Impact of Premenstrual Syndrome on Productivity in a Pressure Cooker Manufacturing Industry

A Cross-Sectional Study

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Abstract:

Background: Premenstrual syndrome (PMS) is a condition that affects a woman's emotions, physical health, and behaviour during certain days of the menstrual cycle, generally just before her menses. Past studies show that PMS harms daily activities. This study assessed the impact of PMS on work-related quality of life.

Objectives**:** The aim of the study is to conduct a premenstrual syndrome assessment, assess its impact on productivity, and provide a baseline premenstrual syndrome and Work-Related Quality of Life assessment so that those subsequent assessments can be compared and interpreted. The study also aims to link the effectiveness of control measures, welfare programs, and employee engagement, therefore promoting the well-being of the employee and individual productivity.

Methods: This cross-sectional study was conducted among the women employees of a pressure cooker manufacturing company. 71 eligible women employees were included in this study. Screening for premenstrual syndrome was done using a validated premenstrual syndrome (PMSS Scale), and the impact of premenstrual syndrome was assessed using a work-related quality of life scale (WRQoL).

Results: Around 23% of participants had premenstrual syndrome, and 75% had good work-related quality of life. Around 88% of the study participants without premenstrual syndrome had good work-related quality of life, whereas among the study participants with premenstrual syndrome, around 36% only had good WRQoL.

Conclusions: This study's results showed that one in four women employed had premenstrual syndromes. The majority of the participants had good work-related quality of life, but women employees with PMS had significantly lower quality of life.

Keywords: premenstrual syndrome, Productivity, Work-Related Quality of Life, Women's Health, Women Employees, Employee Engagement.

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Introduction

"The much higher mortality in those who work with minerals in mines, and women who marry those miners had married several times. As mentioned by Agricola, at the Carpathian Mountain mines, wife of those miners known to marry seven times." by Bernardino Ramazzini, in (De Morbis Artificum Diatriba), Diseases of Workers, Translated by W. C. Wright, preface.

The quote by the father of occupational health emphasises the impact of occupational diseases and mortality prevalent among mining industrial employees in the 1700s. But now, in the modern era, the number of women working at work is increasing dramatically and is very welcoming.

Premenstrual syndrome (PMS) is generally defined as a cluster of emotional, physical, and behavioural symptoms unrelated to any organic disease that appears during the end of the luteal phase and dissolves with the beginning of menstruation or briefly thereafter.[1] PMS can occur among menstruating women of any age, and the effect of PMS varies between women. PMS has a wide range of psychological symptoms like depression, irritability, anxiety, tension, aggression, inability to cope, and physical symptoms like bloating, tenderness of the breast and headache. PMS can cause significant distress in their daily lives, interfere with work, and deteriorate their quality of life and social activities.[2]

The prevalence of PMS in India ranged from 15% to 64%.[3] Most of the girls with premenstrual syndrome reported abdominal bloating (35.2%) as the most common somatic problem and social withdrawal as the most common effective symptom.[4] Due to social withdrawal, the quality of work life is affected. Women with premenstrual syndrome also have a deterioration of sleep quality.[5] The risk of poor sleep quality was two times higher in women with PMS.[6] Studies showed that premenstrual symptoms have a good correlation with perceived stress.[7] The physical, mental, and behavioural symptoms recur during the cycle's luteal phase and cause a deterioration of quality of life, affecting the patient's social, work, and family relations.[8]

Nearly half of the world's population is women, and their Good Quality of Work Life is necessary for an organization to appeal to and retain skilled and capable employees.[9] To survive in the competitive market because of liberalisation and globalisation and reduce employee attrition rates, work-related quality-of-life initiatives are essential. Work-related quality of life includes various components that are influenced by the performance of employees.[10]

A literature review showed the scarcity of data on PMS among Indian working women. A few studies have examined PMS; however, the relationship between PMS and work-related quality of life among Indian working women has not been studied. Therefore, we decided to examine this relationship to determine if PMS affects the professional lives of working women in the pressure cooker manufacturing industry.

