

## Premenstrual Distress among Caucasian, African-American and Chinese Women

Cindy Davis<sup>1\*</sup>, Melissa Sloan<sup>2</sup> and Catherine Tang<sup>3</sup>

<sup>1</sup>University of Tennessee, College of Social Work, USA

<sup>2</sup>Department of Sociology, University of South Florida, USA

<sup>3</sup>Department of Psychology, National University of Singapore, Singapore

### Abstract

While clinical research on Premenstrual Syndrome (PMS) has focused mainly on women's prevalence and symptomatology in the west, PMS is a disorder that affects women of many cultures. A limited number of cross-cultural studies have compared the western experience of PMS with that of other cultures and have found that the prevalence of specific symptoms varies amongst cultures. Given the lack of research on PMS across cultures, this study explores the symptoms of PMS in Caucasian and African-American women in the US and Chinese women in Hong Kong and the differences and/or similarities among these groups. This research study utilized a quantitative survey research design with a convenience sample of 700 women (193 African-American, 180 Caucasian and 327 Chinese) aged between 20 to 55 years in both the US and Hong Kong. It was found that race/ethnicity significantly contributes to the prediction of each symptom subscale with the exception of the autonomic symptoms. The amount of variance in symptoms that can be explained by race/ethnicity ranges from about 5% (for pain symptoms) to almost 19% (for arousal symptoms). In general, the Chinese participants reported significantly fewer premenstrual distress symptoms than African-American and Caucasian participants. The results suggest this is true in the case of pain-related symptoms and concentration-related symptoms. In addition, compared to the Caucasian and African-American participants, the Chinese participants reported significantly lower levels of affective symptoms.

**Keywords:** Premenstrual distress; PMS; Women; African American; Chinese; Race

### Introduction

Premenstrual syndrome, or PMS, is a cluster of symptoms that occurs during the luteal phase of a woman's menstrual cycle, which is the week prior to menses. Generally, symptoms subside within a few days of the onset of menses [1]. It is estimated that up to 75% of women experience mild premenstrual changes [2], but due to inconsistencies in the ways PMS is defined and assessed, and differences that result from variations in the sample size of women selected for each study, research yield widely varying results in terms of how many women are affected [3]. Symptoms can manifest physically and emotionally to include acne, breast tenderness, insomnia, head and back ache, changes in appetite, joint and muscle pain, tiredness, diarrhea or constipation, cramping in the lower abdominal area, trouble concentrating or remembering, tension, irritability, mood swings, crying spells, anxiety and depression [4].

Symptom occurrence and severity varies widely between individuals, with some women reporting only mild premenstrual discomfort while others experience symptoms that are debilitating [5]. Some research suggest that the presence of PMS symptoms during a woman's menstrual cycle may be associated with depression, increased absenteeism from work, decreased productivity at work, and an impacted quality of life [2,3]. While most women report experience only minor physical and emotional premenstrual changes, a small percentage (3-5%) experience symptoms so severe that daily functioning is affected. They may be diagnosed with a severe form of PMS called Premenstrual Dysphoric Disorder (PMDD) [4]. Women with PMDD often experience a significant decline in interpersonal functioning in intimate friendships because of marked mood swings, depression and anxiety [6].

The causes of PMS are not entirely known, however hormonal shifts, diet, stress, neurotransmitters, lifestyle, and relational factors are factors that potentially contribute to PMS [2,7-9]. Research suggests that women's attitudes about menstruation are related to their perception of the presence and severity of PMS symptoms. Women

with unfavorable attitudes toward menstruation present with more frequent and more intense premenstrual symptomatology, and women who considered menstruation a "debilitating" event (as opposed to a bothersome occurrence) report more symptoms [10]. Additionally, studies demonstrate a positive relationship between depression and PMS symptomatology [11,12] and well as positive relational factors and decreased PMS symptomatology [2,8,13].

PMS and PMDD are sometimes referred to as a "cultural bound syndrome" generally limited to Western countries [9,14]. A limited number of comparative cross-cultural studies have looked at how the experience of premenstrual symptoms varies from culture to culture. A World Health Organization (WHO) study on menstruation (1981) surveyed 5,322 women from Egypt, India, Indonesia, Jamaica, Korea, Mexico, Pakistan, Philippines, United Kingdom and Yugoslavia. Researchers found cross-cultural trends in attitudes about menstruation (i.e. having your period is "dirty") and in beliefs about behavioral restrictions during menstruation (i.e. you should not have sex when you have your period) [15]. Other beliefs about behavior norms during menstruation varied from culture to culture. For example, women in some countries believed that they should not wash their hair while menstruating, and, in other countries, women reported that proscriptions were placed on their social activity. The majority of women in all cultures report some premenstrual physical discomfort in addition to negative mood changes, however fewer women report mood change than physical change. The main cross-cultural difference was in the prevalence of specific symptoms [15].

