

Premenstrual syndrome (PMS) and its associated factors among female college students in China: a cross-sectional study

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Abstract

OBJECTIVE: The study aimed to determine the prevalence of PMS and its associated factors among female college students in China.

METHODS: This cross-sectional study was conducted by administering an online questionnaire to the Wannan Medical College and Tongling Polytechnic, Anhui Province, China.

RESULTS: A total of 1668 female college students participated in the study, aged 17–23 years, age at menarche ranged from 9 to 16 years. The prevalence of PMS was 50.7% (846/1668). Anxiety (OR = 2.132, 95% CI = 1.620–2.807), pressure (OR = 1.890, 95% CI = 1.512–2.363), smartphone addiction (OR = 1.249, 95% CI = 1.009–1.547), and dysmenorrhea (OR = 2.676, 95% CI = 2.170–3.301) were the risk factors for SHS, while sleep time was the protective factors for SHS.

CONCLUSION: Depending on the findings of present study, we recommend that governments develop policies and guidelines to improve the health and productivity of female college students.

Introduction

PMS is a common female disease characterized by mood changes such as irritability,

depression and physical symptoms such as bloating, breast swelling or swelling, headache

et al, usually occurring 7–14 days before the start of the late menstrual cycle¹. Premenstrual syndrome (PMS) has very significant negative impact on women' attendance to courses, school success, and the quality of life negatively, and can impose a substantial public health burden. Many women are unable to cope with symptoms such as premenstrual stress, depression or insomnia. The reported prevalence of PMS in India is between 14.3% and 74.4%², while in Japan it is between 75–95%³. A study in China showed lower prevalence of PMS – prevalence of 37.3% from a community-based sample⁴. The exact etiology of PMS is not known. However, there are a number of risk factors associated with the development of PMS. Premenstrual syndrome can cause distress and pain for a long time in a woman's life, making it an important health problem. Premenstrual dysphoria (PMDD) is the most serious form of PMS, and is currently included as a mental illness in the fifth edition of the Diagnostic and Statistical Manual for Mental Disorders (DSM-5)⁵. The PMS has had a detrimental effect on female college students' lives and academic performance. As far as we know, this is the first study of menstrual syndrome in female college students in China. The aim of this study is to provide a better understanding of the epidemiology of PMS among Chinese female college students, in order to raise awareness among practicing health professionals.

Methods

Study design and period

This cross-sectional study was conducted in Wannan Medical College and Tongling Polytechnic, Anhui Province, China. The survey of the target population was sampled by simple random sampling. Before issuing the questionnaire, we clarified the purpose of this research and the instructions to the research subjects. Students were notified that their participation in this study was voluntary, anonymity, confidentiality, their right freedom to withdraw from the study at any time. The sample was obtained through the electronic version of the questionnaire distributed by the Wenjuan platform.

Research tools

Premenstrual Syndrome

We used the Premenstrual Syndrome Scales (PSS) to measure female college students'

premenstrual syndrome⁶. It includes 12 items assessing premenstrual symptoms of depression, anxiety, nervous, insomnia, neurotic, and physical symptoms. Each item is scored on a 4-point Likert-type scale, ranging from 0 = "no symptom" to 3 = "symptoms had a severe effect on daily work and life and required treatment." Higher scores denote severer premenstrual syndrome, participants scoring 6 and above were considered to be experiencing premenstrual syndrome. The Cronbach's α in this study was 0.894.

Gad-2

The 2-item Generalized Anxiety Disorder Scale (GAD-2)⁷ is a 2-item self-report questionnaire which is used to measure anxiety symptoms over the last 2 weeks. The score of 4-point scale ranges from 0 (not at all) to 3 (nearly every day) and the total score is 6, with higher scores reflecting more severe anxiety. The GAD-2 subscale scores ≥ 3 indicate potential anxiety issues. Cronbach's α in current study was 0.817.

Chinese Perceived Stress Scale (CPSS-14)

Perceived stress was measured by the 14-item Chinese Perceived Stress Scale (CPSS-14)⁸.

