptoms suggests that the pathophysiology of premenstrual problems may be quite different for Western and Chinese women. Further studies are needed to identify etiological factors of premenstrual symptoms that are relevant in the Chinese context.

Our study has several limitations. First, only Chinese female undergraduates in Hong Kong were examined. Hence, the generalisability of our findings is limited to this group of Chinese females. We do not know if the frequency and pattern of premenstrual symptoms and their relationship with stress and poor mental health may be different among other groups of females in Hong Kong, and by that matter, females in other parts of China. Our study is also limited by the fact that assessment of premenstrual symptoms was based on retrospective ratings of the frequency and severity of symptoms. It has been argued that prospective daily charting is preferred as retrospective ratings tend to amplify the severity of premenstrual symptoms but it has also been proven that retrospective rating provides a good indication of respondents' overall premenstrual experiences⁴⁴. Steiner and Streiner⁴⁵ actually demonstrated comparable results between prospective and retrospective assessment of premenstrual symptoms. Prospective daily charting is an extremely tedious task for the respondents and would drastically reduce the response rate and sample size. Balancing the pros and cons of these two kinds of assessment, we had chosen to use retrospective rating with an instrument that asked respondents to separately rate the presence and severity of symptoms in all three phases (premenstrual, menstrual and intermenstrual) of their menstrual cycles in the past 6 months, from which premenstrual increase of symptom score can be calculated to represent the presence and severity of premenstrual symptoms. This is a better option than asking the respondents to simply indicate whether and to what extent they experienced a range of symptoms in the premenstrual phase.

Despite these limitations, our study contributes to our understanding of premenstrual problems among Chinese women by providing much needed preliminary information about the rate and pattern of premenstrual symptoms and its relationship with stress and poor mental health, and by suggesting future directions to take in further investigation of this subject matter. What we now know is that premenstrual symptoms are highly common among Chinese women, and that the pattern is generally similar to that in the West though some culturally distinct features are noted. What we know much less about are the salient predictors of premenstrual symptoms. It seems that stress and poor mental health are somewhat related to the experience

of premenstrual symptoms but their predictive power is not strong. In all likelihood, stress is only related to the awareness of premenstrual symptoms and not in itself a significant contributor to the development of premenstrual symptoms. Poor mental health is also not a strong predictor of premenstrual symptoms. Future studies should continue in the search for factors that

can meaningfully predict premenstrual symptoms among Chinese women. This will then guide prevention and treatment efforts. Much work is needed in this area, especially now that we have documented that premenstrual symptoms are prevalent among Chinese women and deserves attention from clinicians and researchers alike.

References

1. Frank RT. The hormonal causes of premenstrual tension. *Arch Neurol Psychiatry* 1931; 26:1053-1057.
2. Ling FW. Recognizing and treating premenstrual dysphoric disorder in the obstetric, gynecologic, and primary care practices. *J Clin Psychiatry* 2000; 61 Suppl 12:9-16.
3. Reid RL, Yen SS. Premenstrual syndrome. *Am J Obstet Gynecol* 1981; 139:85-104.
4. Smith S, Schiff I. Modern Management of Premenstrual Syndrome. *New York: Norton Medical Books*, 1993.
5. Halbreich U, Borenstein J, Pearlstein T, et al. The prevalence, impairment, impact, and burden of premenstrual dysphoric disorder (PMS/PMDD). *Psychoneuroendocrinology* 2003; 28 Suppl 3:1-23.
6. Pearlstein TB, Halbreich U, Batar ED, et al. Psychosocial functioning in women with premenstrual dysphoric disorder before and after treatment with sertraline or placebo. *J Clin Psychiatry* 2000; 61:101-109.
7. Angst J, Sellaro R, Merikangas KR, et al. The epidemiology of premenstrual psychological symptoms. *Acta Psychiatr Scand* 2001; 104:110-116.
8. Johnson TM. Premenstrual syndrome as a western culture-specific disorder. *Cult Med Psychiatry* 1987; 11:337-356.
9. Merikangas KR, Foeldenyi M, Angst J. The Zurich Study. XIX. Patterns of menstrual disturbances in the community: results of the Zurich Cohort Study. *Eur Arch Psychiatry Clin Neurosci* 1993; 143:23-32.
10. Ramcharan S, Love EJ, Fick GH, et al. The epidemiology of premenstrual symptoms in a population-based sample of 2560 urban women: attributable risk and risk factors. *J Clin Epidemiol* 1992; 45:377-392.
11. Halbreich U, Endicott J, Schacht S, et al. The diversity of premenstrual changes as reflected in the Premenstrual Assessment Form. *Acta Psychiatr Scand* 1982; 65:46-65.
12. Campbell EM, Peterkin D, O'Grady K, et al. Premenstrual symptoms in general practice patients. Prevalence and treatment. *J Repro Med* 1997; 42:637-646.
13. de la Gandara Martin JJ, de Diego Herrero E. Premenstrual dysphoric disorder: an epidemiological study [in Spanish]. *Actas Luso Esp Neurol Psiquiatr Cienc Afines* 1996; 24:111-117.
14. Hylan TR, Sundell K, Judge R. The impact of premenstrual symptomatology on functioning and treatment-seeking behavior: experience from the United States, United Kingdom, and France. *J Womens Health Gend Based Med* 1999; 8:1043-1052.
15. Richardson JT. The premenstrual syndrome: a brief history. *Soc Sci Med* 1995; 41:761-767.
16. Sampson GA. Definition of premenstrual syndrome and related conditions. In: Brush MG, Goudsmit EM, (eds) *Functional Disorders of the Menstrual Cycle*. Wiley: Chichester, 1988, p37.
17. Ussher JM. The demise of dissent and the rise of cognition in menstrual-cycle research. In: Richardson JT, (ed) *Cognition and the Menstrual Cycle*. Berlin: Springer, 1992, p132.
18. Chrisler JC. PMS as a culture-bound syndrome. In: Chrisler JC, Golden C, Rozee PD, (eds) *Menstruation, Health and Illness*. Washington DC: Hemisphere, 1991, pp73-83.
19. Chrisler JC, Caplan P. The strange case of Dr.