Aims and objective

The study's objectives are (1) To conduct a premenstrual syndrome assessment among women employees of the pressure cooker manufacturing industries, (2) To assess the impact on productivity and Work-Related Quality of Life (WRQoL) due to premenstrual syndrome, (3) To link the effectiveness of control measures, welfare programs, and employee's engagement and therefore promoting the well-being of the employee and individual productivity, (4) To provide a baseline premenstrual syndrome and Work-Related Quality of Life (WRQoL) assessment so that those subsequent assessments can be compared and interpreted.

Materials and Methods

A cross-sectional study was carried out among the women employees working in a pressure cooker manufacturing industry in the Coimbatore district of Tamil Nadu State, in southern India, with 110 women workforce. The women who were in the reproductive age group and willing to participate were included, and the women employees who attained menopause or underwent a hysterectomy were excluded.

The structured study tool contains three parts.

- The first part is a questionnaire to collect basic demographic details, health status, and anthropometry (BMI and Blood Pressure).
- The second part was the premenstrual syndrome scale (PMSS), which contains 40 items. The validity and reliability of the scale were carried out in a similar study population by a study conducted by Padmavathi P et al. 2014.[11] Each item has a 5-point Likert scale response which ranges between 1 (not present or no change from usual) to 5 (extreme change, perhaps noticeable even to casual acquaintances) The responses were scored as "1", rarely as "2", sometimes as "3", very often as "4" and always as "5" points. The final score was 1-40 no symptoms, 41-80 mild symptoms, 81-120 moderate symptoms, 121-160 severe, and 161-200 very severe symptoms.
- The third part is The Work-Related Quality of Life (WRQoL) scale, a 23-item psychometric scale used to gauge employees' perceived quality of life as measured through six psychosocial sub-factors.[12] The scale was scored on a 1 to 5-point Likert scale. Items 7, 9, and 19 were coded reversely. Item number 24 was not used to calculate subgroup factor scores. The score was categorized as given in (Table no 1).

Table 1: The Classification by WRQoL Score

WRQoL Domains	Item numbers	Low	Average	Good
General Well-Being	4,9,10,15,17,21	6-18	19-23	>24
Home-Work Interface	5,6,14	3-9	10-11	>11
Job and Career Satisfaction	1,3,8,12, 18, 20	3-18	19-22	>22
Control at Work	2, 12, 23	3-9	10-11	>11
Working Conditions	13, 16, 22	3-10	11	>11
Stress at Work	7, 19	2-4	5-6	>6
Total		1-71	72-84	>84

Written informed consent was obtained before collecting data. The study participants filled out the questionnaire, and basic anthropometry like height and weight was measured. The blood pressure was measured using a digital sphygmomanometer. Data was entered in Microsoft Excel, and analysis was done using SPSS 26 Version. Continuous variables were summarised as mean, standard deviation, median, and Interquartile range based on normality. Categorical variables will be summarized by frequency and proportions. Association categorical and categorical variables will be assessed using the Chi-square test. P-values less than 0.05 will be considered statistically significant.

Results

Out of 110 women employees, in the two weeks duration, 71 study participants provided data. Most of the study participants were aged between 31 and 40 (69%), and 15% were above 40. About 10% graduated and 50% completed high school. The majority of them work in assembling units of products. All the participants had a mean family income of more than 10,000 INR, and 40% had a family income between 20,001 to 25,000 INR. Most were married (94%) and had more than two children (63%). Around 82% never used contraception, and 4% currently use it. Most contraception users used intrauterine devices (15%). One study participant had hypertension, two had diabetes mellitus, and six had hypothyroidism. More than half of the study participants had a body mass index that was more than normal. 11% of study participants had blood pressure at the prehypertension level, and 13% had blood pressure higher than the hypertension level. The prevalence of Premenstrual Syndrome (PMS) among the study participants was 23%, as shown in (Table 2) and (Figure 1).

