

Using the SF-12 Summary Scores to Predict Risk of Work Loss Associated with Premenstrual Syndrome and Premenstrual Dysphoric Disorder

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BACKGROUND

Premenstrual syndrome (PMS) is defined as a set of cyclic physical and psychological premenstrual symptoms that are severe enough to impair some aspects of an affected woman's life during the week before the onset of menstrual bleeding. The symptoms attenuate when the menstrual period begins or shortly after.¹ Premenstrual dysphoric disorder (PMDD) describes a subset of women with at least five severe premenstrual symptoms and at least one of them being mood symptom.²

Premenstrual disorders, including both PMS and PMDD, can interfere with an affected woman's interpersonal relationships, social activities, work absenteeism, work productivity, and health-related quality of life (HRQOL).^{3,4} Much of the research in premenstrual disorders has focused on the emotional impact of the conditions. For instance, studies have shown that PMDD could have somewhat better but much comparable mental health status to depression.^{2,7,9}

A recent study also suggest that PMDD may have substantial impact on physical health as well, comparable to the impact of osteoarthritis and rheumatoid arthritis, from the perspective of HRQOL.⁹

OBJECTIVES

To use the **Physical Component Summary (PCS)** and **Mental Component Summary (MCS)** scores from the SF-12 Health Survey to predict work loss risk associated with **PMS** and **PMDD**

METHODOLOGY

Data Sources

- Premenstrual Symptoms Impact Survey development and validation study (PMSIS study)¹⁰:
 - **Study Overview:** An internet survey study from a sample of the national representative female population (see Figure for the flow chart on study participants)
 - **Predictors:** PCS and MCS Scores from the SF-12 Health Survey
- Medical Outcomes Study (MOS)¹¹:
 - **Study Overview:** A 4-year observational study of variations in practice styles and health outcomes for patients with chronic conditions in Boston, Chicago and Los Angeles
 - **Independent Variables**
 - Baseline PCS scores, baseline MCS scores from the SF-36 Health Survey
 - Demographics: Age, Gender
 - **Outcome Variables**
 - Unable to work due to health at baseline
 - Work loss due to health at 6-month follow-up
 - Work loss due to health at 1-year follow-up

Diagnoses in the PMSIS study

- Women were classified as "at risk for PMS" based on the retrospective component of the ACOG criteria¹
- Women were classified as "at risk for PMDD" based on the retrospective component of the DSM-IV-TR criteria²

Analysis Procedures

- Work loss related outcome variables were regressed onto the baseline predictor to assess the risk of work loss due to health at 1) baseline, 2) 6-month follow-up, and 3) 1-year follow-up, controlling for age and gender (Table 1). The baseline predictor was
 - MOS PCS scores, or
 - MOS MCS scores
- Regression coefficients generated from the MOS models were used to derive the means of odds ratios (OR) of work loss risk outcomes, given the score differences of the PCS or MCS from the PMSIS study relative to the mean score of the general population (=50).
- Two sets of mean ORs were derived separately for each diagnosis
 - For women at risk for PMS vs. not at risk for PMS
 - For women at risk for PMDD vs. not at risk for PMDD
- ANOVA tests compared the probability differences in ORs within each diagnosis group: at risk for PMS or PMDD vs. not at risk.

Table 1 – Logistic Regression Coefficients from the MOS Using Baseline PCS/MCS Scores to Predict Work Loss Outcome Variables

Dependent Variable	PCS		MCS	
	b	p	b	p
Unable to work due to health at baseline	-.123	<.001	-.057	<.001
Job Loss at 6 months due to health	-.070	<.001	-.046	<.001
Job Loss at 1 year due to health	-.070	<.001	-.043	<.001

*Age and gender were not significant in all logistic models.

Table 2 – Comparisons between Means of Odds Ratios for Risk of Work Loss for Women Who Were at Risk for PMS and Women Who Were Not at Risk

Predicted Outcome	Mean OR (95% CI)		F	P
	At-risk for PMS	Not-at-risk for PMS		
Using PCS Scores				
Unable to work at baseline	2.39 (1.93-2.86)	1.04 (0.83-1.26)	26.70	<.001
Work loss at 6-month	1.32 (1.21-1.43)	0.89 (0.83-0.94)	46.25	<.001
Work loss at 1-year	1.32 (1.21-1.43)	0.89 (0.83-0.94)	46.25	<.001
Using MCS Scores				
unable to work at baseline	1.74 (1.63-1.85)	1.13 (1.08-1.18)	99.16	<.001
Work loss at 6-month	1.53 (1.45-1.61)	1.08 (1.04-1.12)	103.47	<.001
Work loss at 1-year	1.48 (1.41-1.55)	1.07 (1.04-1.10)	104.51	<.001

Table 3 – Comparisons between Means of Odds Ratios for Risk of Work Loss for Women Who Were at Risk for PMDD and Women Who Were Not at Risk

Predicted Outcome	Mean OR (95% CI)		F	P
	At-risk for PMDD	Not-at-risk for PMDD		
Using PCS Scores				
Unable to work at baseline	2.81 (2.00-3.61)	1.18 (0.98-1.39)	14.70	<.001
Work loss at 6-month	1.46 (1.27-1.66)	0.93 (0.88-0.98)	26.55	<.001
Work loss at 1-year	1.46 (1.27-1.66)	0.93 (0.88-0.98)	26.55	<.001
Using MCS Scores				
Unable to work at baseline	1.99 (1.80-2.18)	1.19 (1.14-1.23)	63.81	<.001
Work loss at 6-month	1.70 (1.56-1.83)	1.13 (1.09-1.16)	62.15	<.001
Work loss at 1-year	1.63 (1.50-1.75)	1.11 (1.08-1.14)	61.63	<.001