Participants are asked to rate how often they have been troubled by stressful situations in the past month using a 5-point Likert-type scale from 0 (Never) to 4 (Very often). A total score is obtained by adding the scores of 14 items, the higher composite value indicates more perceived stress, Participants with a score of 25 and above were considered to be experiencing high level of perceived stress. In this study, Cronbach's α was 0.83.

Smartphone Addiction

Smartphone addiction was measured by the 10-item Smartphone Addiction Scale short version (SAS-SV)⁹, it was rated on a 6-point Likert scale (from 1 (strongly disagree) to 6 (strongly agree)). The total score of SAS-SV ranges from 10 to 60, higher scores composite value indicated high smartphone

addiction, Participants scoring 33 and above were considered to be experiencing smartphone addiction. Cronbach's α in this study were 0.86.

Statistical analysis

The questionnaires were directly exported to Microsoft Office Excel files, all the statistical analyses were performed using Statistical Package for Social Sciences (SPSS, Inc., Chicago, Ill, Version 20.0). The mean \pm standard deviation (SD) and percentage (%) were used for descriptive statistical analysis. The χ^2 test was used to compare the detection rate of Premenstrual Syndrome in female college students for different variables. The logistic regression was performed to analyze the factors associated with Premenstrual Syndrome.

2-tailed P-value of < 0.05 was considered statistically significant.

Results

Demographic characteristics

As shown in Table 1, A total of 1668 female college students participated in the study, aged 17–23 years, age at menarche ranged from 9 to 16 years, of which 758 (45.4%) were freshmen, 465 (27.9) were sophomore, 300 (18.0%) were juniors, 145 (8.7%) were seniors, 689 (41.3) female college students suffer from dysmenorrhea.

Table 1
Sociodemographic Characteristics of the study
sample(N = 1668).

Variable		n	(%)
School year	1st year	758	45.4
	2nd year	465	27.9
	3rd year	300	18.0
	4th year	145	8.7
Age	17–18	602	36.1
	19–20	765	45.9
	21–23	301	18.0
Sleep time	≤ 6 hours	568	34.1
	7 hours	798	47.8
	≥ 8 hours	302	18.1
Dysmenorrhea	No	689	41.3
	Yes	979	58.7
Age at menarche	9–10	24	1.4
	11–13	1102	66.1
	14–16	542	32.5
Menstrual cycle	< 21days	74	4.4
	21–35 days	1446	86.7
	> 35 days	148	8.9

The prevalence of PMS

The prevalence of PMS among the female college students was 50.7% (846/1668). The symptoms reported to be statistically significantly associated with PMS were Sleep time, dysmenorrhea, anxiety, high pressure and smartphone addiction ($p = 0.000, 0.000, 0.000, 0.000$ and 0.000 , respectively). (Table 2).

Table 2
The detection rate of PMS in female college students using different variables (%).

Variables	PMS		χ^2	P-value
	No (n = 822)	Yes(n = 846)		
Age				
17-18	300(49.8)	302(50.2)	0.151	0.927
19-20	376(49.2)	389(50.8)		
21-23	146(48.5)	155(51.5)		
School year			6.365	0.095
1	349(46.0)	409(54.0)		
2	237(51.0)	228(49.0)		
3	161(53.7)	139(46.3)		
4	75(51.7)	70(48.3)		
Sleep time			25.126	0.000
≤ 6 hours	238(41.9)	330(58.1)		
7 hours	405(50.8)	393(49.2)		
≥ 8 hours	179(59.3)	123(40.7)		
Menstrual cycle			0.377	0.828
< 21days	35(47.3)	39(52.7)		
21-35 days	711(49.2)	735(50.8)		
> 35 days	76(51.4)	72(48.6)		
Age at menarche			0.538	0.764
9-10	12(50.0)	12(50.0)		
11-13	536(48.6)	566(51.4)		
14-16	274(48.6)	274(48.6)		
Dysmenorrhea			80.952	0.000
No	430(62.4)	259(37.6)		
Yes	392(40.0)	587(60.0)		

