Population study of premenstrual syndrome

Celene Maria Longo da Silva*, Denise Petrucci Gigante, Maria Laura Vidal Carret and Anaclaudia Gastal Fassa

Programa de Pós-graduação em Epidemiologia. Faculdade de Medicina. Universidade Federal de Pelotas. Pelotas, RS, Brasil

Abstract

Objective

To study the prevalence of premenstrual syndrome and the factors associated with this, by comparing the obtained frequency with the self-reported frequency.

Methods

This was a cross-sectional population-based study, involving 1,395 women aged 15 to 49 years old in a medium-sized municipality in Southern Brazil, carried out in 2003. Questionnaires were applied to measure the prevalence of premenstrual syndrome by means of a score based on five premenstrual symptoms that interfered with family life or led to absence from work or school. Associations with socioeconomic, demographic and behavioral variables were investigated. Self-reported syndrome was investigated with regard to its sensitivity and specificity, taking the score as the gold standard. The statistical analyses performed were Pearson χ^2, Mantel-Haenszel and Poisson regression, with Kappa coefficients to verify the concordance of the responses.

Results

The obtained prevalence was 25.2% (95% CI: 22.5-27.9) and the self-reported prevalence was 60.3% (95% CI: 57.4-63.3). The principal premenstrual symptoms found were: irritability, abdominal discomfort, nervousness, headache, fatigue and breast pain; all of these showed prevalence of over 50%. Higher risk was presented by women of higher socioeconomic level, better schooling level, aged under 30 years and with white skin color. Psychotropic drug users and women who were not using any hormonal contraceptive presented higher prevalence of the syndrome. The sensitivity of the test was 94%, specificity 51% and accuracy 62%.

Conclusions

A high prevalence of premenstrual syndrome was found. Even though the women's perception of the syndrome was higher than the result measured by the symptom score, one quarter of the women presented this health problem.

INTRODUCTION

Premenstrual syndrome (PMS) is a set of physical, emotional and behavioral symptoms that start during the week preceding menstruation and are alleviated when the menstrual flow begins.[13] The symptoms present a cyclic and recurrent character and may be variable in quantity and intensity. Slight symptoms during the premenstrual period that are presented by the majority of women, and which do not interfere in the daily routine, are not considered to form part of the diagnosis of PMS. For the symptoms to be considered to represent the syndrome, it is necessary that some impediment be reported with regard to routine activities at work, at school or in social activities.[12]

Correspondence:
Celene Maria Longo da Silva
Av. Duque de Caxias, 250 3º piso
96030-020 Pelotas, RS, Brasil
E-mail: celene.longo@terra.com.br

One of the theories for explaining the physiopathological mechanism of premenstrual syndrome is that the endocrine, reproductive and serotoninergic systems converge to regulate the individual's behavior. The oscillations in estrogen and progesterone levels during the menstrual cycle act on serotoninergic function such that PMS is manifested in women who are more sensitive to this.[10]

Most of the studies that have been published were carried out in gynecological and/or psychiatric outpatient clinics of reference centers, and there are few population-based studies.[5,22] A variety of instruments have been developed for evaluating PMS, and these have taken into consideration varying numbers of symptoms and intensity levels.[19] Since PMS does not have a characteristic clinical condition, the first questionnaires on PMS were long and directed towards application in clinics.[1,15]

Population studies have shown different prevalences of PMS, ranging from 5 to 35%, according to the criteria utilized and the place where the study was conducted.[5,14,22] Higher prevalences are found when the diagnostic criteria are less rigid and include women who report four or more symptoms.[22] In one population-based study carried out in Virginia (USA),[5] PMS was observed in 8.3% of the women interviewed by telephone. However, there is concordance regarding the fact that approximately 5% of women present severe symptoms,[7] and such symptoms are known as premenstrual dysphoric disorder (PMDD).[4]

In Brazil, studies in clinics have shown PMS prevalence of between 8% and 86%, depending on the severity of the symptoms considered.[7,*] In a study carried out in a gynecology outpatient clinic,* the premenstrual symptoms reported among women with the severe form of PMS (43.3%) were: irritability (86%), tiredness (71%), depression (62%) and headache (62%); 95% presented more than one symptom and 76% presented an association between physical and psychiatric symptoms.