RESULTS

Descriptive Results

- Study sample: N=971
- "At risk for PMS": n=172 (17.7%)
- "At risk for PMDD": n=58 (6.0%)
- No reported chronic conditions: n = 319 (32.9%)
- Mean age: 31.4±7.3

Means PCS scores

- Overall study sample: 52.7±6.9
- At risk for PMS: 49.5±9.1
- At risk for PMDD: 47.9±9.4
- No reported chronic conditions: 54.6±5.2

Mean MCS scores

- Overall study sample: 48.6±8.4
- At risk for PMS: 42.8±9.0
- At risk for PMDD: 41.1±10.4
- No reported chronic conditions: 50.1±7.2

Women at Risk for PMS (Table 2)

- **PCS Model:** women at risk for PMS had a 139% increased risk of not being able to work at the concurrent state.
- **PCS Model:** women at risk for PMS who worked at baseline had a 32% increased risk of work loss both in 6-month and 1-year.
- **PCS & MCS Models:** Compared to women **NOT** at risk for PMS, women at risk for PMS were significantly more likely to not be able to work at the concurrent state, and were significantly more likely to experience work loss both in 6-month and 1-year (p<0.001).

Women at Risk for PMDD (Table 3)

- **PCS Model:** women at risk for PMDD have a 181% increased risk of not being able to work at the concurrent state.
- **PCS Model:** women at risk for PMDD who worked at baseline had a 46% increased risk of work loss both in 6-month and 1-year.
- **PCS & MCS Models:** Compared to women **NOT** at risk for PMDD, women at risk for PMDD were significantly more likely to not be able to work at the concurrent state, and were significantly more likely to experience work loss both in 6-month and 1-year (p<0.001).

LIMITATIONS

Study analyses were conducted using secondary data sources. PMS and PMDD diagnoses were based on retrospective criteria only.

No direct productivity impact and work loss risk measures were captured in the PMSIS study.

It is important to obtain such direct measures and to validate the approach of using PCS/MCS scores to estimate the work loss risk related to PMS and PMDD.

CONCLUSIONS

Using either the PCS scores or MCS scores as a predictor, women with premenstrual disorders were more likely to experience work loss than the general population, especially women with PMDD at a higher risk.

When comparing the PCS and MCS models for the work loss risk prediction, it appears that physical health (PCS score) is a better predictor for the concurrent state of work status, and mental health (MCS score) is a better predictor of the long term work ability.

Given that premenstrual disorders largely impact women between 18 and 45 years who have great responsibilities in school, family, and the workforce, it is important to identify women with such conditions and provide appropriate treatment to improve their health.

References

1. American College of Obstetricians and Gynecologists (ACOG). Premenstrual syndrome. Washington, DC: ACOG, 2000, vol. 15
2. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders, 4th ed. American Psychiatric Association: Washington, DC, 2000
3. Borenstein JE, Dean BB, Endicott J, Wang J, Brown C, DiKevonian V, Yorkens KA. Health and economic impact of the premenstrual syndrome. *J Reprod Med* 2003;48: 515-34
4. Dean BB, Borenstein JE. A prospective assessment investigating the relationship between work productivity and impairment with premenstrual syndrome. *J Occup Environ Med* 2004;46:649-56
5. Hylan TR, Suredell K, Judge R. The impact of premenstrual symptomatology on functioning and treatment-seeking behavior: Experience for the United States, United Kingdom, and France. *J Womens Health Genet Based Med* 1999;8:1043-52
6. Rapaport MH, Clary C, Fayyad R, Endicott J. Quality-of-life impairment in depressive and anxiety disorders. *Am J Psychiatry* 2005;162: 1171-8
7. Yorkens KA. Antidepressants in the treatment of premenstrual dysphoric disorder. *J Clin Psychiatry* 1997;58(Suppl 14):4-10
8. Halbreich U, Borenstein JE, Pearlstein T, Kahn LS. The prevalence, impairment, and burden of premenstrual dysphoric disorder (PMS/PMDD). *Psychoneuroendocrinology* 2003;28:1-23
9. Yang M, Wallerstein G, Hagan M, Guo A, Chang J, Komstein S. Burden of Premenstrual dysphoric disorder on health-related quality of life. *J Womens Health* 2008;17:113-21
10. Wallerstein GV, Blaisdel-Cross B, Gajria K, Guo A, Hagan M, Komstein SG, Yorkens KA. Development and Validation of the Premenstrual Symptoms Impact Survey (PMSIS): A Disease-Specific Quality of Life Assessment Tool. *J Womens Health* 2008;17:439-50
11. Stewart AL, Greenfield S, Hays RD, Wells K, Rogers WH, Berry SD, McGlynn EA, Ware JE Jr. Functional status and well-being of patients with chronic conditions. Results from the Medical Outcomes Study. *JAMA* 1989;262:907-13
12. Bjorner JB, Wallerstein GV, Martin MC, Liu P, Blaisdel-Cross B, Piech CT, Mody SH. Interpreting score differences in the SF-36 Vitality scale: Using clinical conditions and functional outcomes to define the minimally important difference. *Curr Med Res Opin* 2007;23:71-9