

Epidemiology of Premenstrual Syndrome (PMS)-A Systematic Review and Meta-Analysis Study

ASHRAF DIREKVAND-MOGHADAM¹, KOUROSH SAYEHMIRI², ALI DELPISHEH³, SATAR KAIKHAVANDI⁴

ABSTRACT

Background and Objectives: Premenstrual Syndrome (PMS) is a common health problem in women in reproductive age. The present study aimed to investigate the prevalence of PMS using meta-analysis method.

Methods: This meta-analysis systematically reviewed the prevalence of PMS. A search was conducted using keywords Premenstrual Syndrome, PMS, prevalence PMS and symptom of PMS in reliable English articles. The initial search 53 articles were available. After review of full-text articles, 17 articles were selected for analysis. Data were combined using meta-analysis (random effects model). Data were analyzed using STATA software, Version 11.1

Results: Overall, 17 studies met our inclusion criteria. The pooled prevalence of PMS was 47.8% (95% CI: 32.6-62.9). The lowest and highest prevalence were reported in France 12% (95% CI: 11-13) and Iran 98% (95% CI: 97-100) respectively. However, meta-regression scatter plot showed an increasing trend in the prevalence of PMS during 1996-2011 but correlation between prevalence of PMS and year of study was not significance ($p=0.797$).

Interpretation and Conclusions: Considering that different tools have been used in studies and many studies have been designed based on a limited sample, therefore, future research needs to consider the prevalence of PMS in different countries of world.

Keywords: Prevalence of Premenstrual Syndrome, Meta-regression model, Symptom of Premenstrual Syndrome

INTRODUCTION

Today, research on women's health has greatly improved [1,2]. PMS is a common health problem in women in reproductive age and defined as a collection of emotional symptoms, with or without physical symptoms, related to a woman's menstruation cycle [3]. PMS is occur during the luteal phase of menses, however, it disappear with menstrual flow. The prevalence of PMS has been reported in 20 to 32 % of premenopausal [4] and 30-40% of the reproductive female population [5].

There are several different symptoms have been associated with PMS [6]. The symptoms are cyclic and recurrent. The symptoms can change in extent and strength during different cycles [7].

Different etiologies have been suggested for the PMS. The abnormal function of hypothalamic-pituitary-adrenal axis (HPA), which leads to defect in adrenal hormone secretion, nutritional defects and environmental factors are the main factors for PMS [8]. The endocrine systems is one of the theories for explaining the physiopathological mechanism of PMS [7].

PMS affects women's quality of life, economic and social performance. In other study, about 23- 31 % of reproductive aged women experience PMS to a degree that affects their daily lives [9].

PMS can cause mood disorders and its complications [10]. Therefore, during the last 2 decades; several studies have been conducted on various treatment options regarding PMS [11-14].

Due to side effects of PMS, the present study aimed to investigate the prevalence of PMS using meta-analysis method.

METHODS

Search strategy

This originally meta-analysis reviewed the world wide prevalence of PMS. We electronically searched the English-language medical literature published between 1996 -2011 using the available databases including Pub Med and Medline. The protocol was

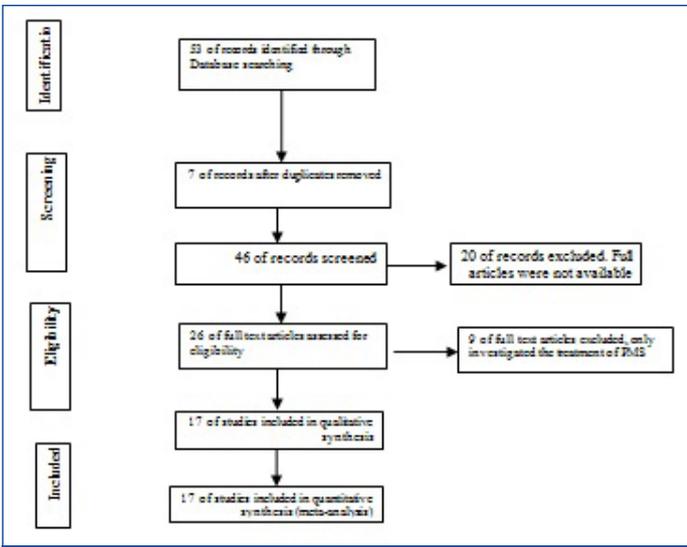
designed using widely recommended methods and reported according to PRISMA [15]. Using the medical subject headings (MeSH), we searched "Premenstrual Syndrome", "Epidemiology of PMS" and "prevalence of Premenstrual Syndrome" including all subheadings.