A review of the literature[11,21] shows that there is no consensus regarding this subject. There is controversy regarding the risk and protection factors and also regarding the level of limitations that PMS places on women's lives. Thus, the present study had the objectives of identifying the symptoms that have a repercussion on the day-to-day life of women of fertile age, describing the prevalence of PMS and investigating its association with certain socioeconomic, demographic and behavioral factors. In addition to this, the study had the objective of comparing these findings with the prevalence of self-reported PMS.

METHODS

A population-based cross-sectional health survey was carried out in 2003, among women aged 15 to 49 years living in the urban zone of the city of Pelotas. Women who did not present regular menstrual cycles because of anovulation, and those who were using hormonal medication as a treatment for the menopause, were excluded from the study.

The municipality of Pelotas is located in the state of Rio Grande do Sul, in the south of Brazil, and has approximately 320,000 inhabitants. Women represent 53% of the total population, and 53% of them are at a fertile age.

To calculate the sample size, the size of the population of women of fertile age (around 90,000) and a PMS prevalence of 50% were taken into account.[22,*] To have a confidence interval of 95% with an acceptable error of 3.0 percentage points, it would be necessary to study 1,054 women. After adding 10% to allow for losses and refusals, and considering that the sampling delineation effect would be close to one, and that there would be a mean of not less than 0.8 women aged 15 to 49 years per household, it was calculated that it would be necessary to visit approximately 1,440 homes.

The sampling process included the selection of 144 census tracts out of the 404 that exist in the urban zone of Pelotas, and these were ranked in increasing order according to the mean income of the head of the household. The choice of the census tracts was systematic and proportional to the number of homes in the sector. In accordance with this number, the interval between the homes within each sector was defined, and the first home was drawn. After identifying the sectors drawn, it was observed that there had been demographic changes since the 2000 census. While the initial interval in each sector was maintained, with a mean of ten homes per sector, the number of homes sampled per sector ranged from nine to 27, to match the demographic changes over the period.

The outcome of PMS was characterized by different symptoms that needed to have been present during the last three cycles, in the week preceding menstruation, with alleviation in the week following menstruation. The emotional symptoms asked about were: sadness, rage, irritability, nervousness, confusion,

social isolation and tiredness. The physical symptoms asked about were: mastalgia, abdominal distension, headache, swelling in the hands and legs, weight increases and paints in the joints or muscles. An adaptation of the criteria proposed in DSM-IV[8] was made, such that PMS was considered to be the presence of five of the above symptoms. Among these, at least one of them needed to be sadness, rage, nervousness or irritability, accompanied by difficulties in relationships at home, missing work or missing school. In addition to this, self-reported PMS was also evaluated as an outcome. The interviewees' perception was taken into account to define self-reported PMS, which was considered to be present when the women answered in the affirmative to the question "Do you think that you have premenstrual tension (PMT) or premenstrual syndrome?".

The variables studied were classified or dichotomized according to their specific nature. Family income was categorized into increasing quartiles. The income range was from zero to R$15,000 per month. The economic level was presented in two ways: firstly, divided in the levels A, B, C, D and E, in conformity with the Brazilian Economic Classification Criteria;* and secondly, in quartiles. Schooling was considered on the basis of numbers of completed years of study. Skin color was grouped as white and non-white. The present marital situation was dichotomized as having or not having a partner at the time of the interview. Parity was considered in terms of the number of children born alive reported by the woman. Working outside of the home was considered as yes or no. The variable of physical activity during leisure time was constructed by means of a score of activities performed over the past week and dichotomized, with information collected only for women aged 20 years or over. Health perception was considered by means of the interviewee's self-assessment, as excellent, very good, good, regular and bad, and was regrouped into three categories for analysis. Religious observance was divided into practicing and non-practicing. Smoking habits were classified as: never smoked, current smoker and used to smoke, but stopped more than one month ago. In collecting information regarding psychiatric drugs, the interviewee was asked whether, over past 15 days, she had used medications that are only sold under medical prescription, and the commercial or generic names were noted down. Subsequently, these were classified according to the major pharmacological groups. In addition to antidepressives and anxiolytics, there were reports of amphetamines, hypnotic drugs and antipsychotic drugs, but the users of each of these accounted for less than 1% of the interviewees. These were transformed into missing and excluded from the analysis. Interviewees were said to be hormonal contraceptives users if they utilized oral or injectable contraceptives or other hormonal methods (vaginal rings, implants and contraceptive adhesive patches).