- Jekyll and Ms. Hyde: how PMS became a cultural phenomenon and a psychiatric disorder. *Annu Rev Sex Res* 2002; 13:274-306.
20. Chandra PS, Chaturvedi SK. Cultural variations of premenstrual experience. *Int J Soc Psychiatry* 1989; 35:343-349.
 21. Chang AM, Holroyd E, Chau JP. Premenstrual syndrome in employed Chinese women in Hong Kong. *Health Care Women Int* 1995; 16:551-561.
 22. Chaturvedi SK, Chandra PS, Gururaj G, et al. Prevalence of premenstrual symptoms and syndromes: preliminary observations. *Nimhans J* 1994; 12:9-14.
 23. Yu M, Zhu X, Li J, et al. Perimenstrual symptoms among Chinese women in an urban area of China. *Health Care Women Int* 1996; 17:161-172.
 24. Zhao G, Wang L, Qu C. Prevalence of premenstrual syndrome in reproductive women and its influential factors [in Chinese]. *Zhonghua Fu Chan Ke Za Zhi* 1998; 33:222-224.
 25. Lee AM. Perimenstrual distress: its measurements and relationship with psychological variables among Chinese women in Hong Kong. *Dissertation Abstracts Int* 2001; 61:4413.
 26. Condon JT. Premenstrual syndrome in primary care: an update. *Primary Care Psychiatry* 2001; 7:85-90.
 27. Yonkers KA, Davis LL. Premenstrual dysphoric disorder. In: Sadock BJ, Sadock VA, (eds) *Comprehensive Textbook of Psychiatry*, 7th edition. Philadelphia, Baltimore: Lippincott Williams & Wilkins, 2000, pp1952-1958.
 28. Dimmock PW, Wyatt KM, Jones PW, et al. Efficacy of selective serotonin-reuptake inhibitors in premenstrual syndrome: a systematic review. *Lancet* 2000; 356:1131-1136.
 29. Deuster PA, Adera T, South-Paul J. Biological, social, and behavioral factors associated with premenstrual syndrome. *Arch Fam Med* 1999; 8:122-128.
 30. Hourani LL, Yuan H, Bray RM. Psychosocial and lifestyle correlates of premenstrual symptoms among military women. *J Womens Health (Larchmt)* 2004; 13:812-821.
 31. Lustyk MK, Widman L, Paschane A, et al. Stress, quality of life and physical activity in women with varying degrees of premenstrual symptomatology. *Women Health* 2004; 39:35-44.
 32. Yonkers KA. Anxiety symptoms and anxiety disorders: how are they related to premenstrual disorders? *J Clin Psychiatry* 1997; 58 Suppl 3:62-69.
 33. Hart WG, Coleman GJ, Russell JW. Psychiatric screening in the premenstrual syndrome. *Med J Aust* 1987; 146:518-522.
 34. Moos RH. The development of a menstrual distress questionnaire. *Psychosom Med* 1968; 30:853-867.
 35. Moos RH. *Menstrual Distress Questionnaire Manual. Department of Psychiatry, Stanford University and Veterans Administration, Palo Alto, California, 1977.*
 36. Sarason IG, Johnson JH, Siegel JM. Assessing the impact on life changes: development of the Life Experiences Survey. *J Consult Clin Psychol* 1978; 46:932-946.
 37. Goldberg DP, Gater R, Sartorius N, et al. The validity of two versions of the GHQ in the WHO study of mental illness in general health care. *Psychol Med* 1997; 27:191-197.
 38. Chan DW. The Chinese version of the General Health Questionnaire: does language make a difference? *Psychol Med* 1985; 15:147-155.
 39. Goldberg DP, Williams P. *The User's Guide to the General Health Questionnaire. Berkshire: NFER/Nelson, Slough, 1988.*
 40. Moos R. *Menstrual Distress Questionnaire. Los Angeles: Western Psychological Services, 1991.*
 41. Warner P, Bancroft J. Factors related to self-reporting of the pre-menstrual syndrome. *Br J Psychiatry* 1990; 157:249-260.
 42. Hartlage SA, Arduino KE. Toward the content validity of premenstrual dysphoric disorder: do anger and irritability more than depressed mood represent treatment-seekers' experiences? *Psychol Rep* 2002; 90:189-202.
 43. Landen M, Eriksson E. How does premenstrual dysphoric disorder relate to depression and anxiety disorders? *Depress Anxiety* 2003; 17:122-129.
 44. Haywood A, Slade P, King H. Assessing the assessment measures for menstrual cycle symptoms: a guide for researchers and clinicians. *J Psychosom Res* 2002; 52:223-237.
 45. Steiner M, Streiner DL. Validation of a revised visual analog scale for premenstrual mood symptoms: results from prospective and retrospective trials. *Can J Psychiatry* 2005; 50:327-332.