**\*Corresponding author:** Dr. Cindy Davis, University of Tennessee, College of Social Work, 193E Polk Avenue Nashville, TN 37210, USA, Tel: 615-256-1885; Fax: 615-248-8823; Email: [cdavis3@utk.edu](mailto:cdavis3@utk.edu)

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Although studies on PMS in minority women and across cultures are limited, there is evidence that women's experience of PMS differs across cultures, especially in terms of the prevalence of symptoms. The prevalence of PMS remains higher among Western women than women in other cultures [16]. Among Afro-Caribbean, Caucasian, and Asian women residing in Britain, Caucasian women have significantly higher levels of PMS than the other two groups [17]. Woods et al. (1982) studied 241 women in the US and found that African-American women were significantly less likely than Caucasians to experience menstrual cramps, crying, and anxiety, but they were more likely to experience weight gain, headache, fatigue, and swelling [18]. In contrast, Kritz-Silverstien et al. (1999) found that African-American women in the U.S. Navy had a higher proportion of menstrual cycle symptoms, particularly bleeding between periods and scanty menstrual flow [19].

Takeda and colleagues (2006) looked at prevalence rates of premenstrual symptoms in Japanese women. As compared to the previously reported prevalence in Western women [20], Japanese women reported similar levels of premenstrual symptoms in general, however they were significantly less likely to report moderate to severe PMS or PMDD symptoms than were their Western counterparts [21]. Furthermore, Pilver and colleagues found that exposure to American culture increased ethnic minority women's likelihood for PMDD.

Research shows that the way in which menstruation is described (as a positive, negative, or neutral event) can influence a woman's attitude towards the experience [22]. In a study that examined women's attitudes towards menstruation using the Menstrual Attitude Questionnaire, Indian women were shown to have more positive attitudes toward menstruation than American women [23]. Hoerster, Chrisler, and Rose posit that an explanation for these differing attitudes may lie with the nature of the information on menstruation with which Indian and American women are presented. Indian women report that they are presented mainly with positive and neutral information about the menstrual cycle and cite magazines as the only source of negative information, whereas American women report receiving negative information from multiple sources. Pal and colleagues [24] examined prevalence rates of premenstrual symptoms in Pakistani women and found that 98.8% of women studied had no knowledge of or PMDD but that the symptoms of these disorders greatly affected Pakistani women and had significant impact on daily life [24]. 69% of these women reported that activities such as housekeeping, interactions with friends and colleagues, school/university attendance, family relationships and work performance were affected in some way by symptoms while 8% reported that these activities were severely affected. This indicates that even women who are not educated about the disorder still experience disruption of daily life from its symptomology. Similarly, Choi and colleagues studied the prevalence of premenstrual symptoms in Korean women and found that Korean women typically considered premenstrual symptoms to be a natural occurrence for which medical treatment is not needed. However, the majority, 91.5%, did not know the diagnostic terms *PMS* or *PMDD* and Choi and colleagues suggest that their attitude towards symptoms may be due to their lack of clinical knowledge about these problems [25].

Lee and colleagues assessed both prevalence rates and the nature of premenstrual symptoms among Chinese women in Hong Kong (2007), and their findings further suggest that cultural understandings of health and body greatly influence the way premenstrual and menstrual symptoms are experienced. Their results demonstrate that premenstrual symptoms are experienced by Chinese women with similar prevalence as in the west but are reported differently [26]. For Chinese women, a wide range of somatic symptoms that included pain,

autonomic changes, and behavioral changes were viewed as a single factor, which is distinctly different from the way these symptoms are experienced separately by women in western cultures [27]. Lee and colleagues' findings suggest that the influence of Traditional Chinese Medicine's conceptualization of health in which the body is viewed as an integrated and interconnected unit causes symptoms of PMS to be described differently than in the West [26]. In this way, their research points out the importance of using culturally-relevant scales and questions to gather information about PMS.