Variables	PMS		χ^2	P-value
	No (n = 822)	Yes(n = 846)		
Anxiety			59.987	0.000
No	719(54.1)	611(45.9)		
Yes	103(30.5)	235(69.5)		
Pressure			64.319	0.000
No	380(62.2)	231(37.8)		
Yes	442(41.8)	615(58.2)		
Smartphone addiction			18.705	0.000
No	378(55.7)	301(44.3)		
Yes	444(44.9)	545(55.1)		

Binary logistic regression analyses of SHS

Table 3 displays the Binary logistic regression analyses results for PMS among the female college students. we found that anxiety (OR = 2.132, 95% CI = 1.620–2.807), pressure (OR = 1.890, 95% CI = 1.512–2.363), smartphone addiction (OR = 1.249, 95% CI = 1.009–1.547), and dysmenorrhea (OR = 2.676, 95% CI = 2.170–3.301) were the risk factors for SHS, while sleep time was the protective factors for SHS.

Table 3
Binary Logistic regression analysis of predictors of PMS (N = 1668).

Variables	β	S.E.	Wald	P	OR	OR 95% CI
Anxiety						
No					1.00	
Yes	0.757	0.140	29.131	0.000	2.132	1.620–2.807
Pressure						
No					1.00	
Yes	0.637	0.114	31.192	0.000	1.890	1.512–2.363
Smartphone addiction						
No					1.00	
Yes	0.223	0.109	4.185	0.041	1.249	1.009–1.547
Dysmenorrhea						
No					1.00	
Yes	0.984	0.107	84.631	0.000	2.676	2.170–3.301
Sleep time						
≤ 6 hours					1.00	
7 hours	-0.338	0.118	8.241	0.004	0.713	0.566–0.898
≥ 8 hours	-0.552	0.154	12.887	0.000	0.576	0.426–0.778
constant	-0.969	0.143	46.097	0.000	0.379	

Discussion

Key findings

We found a high prevalence of PMS among China females college students which adversely affects their quality of life. This study found that the overall detection rate of PMS was 50.7%, higher than the previous surveys community-based sample [4], which indicates that the incidence of PMS was prevalent among female college students. PMS is mainly caused by various socio-demographic, genetic and psychological factors. Medical students in the study not only have to face high-intensity education, and fierce academic competition, but also the pain/death of patients, so they were more stressed. This finding supports previous research that anxiety and stress may play a role in the development of PMS. Study has shown that increased stress and anxiety and depression are also important influencing factors for PMS¹⁰.

In addition, our analysis reveals that Sleep time and smartphone addiction can negatively correlate with one's premenstrual syndrome (PMS)¹¹. Former studies indicated that good sleep promotes a balance of estrogen, progesterone, androgen and gonadotropin concentrations. It is the mechanisms responsible for the influence of Sleep time on PMS unknown. With early intervention, the impact of Sleep time on PMS could be reduced. Smartphones have become an inseparable part of college students' lives. Previous studies had suggested various negative physical and mental consequences of excessive smartphone use, including lack of sleep, anxiety, stress, and depression, which can aggravate PMS in female college students¹². Study had found that smartphone addiction could lead to unhealthy diets and sleep disturbances in adolescents PMS¹³.

Conclusions

We found a high prevalence of PMS among China females college students which adversely affects their quality of life. Depending on the findings of present study, we recommend that governments develop policies and guidelines to improve the health and productivity of female college students.

Declarations

Ethics approval and consent to participate

This research was approved by the ethics committee of the Nursing Department of the First Affiliated Yijishan Hospital of Wannan Medical College (Yijishan Hospital of Wannan Medical College). Before completing the questionnaire, all participants signed the written informed consent. All participants can withdraw at any time without providing any reason. All methods were performed in accordance with the Declaration of Helsinki.

Consent for publication

All authors consent to publication.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author (Z. Z or M. Z) on reasonable request.

Competing interests

The authors declare that they have no competing interests or other interests that might be perceived to influence the results and/or their interpretation as reported in this paper.

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Authors' contributions

HL, MZ, LH: Conceptualization. HL: Methodology. ZZ: Software. LH, HL, MZ: Validation. LH: Formal Analysis. EZ, WZ: Investigation. MZ, SD: Resources. HL: Data curation. HL, MZ: Writing – original draft. All authors have read and agreed to the published version of the manuscript.

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