Interviewees were considered to have regular menstruation if they had been menstruating cyclically within a range of every 21 to every 35 days over the past three months, whether using hormonal contraceptives or not, in conformity with the criteria described by Halbe.[10]

The women were considered to be losses when, after three attempts to find them in their homes, they were always on trips, or had changed address or were not at home. The main reasons for refusal to be interviewed were that they did not have time or did not have any interest in taking part in the study, even when the interviewer tried on different days, at different times. After two refusals, one of the supervisors went to the home to explain in more detail what the importance of the study was.

There were 1,431 women who were eligible to take part in the study. There were seven losses due to changes of address, trips or never being found at home, and 29 did not agree to be interviewed after at least three attempts to interview them (2.6%). Thus, a total of 1,395 women were interviewed.

The 32 interviewers who were selected and trained were female, with schooling up to the end of high school, and they carried out the field work between October and December 2003.

The supervisors of the fieldwork were responsible for the quality control, and they reviewed the filling out of the questionnaires, the coding of the variables and the appraisal of the interviewers' performance. They also applied a repeat questionnaire of reduced length to 10% of the interviewees, which included key questions to assess the repeatability by means of the Kappa index.

Sensitivity, specificity, accuracy and concordance (this latter measured by means of the Kappa index) were calculated to compare the results obtained from the score (the gold standard) with the self-reported PMS data.

The analyses were performed using the Stata for Windows 8.2 software, with description of the variables by means of simple tabulation and summarizing of the data. The raw analysis was performed using

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the Pearson χ^2 test to evaluate proportions and Poisson regression to estimate prevalence ratios, since this is the most appropriate test when the prevalence is expected to be high.[2] For the ordinal and nominal categorical variables, the significance was evaluated using the linear trend and Wald tests, respectively.

Responses were considered to be unknown when the interviewees were unable to place themselves in one of the categories presented to them. These responses were excluded from the analysis and transformed into missing. However, the proportion of such responses was no greater than 3% for any of the variables. Association tests and stratified analysis using the Mantel-Haenszel test were performed between the variables studied in order to verify possible interactions. The variables that were possibly associated with the outcomes were taken for further analysis with any p-value, and those that showed associations with p<0.05 for at least one outcome were kept in the model, in order to maintain comparability between the two outcomes.

The adjusted analysis was performed using Poisson regression and taking into account the sampling process by clusters. This adjustment, which had the objective of controlling for possible confounding factors, was done in accordance with the following analysis model: the first level consisted of schooling, age, skin color and parity; the second level consisted of health perception, current smoker and use of psychiatric drugs; and the third level consisted of hormonal contraceptives. This model was formulated beforehand.

The project was approved by the Research Ethics Committee of the Faculdade de Medicina of Universidade Federal de Pelotas. Confidentiality of the information contained in the questionnaires was guaranteed and informed verbal consent was requested from all interviewees.

RESULTS

The effect of the study delineation on the prevalence of PMS was 1.06 and the intraclass correlation was 0.005. Comparison relating to the question on menstrual regularity over the last three cycles resulted in a Kappa value of 0.75.

The family income of the study population presented a median of R$839 per month and a mean of R$ 1,332 (SD=1,564). Table 1 shows that 41.4% of the women were in the economic levels D and E, half of them had had up to eight years of schooling and almost half were up to 30 years old. The white-skinned women represented 79% of the sample, more than

half of the women said that they lived with a partner, 60.5% of them had one or more children, and almost half of them said that they worked outside of the home. Around one-fifth of the women aged 20 or over practiced physical activities during their leisure time, and 19.8% considered that their health was regular or bad. More than half of the women said that they practiced some type of religion. One quarter of them were smok-

Table 1 - Socioeconomic, demographic and behavioral characteristics of women aged 15 to 49 years. Pelotas, state of Rio Grande do Sul, Brazil, 2003.