Table 2: Demographic and Basic Health Status of the Study Participants

Item	Sub groups	Frequency	Proportion
Age group	20 - 30	11	15.5
	31 - 40	49	69.0
	> 40	11	15.5
Education	Graduate and above	7	9.9
	Higher secondary (11-12)	18	25.4
	High school (9-10)	35	49.3
	Middle (6-8)	5	7.0
	Primary (1-5)	6	8.5
Site of working	Assembly Line worker	67	94.4
	Office /Desk worker	2	2.8
	Physical/Lifting worker	2	2.8
Family Income Per month	10000- 20000	25	35.2
	20001 - 25000	29	40.8
	> 25000	17	23.9
Marital Status	Married	67	94.4
	Unmarried	1	1.4
	Widow/Separated	3	4.2
No of Children	0	1	1.4
	1	22	31.0
	2	43	60.6
	3	2	2.8
	Nil	3	4.2
Only Earning Member of Family	No	69	97.2
	Yes	2	2.8
Contraception Use	Currently Using	3	4.2
	Never Used	58	81.7
	Previously Used	10	14.1
Type of Contraception	IUD	11	15.5
	None	58	81.7
	PS	2	2.8
History of DM	No	69	97.2
	Yes	2	2.8
History of HTN	No	70	98.6
	Yes	1	1.4
History of Thyroid	No	64	90.1
	Yes	6	8.5
BMI	Malnutrition	3	4.2
	Normal	27	38.0
	Over weight	27	38.0
	Obese	14	19.7
HTN	Normal	54	76.1
	Prehypertension 130-139/85-89 mmHg	8	11.3
	Hypertension > 140/90 mmHg	9	12.7

About 17% of study participants had mild premenstrual syndrome, 7% of study participants had moderate premenstrual syndrome, and 3% had severe premenstrual syndrome (figure 2).

Table 3 shows the distribution of work-related quality of life of study participants. Around two-thirds of the study participants had a good overall work-related quality of life, and 25% had an average overall work-related quality of life. In

general well-being, 50% of study participants had a good work-related quality of life. Similarly, most participants had a good work-related quality of life in the Home-Work Interface and Job & Career Satisfaction domains. On the other hand, 45% of study participants had a poor work-related quality of life in control of the work domain. However, 87% of participants were in working conditions, and 73% had a good work-related quality of life.

Table 3: Distribution of Work-related quality of Life of Study participants

WRQoL Domains	Low	Average	Good
General Well-Being	3 (4.2)	32 (45.1)	36 (50.7)
Home-Work Interface	2 (2.8)	11 (15.5)	58(81.7)
Job and Career Satisfaction	2 (2.8)	10 (14.1)	59 (83.1)
Control at Work	32 (45.1)	17 (23.9)	22 (31.0)
Working Conditions	5(7.0)	4(5.6)	62(87.3)
Stress at Work	13(18.3)	6(8.5)	52(73.2)
Total	0 (0.0)	18 (25.4)	53 (74.6)

A comparison of the prevalence of premenstrual syndrome and WRQoL is shown in Table 4. The majority (63.5 %) of study participants without premenstrual syndrome had a good work-related quality of life, whereas among the study participants with premenstrual syndrome, around 15% only had good WRQoL. The majority of them had an average WRQoL. This difference in WRQoL in general well-being was statistically significant (p-value- 0.002). In the Home-Work interface domain, most participants in both groups had good WRQoL. Around 10% of participants with premenstrual syndrome have poor WRQoL, but none of the participants in the study group without premenstrual syndrome had poor WRQoL. Similar results were observed in the domain of job and career satisfaction. These differences in WRQoL in both domains were statistically significant (p-value- 0.014 and 0.009). In contrast to the above observation, most participants without premenstrual syndrome had poor WRQoL, and most participants with premenstrual syndrome had good WRQoL. In working conditions, around two-thirds of participants with premenstrual syndrome had good WRQoL, and more than 92% of participants without premenstrual syndrome had good WRQoL. 31% of participants with premenstrual syndrome had poor WRQoL, whereas 13% of participants without premenstrual syndrome had poor WRQoL in stress at work. This difference was not statistically significant (p-value- 0.177). Most (88 %) of study participants without premenstrual syndrome had a good work-related quality of life. In contrast, among the study participants with premenstrual syndrome, around 36% only had good WRQoL, and the majority (63.2%) of them had average WRQoL. This difference in overall WRQoL among study groups was statistically significant (p-value- <0.001).

