Journal of Engineering and Health Science
eISSN 2600-8378
Volume 8 (Bil.1) 2024: 1-7

THE EFFECTIVENESS OF STRESS MANAGEMENT PROGRAM ON JOB STRESS AND MENOPAUSAL SYMPTOMS AMONGS REGISTERED NURSES IN A PRIVATE HOSPITAL

Norjana Kamarludin, Assoc.Prof Dr.Annamma Kunju&Prof.Dr.Aini Ahmad
School of Nursing,
KPJ Healthcare University
**Corresponding Author's Email: jana@kpju.edu.my*

Article History:
Received : 6 OKTOBER 2024
Revised : 6 OKTOBER 2024
Published : 31 DISEMBER 2024

To cite this article:
Kamarludin, N., Kunju Kunju, A & Ahmad, A. (2024). THE EFFECTIVENESS OF STRESS MANAGEMENT PROGRAM ON JOB STRESS AND MENOPAUSAL SYMPTOMS AMONGS REGISTERED NURSES IN A PRIVATE HOSPITAL. Journal Engineering and Health Sciences, Volume 8(Bil 1):1-7.

ABSTRACT
Job stress and menopausal symptoms are prevalent among registered nurses, affecting their quality of life and job performance. The effectiveness of stress management programs in mitigating these issues has been under-explored in this demographic. This study aimed to evaluate the effects of a stress management program on job stress and menopausal symptoms among registered nurses in private hospitals. A quasi-experimental design with a sample of 74 registered nurses was used. Participants underwent a stress management intervention, and data on job stress and menopausal symptoms were collected using validated scales before and after the intervention. Paired sample t-tests and Spearman's correlation coefficients were employed to analyse the data. The intervention significantly reduced job stress and menopausal symptoms ($p < 0.001$). A strong positive correlation was found between pre- and post-intervention scores for job stress ($r = 0.729$) and menopausal symptoms ($r = 0.884$). The results suggest that the intervention was effective in reducing both job stress and menopausal symptoms. The stress management program significantly reduced job stress and menopausal symptoms among registered nurses. These findings underscore the importance of implementing such programs to improve nurses' well-being and job performance. Further research is recommended to explore long-term effects and applicability in different settings.

Keywords: *Job stress, Stress management program, Menopausal Symptoms, Registered nurses.*

1.0 INTRODUCTION

Job stress is a significant concern for registered nurses, particularly in private hospitals where high patient loads, long working hours, and organizational demands amplify stress levels (Haslinda & Tyng, 2016). This stress is especially challenging for nurses undergoing menopausal transition, a period marked by physical and psychological changes that can significantly impact their work performance and well-being. The combination of job stress and menopausal symptoms not only affects patient care quality but also leads to increased absenteeism, burnout, and job dissatisfaction among nurses (Lua & Imilia, 2011).

The prevalence of job stress among healthcare professionals is high, with estimates suggesting that 75-90% of primary healthcare providers experience stress (Choi et al., 2015). Nursing, in particular, is recognized as one of the most stressful occupations due to the nature of the work, which often involves emotional and mental strain (Samuel et al., 2021; Muhamad R et al., 2021). In Malaysia, a significant portion of the nursing workforce consists of women, many of whom are in their mid- to late-adult years and experience menopause while working (Dousin et al., 2020).

Menopause, a natural phase in a woman's life, brings about various physical, emotional, and hormonal changes, often exacerbated by job stress (Bariola et al., 2017; Koukouliata et al., 2017). Symptoms such as hot flashes, sleep disturbances, and mood fluctuations are common and can be aggravated by stress, which is a significant contributing factor to these symptoms (Matsuzaki et al., 2014). Although menopause is a common experience for many female professionals, it remains an under-discussed issue in the workplace, particularly among healthcare professionals who report job stress as a major factor in worsening menopausal symptoms (Aydin et al., 2020). Given the complex relationship between job stress and menopausal symptoms, effective stress management is crucial. Stress management programs, including cognitive-behavioral therapy, relaxation exercises, and mindfulness training, have been widely recognized as effective in reducing workplace stress and improving health outcomes (Lee & Kim, 2019). However, there is limited research specifically focusing on the intersection of job stress and menopausal symptoms among nurses.