In order to have a greater understanding of PMS, more research is needed across ethnic and cultural groups [14,27]. Given the scant research on PMS across cultures, the primary hypotheses of this study are as follows: (a) The symptoms of PMS in Caucasian and African-American women in the US will be similar but greater than those reported by Chinese women in Hong Kong. (b) A positive association between PMS and depressive symptomatology and psychological factors will exist among all groups and (c) The manifestation of PMS will vary among the three groups.

## Methods

This research study utilized a quantitative survey research design with a convenience sample of women aged between 20 to 55 years in both the US (Caucasian and African-American) and Hong Kong (Chinese). The U.S. Census (2013) reported that Asians were the nations fastest growing race or ethnic group in 2012. The Asian population in the U.S. increased 530,000 or by 2.9 percent in the previous year [28]. Thus, the expected increase of Asians in the U.S. makes this population a concern for health care providers. Hong Kong was selected as a comparison site to the US because it has had a greater exposure to Westernization as compared to many other Asian countries, which would minimize the effect of Westernization on study results. However, it is important to note that those women living in Hong Kong cannot be generalized to those living in the USA. Participants were recruited through various community centers for women, work settings, churches and women's organizations. As the present sample was non-random, caution must be taken that it may not be representative of the target population. All participants voluntarily participated in the research and no identifying information was collected from participants.

Research assistants distributed questionnaires and business reply envelopes to participants at the various settings. Participants were asked to complete a self-administered questionnaire that took about 30 minutes to complete at their own leisure. Participants were asked to return the questionnaire in person to the research assistant or via an attached business reply envelope provided by the researcher. Participants were offered a token incentive of a \$5 gift card to participate in the study regardless of whether they returned the questionnaire. Prior to contacting participants, appropriate IRB approval was obtained for the study.

### Measures:

The questionnaire included the various standardized scales, and the demographic and menstrual cycle characteristics data sheet including: age, marital status, educational background, occupation, household income, number of children, age at menarche, regularity of menstruation, date of last menstruation, use of contraceptive measure, use of hormonal or other gynecological treatment, history of miscarriage and gynecological surgery and whether the respondent was menstruating at the time of completing questionnaire.

Menstrual distress was measured by the 30-item Chinese Menstrual

	Mean (s.d.) or Percent			ANOVA F	χ <sup>2</sup>	GLM F
	African-American	Caucasian	Chinese			
Number of Children	2.3 (1.3)	1 (1.3)	2.1 (0.93)	62.8**		3.9*
Age at first menarche	12.5 (1.6)	12.4 (1.4)	13.52 (1.2)	30.1***		8.3***
Menstrual regularity	1.9 (0.95)	1.8 (1.0)	1.80 (0.83)	.81		0.218
Number of miscarriages	0.39 (0.75)	0.17 (0.46)	0.63 (0.93)	16.6**		2.9
Contraceptive pills (% yes)	18.9%	29.4%	6.7%		52.1***	6.69***
Gyn. problems/ surgery	36%	39%	27%		9.0*	0.865

\*p<0.05, \*\*p<0.01, \*\*\*p<0.001, two-tailed test

Table 1: Group Differences in Menstrual Experiences.

Premenstrual Distress Symptom Subscales	Race/Ethnicity	Mean	Std. Deviation
Pain	African-American	2.022	0.945
	Chinese	1.573	0.727
	Caucasian	2.032	0.956
Concentration	African-American	1.735	0.894
	Chinese	1.334	0.605
	Caucasian	1.907	0.958
Autonomic	African-American	1.398	0.716
	Chinese	1.196	0.484
	Caucasian	1.303	0.521
Affective	African-American	2.181	1.203
	Chinese	1.466	0.681
	Caucasian	2.472	1.247
Arousal	African-American	1.785	0.903
	Chinese	1.202	0.372
	Caucasian	2.162	0.977

Table 2: Mean Scores on the Premenstrual Distress Symptom Subscales by Race/Ethnicity.

Distress Questionnaire [26] and the 47-item Moos Menstrual Distress Questionnaire (Moos, 1968). Both questionnaires were given to all participants and used to determine the common as well as unique clusters of symptoms for women in the two regions. Two measures were translated and back translated into Chinese and English by trained professionals. Procedures that ensured transliterational and conceptual equivalence of the two scales were followed. For the present study, the internal consistency coefficient was 0.85.