Table 4: Prevalence of premenstrual syndrome and work-related quality of Life (WRQoL)

WRQoL Domains	Status	PMS Present N (%)	PMS Absent N (%)	P- value*
General Well-Being	Low	1 (5.3)	2 (3.8)	0.002
	Average	15 (78.9)	17 (32.7)	
	Good	3 (15.8)	33 (63.5)	
Home-Work Interface	Low	2 (10.5)	0 (0.0)	0.014
	Average	5 (26.3)	6 (11.5)	

	Good	12 (63.2)	46 (88.5)	
Job and Career Satisfaction	Low	2 (10.5)	0 (0.0)	0.009
	Average	5 (26.3)	5 (9.6)	
	Good	12 (63.2)	47 (90.4)	
Control at Work	Low	3 (15.8)	29 (55.8)	0.009
	Average	6 (31.6)	11 (21.2)	
	Good	10 (52.6)	12 (23.1)	
Working Conditions	Low	2 (10.5)	3 (5.8)	0.056
	Average	3 (15.8)	1 (1.9)	
	Good	14 (73.7)	48 (92.3)	
Stress at Work	Low	6 (31.6)	7 (13.5)	0.177
	Average	2 (10.5)	4 (7.7)	
	Good	11 (57.9)	41 (78.8)	
Total	Low	0 (0.0)	0 (0.0)	0.000
	Average	12 (63.2)	6 (11.5)	
	Good	7 (36.8)	46 (88.5)	

*Chi-Square Test used

Discussion

The prevalence of Premenstrual Syndrome (PMS) among the study participants workers of pressure cooker industries was 26% (95% CI: 17.2-37.4). A systematic review and meta-analysis reported that the prevalence of PMS in India ranged from 15% to 64%, with a pooled prevalence of 43% (95% CI: 0.35-0.50).[3] The international studies from Iran, Sri Lanka, Myanmar, and China reported that the prevalence of PMS was 70.8%, 65.7%, 37.3%, and 21.1%, respectively.[3] The prevalence of PMS might be due to the difference in geographical region, urban or rural residence, socio-economic status, and the instrument used. The overall work quality of life was good for 75% of the participants. The literature on work-related quality of life among workers in the pressure cooker industry is very limited. A high QWL is vital to attract new workers and retain a workforce that is an asset to the organization.[3] Investing in the well-being of working women through QWL initiatives can yield positive outcomes for everyone involved. When employees feel more engaged and satisfied, organizations experience stronger commitment and improved work quality, and consumers benefit from a more productive workforce. According to Padmavathi and colleagues,[7] a happy employee is productive, dedicated, and committed. On the other hand, failure to manage these factors can have a major impact on employee behavioural responses (for example, organizational identification, job satisfaction, job performance, turnover intention, organizational turnover, and personal alienation) as well as outcomes of the organization.

Limitations of the Study

Anxiety and fear among employees about future outcomes of answering the questionnaire. Unable to take more samples for the study due to the lack of time and some employees being on leave during this study period.

Conclusion

This study showed that one in four women employees had premenstrual syndromes. The majority of the participants had a good quality of life in terms of work-related activities. The women employees with premenstrual syndromes had significantly lower quality of life compared to women without premenstrual syndrome. Our study results show there is a need to screen women employees regularly for premenstrual syndrome along with routine health check-ups for early diagnosis and intervention. This will help improve the work-related quality of life, which indirectly helps in improving the productivity of women employees.

Recommendations

- Awareness of premenstrual syndrome and menstrual hygiene is mandatory for all workers, especially women workers.

Hot water provision can be made available near women's working areas, which can reduce PMS symptoms, and it is a caffeine-free alternative.

- Providing periodic recreational activities aimed at de-stressing workers in PMS will be helpful.
- Education on the "Progressive muscle relaxation technique" will be taught to all women, especially all working women, which will help to have a medicine-free cycle.
- Habituating a balanced diet with the inclusion of vegetables, fruits, and whole grains is essential. Healthy fatty acids such as Omega 3 and linoleic acid can reduce irritability and cramps. Eat frequent, small meals or snacks instead of three large meals daily. Having a healthy snack in between meals is also highly beneficial.
- Limit Caffeine and Alcohol (limit your coffee breaks from three to one). Munch on a bar of chocolate to soothe the pain on period days; products tend to dehydrate your body.
- To soothe pain and discomfort, include aerobic exercises, such as walking, and stretching exercises, such as yoga.
- Don't give up on cravings, such as junk foods, especially salt- or sugar-rich, unhealthy foods.
- Cognitive behavioural therapy (CBT), useful in routine treatment practices, and medication should be the last resort.[13]

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