Study Selection and Data Extraction

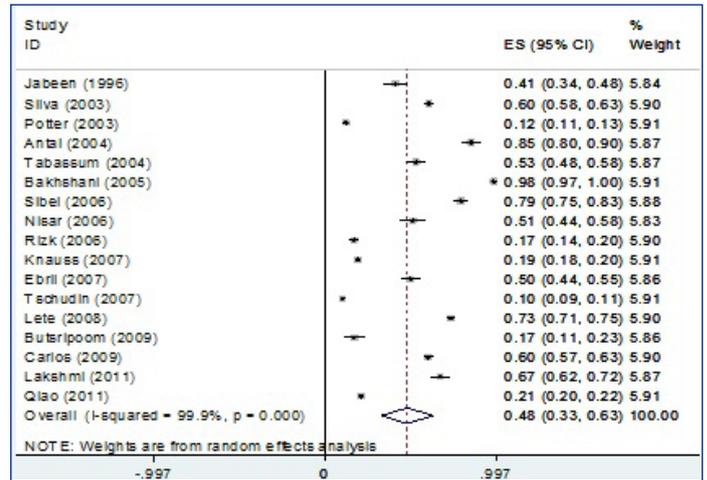
Two researchers independently screened the titles of all recode citations, removing duplicate records and distinguishing potentially relevant studies for inclusion. Abstracts from selected citations were then independently reviewed by two researchers for further relevance, with full text manuscripts retrieved as appropriate. In the disagreement cases, a third consultant acted as an intervener. This search selected 53 abstracts. The following data was extracted from included studies: first author, study population, type of data collection, sampling methods, type of study and main findings. The eligible studies were those which reported the "Premenstrual Syndrome" and "prevalence of Premenstrual Syndrome". However, studies which included treatment of PMS were excluded. Out of 53 abstracts, 26 papers were categorized as potentially eligible for meta-analysis and systematic review. In the last stage 17 full text articles were used in the review [Table/Fig-1].

STATISTICAL ANALYSIS

Data synthesis occurred through meta-analyses using the random effect model of Mantel-Haenszel, with available data presented in a Forest plot. Variance for each study was calculated using the binomial distribution formula. The presence of heterogeneity was determined by the chi-square test with a significance level of <0.1 combined with an I^2 statistic for estimates of inconsistency within the meta-analyses. The I^2 statistic estimates the percent of observed between-study variability due to heterogeneity rather than to chance and ranges from 0 to 100 percent. (Values of 25%, 50% and 75% were considered representing low, medium and high heterogeneity, resp.). For this review we determined that I^2 values above 75 percent



[Table/Fig-1]: Results of the systematic literature search

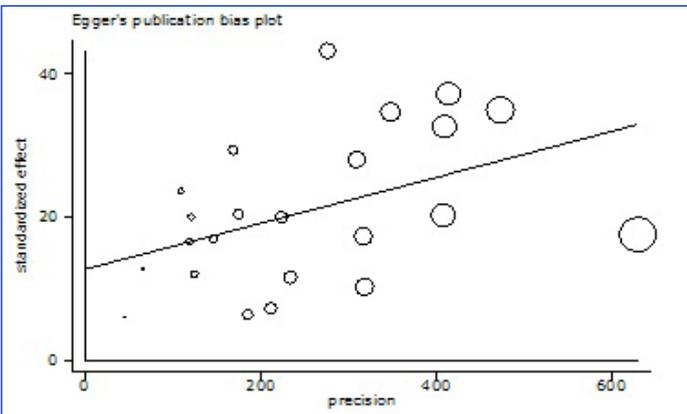


[Table/Fig-3]: The prevalence of premenstrual syndrome. Squares represented effect estimate of studies with their 95% confidence intervals with size of squares proportional to the weight assigned to the study in the meta-analysis. The diamond represents the overall results and 95% confidence interval of the random effect of the meta-analysis