Psychological distress was measured using the 28-item General Health Questionnaire (GHQ) [29]. The Chinese version of the scale is also widely used in Hong Kong and shows good internal consistency factorial integrity [30,31]. It demonstrates high internal consistency (alpha ranged from 0.87 to 0.93), and correlates with the Chinese State-Trait Anxiety Inventory, Chinese Beck Depression, Chinese Somatic Scale, and Leeds Scales for Self-Assessment [31]. Examples of a question include, "Have you felt under constant strain?" Participants rated each item on a 4-point scale, with a higher score representing a higher level of distress. This self-report measure has been widely used as a measure with the general population. For the present study, the internal consistency coefficient was 0.86.

Data was analyzed using descriptive data and chi-square for demographic data. Then, group differences in menstrual experiences were assessed using the mean responses to the items about menstrual cycle experiences were analyzed using one way Analysis of Variance

(ANOVA). General Linear Modeling (GLM) was then used to control for the age and education level of participants.

## Results

The sample contains data from 700 total participants (193 African-American, 180 Caucasian and 327 Chinese). On average, the African-American participants were 36 years of age (s.d.=9.8) and had completed high school and attended some higher education, the Caucasian participants were 34 years of age (s.d.=9.5) and had university-level education, and the Chinese participants were 37 years of age (s.d.=1.8) and had a high school-level education. The Caucasian participants tended to have the highest levels of educational attainment, followed by the African-American and then the Chinese participants ( $\chi^2=195$ ,  $P<0.001$ ). A greater proportion of the Chinese participants was married (69%) compared to the African-American (47%) and Caucasian participants (42%) ( $\chi^2=56.3$ ,  $p<0.001$ ). In addition, the African-American and Caucasian participants reported slightly higher family incomes than the Chinese participants (\$3,800-5,049 compared to \$2,500-3,749/month,  $F=4.9$ ,  $p<0.01$ ).

As shown in Table 1, the African-American and Chinese participants have significantly more children than the Caucasian participants ( $F=3.9$ ,  $P<0.05$ ), and the Chinese participants reported a significantly older age at first menarche (13.5 years) compared to the African-American (12.5 years) and Caucasian (12.4 years) participants ( $F=8.3$ ,  $p<0.001$ ). In addition, the Chinese participants were least likely to be taking oral contraceptives (11%), followed by the African-American (19%) and Caucasian (30%) participants ( $F=6.69$ ,  $p<0.001$ ). Furthermore, the race group did not significantly predict incidence of gynecological problems or surgery and frequency of miscarriage after controlling for age and educational level. In particular, incidence of gynecological problems or surgery was greater among older participants ( $r=0.219$ ,  $p>0.001$ ) while frequency of miscarriage was lower at higher levels of education ( $r=-0.229$ ,  $p>0.001$ ) and is positively associated with age ( $r=0.205$ ,  $p<0.001$ ).

Next, GLM was used to assess differences in premenstrual distress symptoms among the African-American, Caucasian and Chinese participants [32]. The model tests for racial/ethnic group differences in the premenstrual distress subscales of pain, autonomic, concentration, affective and arousal symptoms; each subscale is considered separate dependent variable. Age and education of the participant are included as controls in the model. The mean scores on each subscale for the African American, Caucasian, and Chinese participants are presented in Table 2.

Overall, the F test for between-participant effects shows that the full models for each grouping of symptoms are statistically significant (See Table 3). The model offers the best prediction for the arousal-related symptoms (partial  $\eta^2=0.242$ ). Wilks' lambda (0.722) indicates that race/ethnicity is the key explanatory factor in the model, explaining

Variable	Wilks' Lambda	Premenstrual Distress Symptom Subscales	F	Partial eta <sup>2</sup>
Full Model		Pain	9.578***	0.081
		Concentration	11.869***	0.098
		Autonomic	3.998**	0.035
		Affective	21.854***	0.167
		Arousal	34.865***	0.242
Race	0.722***			0.150
		Pain	11.764***	0.051
		Concentration	15.877***	0.068
		Autonomic	1.464	0.021
		Affective	33.826***	0.129
Age	0.978	Arousal	27.722***	0.186
				0.022
		Pain	7.703	0.017
		Concentration	2.793	0.006
		Autonomic	5.732	0.013
Education	0.988	Affective	3.415	0.008
		Arousal	2.957	0.007
				0.012
		Pain	0.003	0.000
		Concentration	0.654	0.001
		Autonomic	1.055	0.002
		Affective	0.305	0.001
		Arousal	2.034	0.005

Table 3: GLM Analysis of the Significance of Racial/Ethnic Group Mean Differences in Premenstrual Distress.