Variables	N	%
Family income in quartiles (R$)		
1 (0-426)	350	25.2
2 (427-838)	347	25.0
3 (839-1,519)	347	25.0
4 (1,520-15,000)	347	25.0
Family socioeconomic level		
E	84	6.0
D	492	35.4
C	466	33.5
B	277	19.9
A	71	5.1
Schooling (years)**		
0-4	175	12.5
5-8	473	33.9
9-11	495	35.5
12 or more	222	15.9
Age (years)		
15-19	235	16.9
20-29	417	29.9
30-39	366	26.2
40-49	377	27.0
Skin color		
Non-white	293	21.0
White	1,102	79.0
Marital status		
Without partner	643	46.1
With partner	752	53.9
Parity		
None	551	39.5
1 to 2	593	42.5
3 or more	251	18.0
Working outside the home		
No	792	56.8
Yes	603	43.2
Physical activity during leisure time over past week*,**		
No	900	77.7
Yes	258	22.3
Health perception**		
Excellent - very good	425	30.6
Good	688	49.6
Regular - bad	275	19.8
Religious observance		
No	615	44.1
Yes	780	55.9
Smoking habit		
Non-smoker	817	58.6
Smoker	343	24.6
Ex-smoker	235	16.9
Psychiatric drugs**		
Not used	1,009	93.3
Benzodiazepines	39	3.6
Antidepressives	34	3.1
Hormonal contraceptives		
No	787	57.9
Yes	572	42.1
Regular menstruation		
No	299	21.4
Yes	1,096	78.6
Total	1,395	100.0

N: Number of observations in each category
*Information for women aged 20 years or more
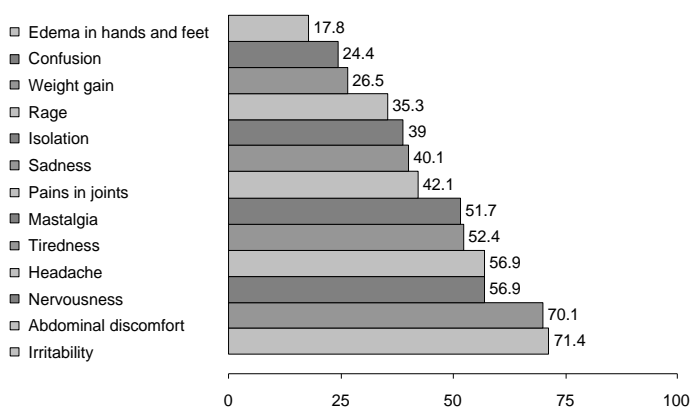**Variables that presented an unknown response rate of up to 2.3%.

Figure 1 - Prevalence and distribution of premenstrual symptoms (N=1,096). Pelotas, state of Rio Grande do Sul, Brazil, 2003.

ers at the time of the interview. The principal psychiatric drugs utilized were benzodiazepines (3.6%) and antidepressives (3.1%). To prevent pregnancy, 42% were using hormonal contraceptives. Among the interviewees, 299 (21.4%) did not have regular menstruation and were excluded because of the impossibility of answering the question regarding the last three cycles. The sample was therefore left with 1.096 interviewees who had given responses about the symptoms of interest. The analyses were performed on these interviewees (Table 1).

Figure 1 shows the prevalence of each premenstrual symptom. The most prevalent were irritability, abdominal discomfort, nervousness, headache, tiredness and mastalgia, all with a frequency of more than 50%. The prevalence of PMS when the modified DSM-IV criterion was used was 25.2% (95% CI: 22.5-27.9) and the self-reported prevalence was 60.3% (95% CI: 57.4-63.3) (Figure 2).

The test to validate the self-reported PMS, using the questionnaire-based characterization of the PMS as the gold standard, found the following values: sensitivity 94%, specificity 51%, positive predictive value 39%, negative predictive value 96% and accuracy 62%.