Researcher	Year	n*	locations	p** (%)	CI 95%***
Jabeen	1996	200	Pakistan	41	34-48
Silva	2003	1395	Brazil	60	58-63
Potter	2003	2863	France	12	10.8-13.2
Antai	2004	200	Nigeria	85	80.1- 89.9
Tabassum	2004	384	Pakistan	53	47.8-58.2
Bakhshani	2005	300	Iran	98.2	96.7-99.7
Sibel	2006	1992	Turkey	79	74.9-83.1
Nisar	2006	172	Pakistan	51	43.5-58.5
Rizk	2006	700	United Arab Emirates	16.8	14-19.6
Knauss	2007	3518	Switzerland	19	17.7-20.3
Erbil	2007	300	Turkey	49.7	44-55.4
Tschudin	2007	3913	Switzerland	10	9.1-10.9
Lete	2008	2018	Spain	73	70.8-75.2
Butsripoom	2009	161	Thailand	16.8	10.9-29.7
Carlos	2009	1053	Brazil	60	57-63
Lakshmi	2011	300	India	67	61.7-72.3
Qiao	2011	947	China	21	19.8-22.2
Total		18803		47.8	32.6-69.9

[Table/Fig-4]: The description of studies that met our eligibility criteria*Number of participants**Prevalence*** Confidence Interval

were indicative of significant heterogeneity warranting analysis with a random effect model as opposed to the fixed effect model to adjust for the observed variability. This heterogeneity was further explored through subgroup analyses and meta-regression. A univariate and multivariate approach were employed to assess the causes of heterogeneity among the selected studies and the Egger test was conducted to examine potential publication bias [Table/Fig-2].



[Table/Fig-2]: Eggers publication bias plot

Meta-regression was used to examine the relationship between the prevalence of PMS and study's year and sample size. All analyses were conducted using Stata version 11.2 (Stata Corp LP, College Station, Texas).

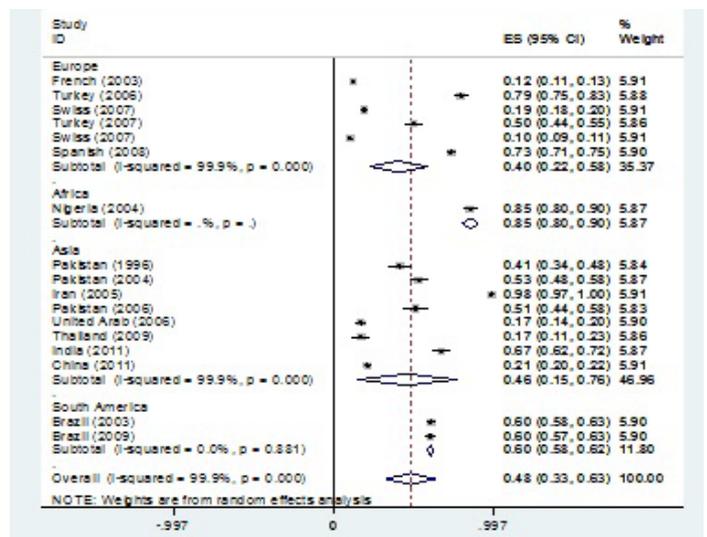
RESULTS

During the search of resources a total of 53 articles were found. After exclusion of duplicate, finally 17 papers were selected for analysis [Table/Fig-1]. In total, 18,803 individuals were participants in the studies. The description of studies that met our eligibility criteria are presented in [Table/Fig-3 and 4].