Premenstrual Distress Symptom Subscales	Race/ethnic group comparison	Mean difference	Standard error
Pain	Caucasian-Asian	0.430***	0.105
	Caucasian-African-American	0.002	0.110
	Asian-African-American	-0.428***	0.103
Concentration	Caucasian-Asian	0.532***	0.098
	Caucasian-African-American	0.161	0.103
	Asian-African-American	-0.371***	0.097
Autonomic	Caucasian-Asian	0.117	0.069
	Caucasian-African-American	-0.087	0.072
	Asian-African-American	-.205**	0.068
Affective	Caucasian-Asian	0.963***	0.125
	Caucasian-African-American	0.280*	0.131
	Asian-African-American	-0.683***	0.123
Arousal	Caucasian-Asian	0.897***	0.091
	Caucasian-African-American	0.356***	0.096
	Asian-African-American	-0.541***	0.090

Note: \*\*\*p<0.001, \*\*p<0.01, \*p<0.05

Table 4: Post-Hoc Tests of Mean Differences.

approximately 15% of the variance in premenstrual distress symptoms overall. Furthermore, race/ethnicity significantly contributes to the prediction of each symptom subscale with the exception of the autonomic symptoms. The amount of variance in symptoms explained by race/ethnicity ranges from about 5% (for pain symptoms) to almost 19% (for arousal symptoms). The control variables, age and education do not significantly contribute to the model (eta<sup>2</sup>=0.022, 0.012, respectively).

In order to determine the pattern of mean differences in premenstrual distress symptomatology by race/ethnicity, post-hoc tests were computed and are shown in Table 4. In general, the Chinese participants reported significantly fewer premenstrual distress

symptoms than African-American and Caucasian participants. The results suggest this is true in the case of pain-related symptoms and concentration-related symptoms. While African-American and Caucasian participants reported similar levels of pain and concentration symptoms, Chinese participants reported significantly fewer of these symptoms. In addition, compared to the Caucasian and African-American participants, the Chinese participants reported significantly lower levels of affective symptoms. Caucasians reported the highest levels of affective symptoms (mean=about 2.5), followed by African-Americans (mean=2.2) and Chinese (mean=1.5). A similar pattern was found for arousal symptoms: Caucasians experience the greatest amount of arousal symptoms (mean=2.2), followed by African-Americans (mean=1.8) and Chinese (mean=1.2). Finally, although autonomic symptoms were reported less frequently by all participants, they were most common among the African-American participants (mean=1.4). African-Americans reported significantly higher levels of autonomic symptoms than the Chinese participants (mean=1.2). However, the average level of autonomic symptoms reported by Caucasian participants (1.3) was not significantly different from that reported by Chinese or African-American participants.

Finally, to determine whether the positive association between premenstrual distress and depressive symptomatology and psychological factors found in previous research exists across the three racial/ethnic groups, partial correlations between the premenstrual distress subscales and the general health questionnaire, a measure of anxiety, depression, social dysfunction and somatic complaints, were computed [11,12]. Premenstrual distress is generally associated with greater psychological symptoms, net of age and level of education (Table 5). However, one racial/ethnic difference in this association is apparent. For the Caucasian and Chinese participants, the pain, concentration, autonomic and affective subscales were positively associated with the GHQ symptoms, while the arousal subscale was unrelated to the GHQ. On the other hand, among the African-American participants, premenstrual arousal symptoms were positively correlated with psychological symptoms but autonomic symptoms were unrelated to the GHQ symptoms.

## Discussion

This study is not without limitations. Our sample was non-random, so it may not be representative of the target population. Thus, it is not possible for health care professionals to generalize these findings to their clients based on race/ethnicity regarding reproductive health. The recruitment of Asian women living in Hong Kong as opposed to living in the USA limits the generalizability of the study and our understanding of race differences within the USA. Additionally, although the present study attempted to minimize validity problems due to the self-report method of gathering data, it is possible that symptoms were not reported accurately, especially due to the retrospective nature of symptom reporting. Another limitation is that some women in the sample may have been peri-menopausal due to the age range of the sample group.