Among the women with self-reported PMS, 4.4% were using some type of treatment and 3.2% had already used treatment for controlling their symptoms.

Table 2 shows the prevalences of PMS (using the score and self-reported), according to the variables studied. It can be seen that PMS was most prevalent among the women of higher economic level (30 vs 69.6%), higher family income (30.3 vs 71.6%),

longer schooling (33.5 vs 70.9%) and in the younger age groups (28.8 vs 65.2%). It was also found that it occurred more among those with white skin (27.6 vs 62.9%) and those who were using psychiatric drugs, especially antidepressives (38.7 vs 87.9%). Marital status, parity, work outside the home, physical activities during leisure time, health perception, religious observance and smoking were not shown to be associated with the outcomes.

Table 3 shows the result from the adjusted analysis. The following maintained their association with PMS: longer schooling, younger age groups, white skin color and parity of three or more children. The risk of PMS was 53% greater among the women who perceived their health as regular or bad, in comparison with those who considered their health to be excellent or very good. The use of benzodiazepines or antidepressives showed a statistically significant association with PMS. The use of hormonal contraceptives represented a protection of 17%, in comparison with the women who were not using this method.

In evaluating the results from self-reported PMS, the risks appeared in the same directions, although lower for all the characteristics studied. The only exception was found with regard to smoking habit, which although forming a risk factor did not show significance for PMS in relation to the score for ex-smokers. However, in the self-assessment, there was significant risk in the raw analysis and this was maintained after adjustment.
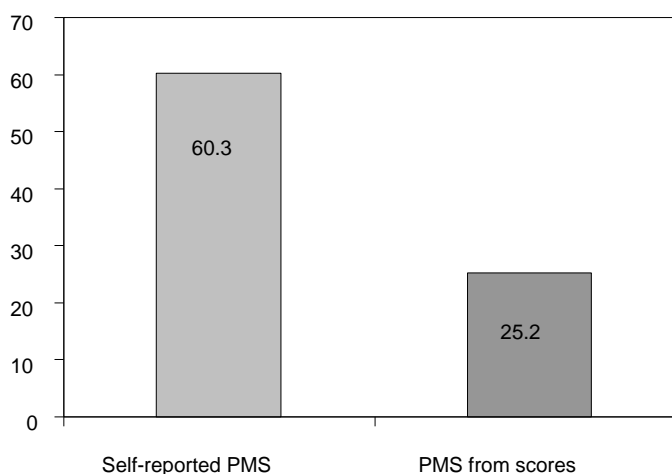
PMS: Premenstrual syndrome

Figure 2 - Prevalence of premenstrual syndrome self-reported and from scoresdesfechos (N=1,096). Pelotas, state of Rio Grande do Sul, Brazil, 2003.

DISCUSSION

This is the first Brazilian study to show the prevalence of PMS from a population-based cross-sectional study. The low percentages of losses and refusals, and the comparison with the age distribution of the data from the Brazilian Institute for Geography and Statistics (2000 census) show that the results found are representative of the population of women aged 15 to 49 years in Pelotas.

In the present study, it was decided to utilize a definition of PMS that considered whether symptoms that severely interfered in the women's lives were present or not. Some authors,* differing from the present study, defined PMS as the presence of a single cyclical symptom, which implies greater sensitivity in the diagnostic criterion. In the sample studied, if this criterion had been utilized, the prevalence would have been 95.4%.

As expected, studies[3,7,]* carried out in gynecologi-

Table 2 - Prevalence of premenstrual syndrome found from scores and self-reported premenstrual syndrome, according to socioeconomic, demographic and behavioral variables for women of fertile age (N=1,096). Pelotas, state of Rio Grande do Sul, Brazil, 2003.