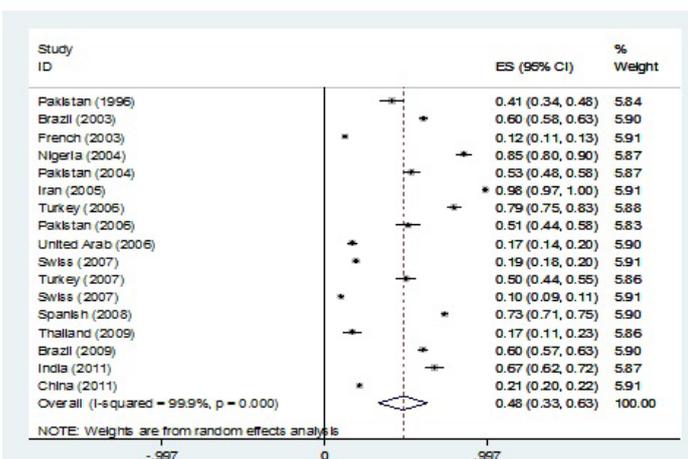
The prevalence of PMS is presented in 17 articles. The pooled of PMS rate is 48% (95% CI: 33- 63). The prevalence of PMS according to continent is presented in [Table/Fig-5]. The prevalence of PMS has been studies in Asia in compared with other continents. [Table/Fig-6] show the prevalence of PMS according to Country. Based the retrieved studies Iran has been the highest prevalence of PMS.

Meta-regression scatter plot did indicated a significant correlation between the sample sizes and the prevalence of PMS (p= 0.013) [Table/Fig-7].

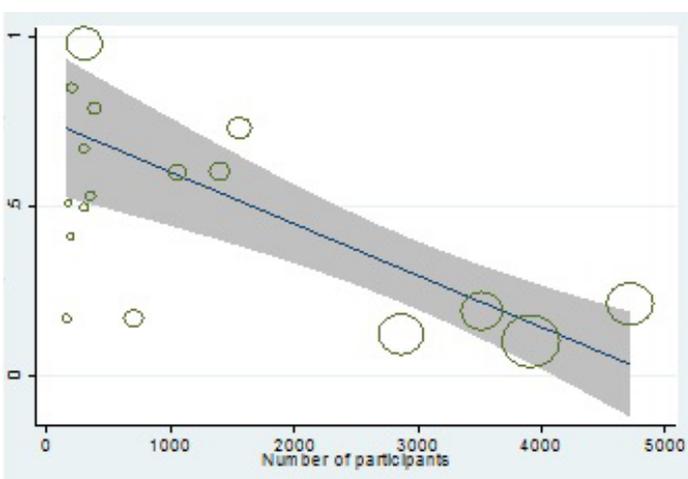
However, meta-regression scatter plot showed an increasing trend in the prevalence of PMS during 1996-2011 but correlation between prevalence of PMS and year of study was not significance (p= 0.797) [Table/Fig-8].



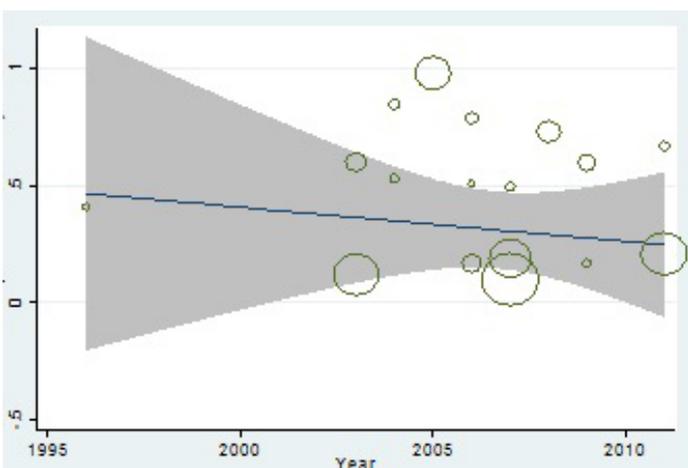
[Table/Fig-5]: The prevalence of PMS according to continent. Squares represented effect estimate of studies with their 95% confidence intervals with size of squares proportional to the weight assigned to the study in the meta-analysis. The diamond represents the overall results and 95% confidence interval of the random effect of the meta-analysis