Premenstrual Distress Subscale	General Health Questionnaire		
	African-American	Caucasian	Chinese
Pain	0.246***	0.350***	0.293***
Concentration	0.319***	0.348***	0.201***
Autonomic	0.075	0.320***	0.230***
Affective	0.305***	0.297***	0.212***
Arousal	0.345***	0.007	0.055

Table 5: Partial Correlations between the General Health Questionnaire and Premenstrual Distress Subscales Controlling for Age and Education.

Despite these limitations, these results are significant as they provide evidence that race/ethnicity is a key feature in explaining differences in the premenstrual symptoms of women.

Exploring the symptoms of PMS among Caucasian and African-American women in the US and Chinese women in Hong Kong, we found that race/ethnicity is the key explanatory factor in explaining differences in premenstrual distress symptoms with the exception of autonomic symptoms. A limited number of previous comparative cross-cultural studies have looked at how the experience of premenstrual symptoms varies from culture to culture. Generally, this research found that women across all cultures experience PMS symptoms but experience and name their symptoms differently in terms of prevalence, nature of symptoms and the type of treatment needed [14,21,22,24]. For instance, Lee, Tang, & Chong found that premenstrual symptoms are experienced by Chinese women with similar prevalence as in the west but are reported differently (2009). Additionally, in an examination of Korean women, Choi and colleagues found that Korean women's lack of clinical knowledge about PMS caused them to accept these symptoms as a natural occurrence for which medical treatment was not needed (2010).

Our study is consistent with the trend found in these findings. In general, we found that the Chinese participants reported significantly fewer pain-related and concentration-related PMS symptoms than African-American and Caucasian participants. In addition, compared to the Caucasian and African-American participants, the Chinese participants reported significantly lower levels of affective symptoms. We did not examine the ways in which cultural understandings affect the medical treatment deemed necessary by women.

Furthermore, earlier research found a positive association between premenstrual distress and depressive symptomatology, and while our research found this general trend to be true, we only found one difference in this area due to race/ethnicity [11,12]. For the Caucasian and Chinese participants, the pain, concentration, autonomic and affective subscales were positively associated with the GHQ symptoms, while the arousal subscale was unrelated to the GHQ. On the other hand, among the African-American participants, and premenstrual arousal symptoms were positively correlated with psychological symptoms but autonomic symptoms were unrelated to the GHQ symptoms. This is significant because it demonstrates that symptoms of PMS are interpreted differently by different racial/ethnic groups.

Given the growing number of Asians in the U.S., health care professionals need to be aware of the role race/ethnicity may play in reproductive health issues. Healthcare professionals need to be aware of the challenges that women experience as a result of PMS and recognize that cultural heritage may affect the woman's experience of such symptoms. Most women report minor physical and emotional premenstrual changes, but a small percentage (3 to 5%) experience PMDD, which encompasses such severe premenstrual symptoms that daily functioning is affected [4]. For some women, however, the challenges associated with premenstrual distress go beyond the physical symptoms and cause interpersonal distress that affect the woman's emotional health [6]. Additionally, cultural understandings of premenstrual symptoms affect the attitude with which women approach PMS and PMDD [10-12]. Medical professionals may better serve diverse populations if culture is considered when screening for PMS and prescribing treatment. The screening tools used in this study (Chinese Menstrual Distress Questionnaire and Moos Menstrual Distress Questionnaire) may be a big asset for healthcare professionals

to utilize because they focus on asking questions about PMS in ways that are culturally relevant.

This study highlights that need for further research that examines the ways that premenstrual symptoms vary across cultures is needed to better screen for and treat premenstrual symptoms among women. In addition, our study did not address the crucial question of "why" observed cultural differences may exist; however, it has been theorized that PMS and PMDD are subject to historical, cultural, political and economic forces that have contributed to the social construction of these conditions [14]. The majority of research is from the perspective of Caucasian, white women, yet the limited number of comparative cross-cultural studies available indicate that diverse populations would be better served if cultural perspective towards PMS was understood. Future studies should focus on understanding the social and psychological reasons that PMS is experienced differently by different populations of women as well as successful intervention strategies to myriad of symptoms. Our study did not address the way in which women view medical treatment of PMS compared with their cultural understanding of the disorder, and there is much room for research on this topic in the future. Further studies are also needed on the role of acculturation on PMS and PMDD. Social workers and medical professionals are in a variety of settings dealing with women who experience premenstrual symptoms, which provides them with unique opportunities to address these issues.

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