Variables	PMS from scores		Self-reported PMS	
	Prevalence	p-value	Prevalence	p-value
Income in quartiles (R$)		0.004*		<0.001*
1 (0-426)	20.2		54.7	
2 (427-838)	22.1		55.5	
3 (839-1,519)	27.9		58.8	
4 (1,520-15,000)	30.3		71.6	
Socioeconomic level (quartiles)		0.037*		<0.001*
1	22.8		54.7	
2	22.2		52.8	
3	26.8		65.6	
4	30.0		69.6	
Schooling (years)		<0.001*		<0.001*
0 to 4	14.9		48.5	
5 to 8	24.6		52.5	
9 to 11	25.8		66.4	
12 or more	33.5		70.9	
Skin color		0.003**		0.001**
Non-white	15.9		50.5	
White	27.6		62.9	
Age		0.10*		0.010*
15-19	28.8		65.2	
20-29	26.1		62.5	
30-39	24.5		61.0	
40-49	21.8		52.5	
Marital status		0.86**		0.12**
Without partner	25.4		58.0	
With partner	25.0		62.5	
Parity		0.78*		0.29*
None	24.8		62.3	
1 to 2	25.4		59.0	
3 or more	25.8		58.2	
Working outside the home		0.80**		0.86**
No	24.9		60.1	
Yes	25.6		60.6	
Physical activity		0.36**		0.6**
No	25.1		59.7	
Yes	22.0		57.8	
Religious observance		0.36**		0.29**
No	23.8		58.6	
Yes	26.4		61.7	
Health perception		0.84*		0.33*
Excellent - very good	26.2		62.1	
Good	23.9		60.5	
Regular - bad	28.1		58.0	
Smoking habit		0.33***		0.066***
Non-smoker	24.5		58.9	
Smoker	24.2		58.9	
Ex-smoker	29.1		67.7	
Psychiatric drugs		0.034***		<0.001***
Not used	24.1		59.2	
Benzodiazepines	31.4		55.6	
Antidepressives	38.7		87.9	
Hormonal contraceptives		0.12**		0.040**
No	27.2		63.5	
Yes	22.9		56.6	

*Chi-square test for linear trend
**Chi-square test
***Wald test

*Nogueira CWM. Determinantes da síndrome pré-menstrual: análise de aspectos clínicos e epidemiológicos [tese de doutorado]. Campinas: Universidade Estadual de Campinas; 1998.

Table 3 - Raw and adjusted prevalence ratios for premenstrual syndrome found from scores and self-reported premenstrual syndrome, according to socioeconomic, demographic and behavioral variables (N=1,096). Pelotas, state of Rio Grande do Sul, Brazil, 2003.