[Table/Fig-6]: The prevalence of PMS according to Country. Squares represented effect estimate of studies with their 95% confidence intervals with size of squares proportional to the weight assigned to the study in the meta-analysis. The diamond represents the overall results and 95% confidence interval of the random effect of the meta-analysis



[Table/Fig-7]: Meta-regression plot of the prevalence of PMS based on year of study



[Table/Fig-8]: Meta-regression scatter plot of the prevalence of PMS based on sample size

DISCUSSION

Main Findings

This study evaluated the prevalence of PMS in different areas in world wide. Based our results, the pooled prevalence of PMS was 47.8% (95% CI: 32.6-62.9). The lowest and highest prevalence

were reported in France 12% (95% CI: 11-13) and Iran 98% (95% CI: 97-100) respectively.

Interpretation in Light of Previous Studies

Present study reported the pooled prevalence of PMS was 47.8 percent in world wide. This study is the first systematic review and meta-analysis of PMS. Based on searches in scientific databases, the impact of some factors on treatment of PMS have been studied using a meta-analysis but any studies have been reported the prevalence of PMS [16,17].

Different studies have reported a wide range of PMS in various countries. So that, the PMS rate has been reported 10 percent in Switzerland [18] and 98 percent in Iran [19].

We evaluated the prevalence of PMS according to continent. The result shows the highest and lowest prevalence in Asia and Europe respectively. In subgroups, the lowest frequency of PMS was reported in Switzerland's study. In this study participated 3913 women aged 15-54. Results showed that 10 percent of all participants experienced some symptoms of PMS [18].

There are several factors affecting on prevalence of PMS such as age [20], aerobic exercise [21,22] and nutrition [23]. The articles that we've entered into the meta-analysis, populations studied were different in terms of age, physical activity and nutrition. Therefore, the difference in study population is an effective factor on reported prevalence. The use of various tools of measurement is other main factor for the differences in the reported prevalence. In tree study conducted in Pakistan have used of different tools. Jabeen et al., evaluated the prevalence of PMS among housewives and working women by 4th ed Diagnostic and Statistical manual of mental from American Psychiatric [24]. While Nisar et al., were examined the Prevalence of PMS among the 172 medical students. The researcher applied the daily record of severity of problems (DRSP) includes 21 items grouped into 11 domains and three occupational productivity questions [20]. However, another study conducted in Pakistan (Tabassum et al.) investigated the medical students, but the tool of data collection was different from other studies [25].

Meta regression scooter plot shows the increase in sample size is associated with a reduced incidence of PMS. This difference is statistically significant. However, the year of study has no effect on increasing the frequency of PMS. Studies reported the prevalence of PMS in 10% of 3913 participants [26] and 12% of 2863 participants [27]. In contrast, studies with low sample size have shown the higher frequency of the PMS [28].

Strengths and Limitations

Our study has several potential Strengths. This study is the first systematic review and meta-analysis of PMS in Iran. Based on searches in scientific databases, the impact of some factors on the prevalence of PMS has been studied using a meta-analysis but any studies have been reported prevalence of PMS.

Our systematic review and meta-analysis study has several limitations. The International databases have not appropriate of quantity (number of papers have been recorded) and quality (tool). This databases do not include all the journals. On the other hand, much of the scientific researches in worldwide are thesis projects. Unfortunately, there is no comprehensive and coherent national database to cover up the thesis projects.

CONCLUSION

Based our results the global prevalence of PMS is high and about half of women of reproductive age who experience this symptoms. Considering that different tools have been used in studies and many studies have been designed based on a limited sample, therefore, future research needs to consider the prevalence of PMS in different countries of world.

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