Level	Variable******	Raw PMS from scores PR (95% CI)*	Adjusted PMS from scores PR (95% CI)**	Raw self-reported PMS PR (95% CI)*	Adjusted self-reported PMS PR (95% CI)**
1	Schooling (years)	<0.001****	<0.001****	<0.001****	<0.001****
	0-4	1.00	1.00	1.00	1.00
	5-8	1.62 (1.05 - 2.52)	1.65 (1.03-2.63)	1.06 (0.89-1.27)	1.08 (0.90-1.30)
	9-11	1.69 (1.06 - 2.68)	1.79 (1.08-2.97)	1.16 (1.06-1.27)	1.37 (1.13-1.67)
	12 or more	2.18 (1.39 - 3.42)	2.65 (1.63-4.31)	1.13 (1.06-1.20)	1.56 (1.28-1.91)
	Age (years)	0.10****	0.001****	0.010****	<0.001****
	15-19	1.36 (0.97 - 1.90)	2.18 (1.46-3.28)	1.07 (1.02-1.13)	1.48 (1.20-1.81)
	20-29	1.22 (0.87 - 1.70)	1.47 (1.04-2.08)	1.09 (1.02-1.17)	1.25 (1.07-1.46)
	30-39	1.19 (0.86 - 1.64)	1.29 (0.94-1.77)	1.17 (1.00-1.36)	1.20 (1.04-1.39)
	40-49	1.00	1.00	1.00	1.00
	Skin color	0.003***	0.021***	0.001***	0.015***
	Non-white	1.00	1.00	1.00	1.00
	White	1.71 (1.18 - 2.48)	1.57 (1.07-2.29)	1.23 (1.09-1.40)	1.16 (1.03-1.32)
	Parity	0.76****	<0.001****	0.29****	0.006****
	None	1.00	1.00	1.00	1.00
	1-2	1.05 (0.83-1.32)	1.45 (1.09-1.92)	0.96 (0.86-1.07)	1.15 (1.00-1.32)
	3 or more	1.02 (0.75-1.40)	1.90 (1.35-2.67)	0.93 (0.80-1.10)	1.28 (1.06-1.55)
2	Health perception	0.84****	0.036****	0.32****	0.043****
	Excellent – very good	1.00	1.00	1.00	1.00
	Good	0.85 (0.63-1.14)	1.06 (0.83-1.36)	1.03 (0.89-1.19)	1.07 (0.98-1.19)
	Regular – bad	0.93 (0.67-1.28)	1.53 (1.11-2.12)	1.07 (0.93-1.23)	1.17 (1.00-1.37)
	Smoking habit	0.33*****	0.30*****	0.066*****	0.0089*****
	Non-smoker	1.00	1.00	1.00	1.00
	Smoker	1.02 (0.76-1.36)	1.05 (0.78-1.42)	1.01 (0.90-1.14)	1.07 (0.95-1.20)
	Ex-smoker	1.17 (0.88-1.56)	1.28 (0.94-1.74)	1.16 (1.03-1.32)	1.22 (1.07-1.38)
	Psychiatric drugs	0.034*****	0.037*****	<0.001*****	<0.001*****
	Not used	1.00	1.00	1.00	1.00
	Benzodiazepines	1.30 (0.78-2.18)	1.66 (0.99-2.78)	0.94 (0.70-1.26)	1.08 (0.79-1.47)
	Antidepressives	1.60 (0.99-2.60)	1.57 (0.99-2.50)	1.48 (1.29-1.70)	1.52 (1.29-1.80)
3	Hormonal contraceptives	0.12***	0.052***	0.040***	0.001***
	Not used	1.18 (0.95-1.47)	1.27 (1.00-1.61)	1.12 (1.01-1.25)	1.20 (1.07-1.35)
	Used	1.00	1.00	1.00	1.00

*Raw prevalence ratio and 95% confidence interval;
**Adjusted prevalence ratio and 95% confidence interval;
***Heterogeneity test;
**** Linear trend test;
*****Wald test;
******All the variables are controlled for the other variables at the same level, and for the variables at the levels above.

cal clinics have shown prevalences greater than what was found in the present study. On the other hand, population-based studies[5,22] have shown lower prevalence. However, there were differences between the diagnostic criteria in these studies. The present study found a higher prevalence of self-reported PMS that in another study.[21] One possible explanation for this difference is that the women with few symptoms also mentioned the presence of the syndrome, even when there was no interference in their daily activities.

Although the sampling process was performed by census tracts, the results obtained from analysis of the study delineation effect showed that there was no difference in the prevalence of the outcome between the census tracts that reached the point of interfering in the interpretation of the results. Nonetheless, Poisson regression analysis took this sampling process into account, in accordance with Barros & Hirataka.[2]

In the present study, the self-reported prevalence of PMS was twice the rate diagnosed by means of the scoring system. The score was constructed in such a way that occasional discomfort was not classified as presence of the syndrome or harm to health. From the sensitivity and specificity tests, it was observed that almost all the women who presented positive scores thought that they had PMS, but among those who said they had PMS, only half fulfilled the scoring criteria for PMS.

In cross-sectional studies, the possibility of presenting PMS but using some type of treatment or behavior modifier may have led to underestimation of the prevalence encountered. This is because the information on the presence of PMS and the factors associated with it are investigated at the same time.[18] One example is the growing use of hormonal contraceptive methods on a continual basis among those who present PMS, thereby avoiding menstruation and the premenstrual period. Such women will not have menstruated during the past three months, and thus will not have answered the questions regarding premenstrual symptoms, or regarding self-reported PMS. With such a possibility, the prevalence found may be lower than the real prevalence. There is controversy regarding the range of menstrual cycle duration that is considered normal.[10]

The Kappa test showed good concordance relating to the question on menstrual regularity. Considering that menstruation is usually an important event in women's routines, it is expected that their recollection of these events will have been clear.

It was found that PMS measured by the score and self-reported PMS were more prevalent among women of higher economic level and higher income. This may be due to the fact that the more affluent women had greater access to knowledge regarding the symptoms. By knowing about the symptoms, they would be alert to the cyclical modifications in their bodies. This result is similar to what was found in a study carried out in Mexico.[13] The risks in self-reported PMS were in the same direction as for the constructed score, but lower. The likely cause of this was error in classifying the outcome.

The younger women reported more symptoms, and this has also been found by other authors,[4,9,20] although one study[7] carried out in a gynecology clinic found greater prevalence among women aged over 30 years. Since the present study was population-based, it is likely that, although the women identified their symptoms at an early age, they only sought specialized assistance after a few years with the problem. There may also have been a cohort effect, in that the younger women are experiencing a time when PMS is discussed to a much greater extent.

White skin color was associated with greater risk of PMS. This was also found in a gynecology outpatient clinic,* but not in another population-based study,[5] in which the prevalence was greater among blacks, in a survey carried out by telephone. There is no known plausible biological reason why white skin color should present greater prevalence of PMS. What may be acting as a confounding factor in this association are the socioeconomic factors, since it is known that white women have a higher economic level. It was observed that the risks remained significant after adjustment for the socioeconomic and demographic variables, but diminished in magnitude. It might be envisaged that other factors not studied here may exist, and that these could be interfering with the association.

The finding that there was no difference in the prevalence or in the risk of PMS between women with and without a partner can be highlighted, as found in other studies.[5,21] This serves to demystify the old concept that *when the woman marries, she will get better*. There was also no difference between the women who worked outside of the home and those who did

not.[5] There has, however, been a report of greater risk for women with children.[11,*]

Physical activity during leisure time and smoking habit did not present any association with PMS in the present study, whereas in some others, physical activity was a risk factor for PMS[5] and smoking habit showed an association with the outcome.[22] Health perception did not show an association with PMS in the raw analysis. However, after adjustment for schooling, there was a positive relationship between PMS and the perception of regular/bad health. This negative confounding effect can be explained by the schooling, since self-perception of regular/bad health was associated with low levels of schooling, with in turn was associated with lower risk of PMS.

The use of psychiatric drugs (anxiolytics and antidepressives) was associated with greater prevalence of PMS, which may signify that the women who used more medications were those who made more reports of symptoms during medical consultations. Thus, it is not thought that the medications cause the symptoms, but that their use is a consequence of PMS. Good results in relation to PMS are being obtained today through treatment using antidepressives[6] and, during some symptomatic periods, anxiolytics,[10] since the symptoms of PMS have the same nature as those of depression and anxiety. The fact that only 20% of the women with PMS as defined in the present study were utilizing some form of treatment can be highlighted. It might be envisaged that the other women either did not have access to healthcare services or, when they went there, they did not received the due attention.[16,17]

There was only a significant difference between use and non-use of hormonal contraceptives in relation to self-reported PMS. It is possible that there was insufficient statistical power to detect such a difference when PMS was measured using the scoring system. Some other authors have not found such differences,[5,*] while in other studies the use of hormonal medication was an exclusion criterion.[7,11] The use of hormonal contraception has been prescribed as a means of preventing hormonal fluctuation and the appearance of premenstrual symptoms. The results found indicate that these medications provide protection against the appearance of symptoms.

One limitation to the present study is its use of retrospective information. There is evidence that data collected prospectively over two or three cycles show prevalences that differ from those obtained retrospectively.[13]

In conclusion, the symptoms were more prevalent at higher economic levels, longer schooling levels, among younger women and among those of white skin color. It must be considered that differences in access to information and knowledge of the symptoms may explain these associations. However, there is a need for further studies to investigate this question. It is recommended that a sample from a young population with similar access to information should be studied, and if possible by means of a longitudinal study, in order to evaluate the appearance or persist-ence of more intense symptoms with advancing age.

The utilization of self-reported PMS can be considered by healthcare professionals, but with reservations, since surveying the associations between the symptoms and the premenstrual period, and how they are alleviated during the week following menstruation, is fundamentally important for diagnosing PMS. There is also a need to rule out other organic and emotional disorders that may lead women to believe that their problem is PMS.

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