This study aims to address this gap by evaluating the effectiveness of a stress management program in reducing job stress and alleviating menopausal symptoms among registered nurses in a private hospital setting. By addressing these interconnected challenges, the research seeks to provide valuable insights into the development of targeted interventions that can enhance the well-being and professional sustainability of nurses during the menopausal transition.

2.0 PROBLEM STATEMENT

Registered nurses in private hospitals face high job stress due to demanding work environments, long shifts, and the emotional toll of patient care. For those undergoing menopause, this stress is intensified by symptoms such as hot flashes, mood swings, and sleep disturbances, further degrading job performance and quality of life (Sarafis et al., 2016). Despite the significant impact of job stress and menopausal symptoms, there is a gap in stress management programs addressing these dual challenges. Current interventions often fail to provide sufficient support, particularly for nurses, who are predominantly female and already balancing work and family responsibilities (Long et al., 2013; Zainal Abidin & Noor Hassim, 2007).

The combination of job stress and menopausal symptoms poses substantial risks to nurses' physical and mental health, leading to increased medical costs, absenteeism, and compromised patient care quality (Geukes et al., 2016; Lua & Imilia, 2011). This dual burden can result in sleep disturbances, reduced concentration, and decreased stamina, impairing nurses' ability to provide optimal care and increasing the likelihood of medical errors. Furthermore, the stress experienced by nurses can compromise patient safety, with negligence becoming a concern (Velana & Rinkenauer, 2021).

This study aims to address these gaps by evaluating the effectiveness of a comprehensive stress management program tailored to reduce job stress and alleviate menopausal symptoms among registered nurses in a private hospital setting. This research is crucial for developing evidence-based strategies that enhance the well-being, job satisfaction, and productivity of this essential workforce.

3.0 LITERATURE REVIEW

Job Stress and Menopausal Symptoms

Work-related stress significantly exacerbates menopausal symptoms, negatively impacting the professional lives of middle-aged women. Hammam et al. (2012) found that poor working conditions worsened symptoms like hot flashes, sleep disturbances, and mood swings among middle-aged female teaching staff in Egypt, leading to increased absenteeism, reduced job satisfaction, and decreased efficiency. The lack of adequate workplace support further aggravates these challenges, highlighting the need for tailored interventions to improve the work experience and well-being of menopausal women. Menopause, defined as the permanent cessation of menstruation due to the loss of ovarian follicular activity (Li et al., 2016; Harun et al., n.d.), typically occurs around 50.7 years in Malaysian women (Wong & Nur Liyana, 2007; Ismael, 1994).

Physiological and Psychological Effects of Job Stress and Menopausal Symptoms

Chronic stress has been linked to an earlier onset of menopause, as found by Choi et al. (2015) in Korean women, suggesting that stress reduction strategies are vital in menopause-related health interventions. Menopause itself is associated with a higher risk of chronic infections and related symptoms, significantly impacting quality of life (Wong & Nur Liyana, 2007; Avis et al., 2009). Common symptoms include musculoskeletal issues, vasomotor symptoms like hot flashes, and fatigue, all of which are exacerbated by stress (Ishak et al., 2021; Syed Alwi et al., 2021; Dhillon et al., 2006).

Women should focus on effective health management during perimenopause to ensure long-term well-being (Iioka & Komatsu, 2014).

Demographic Profile Influencing Job Stress and Menopausal Symptoms

As Malaysia's population ages, with more women working through their menopausal transition, there is an increased risk of health problems such as osteoporosis and cardiovascular conditions (Nurumal et al., 2019; Desai & Brinton, 2019; Bove et al., 2015; Wellons et al., 2012). Li and Lambert (2008) found that stressors in intensive care units (ICUs) significantly affect job satisfaction and coping strategies among nurses, highlighting the need for supportive workplace practices to mitigate stress and reduce burnout. This is particularly crucial in healthcare, where unmanaged stress can have severe emotional and physical consequences (McVicar, 2003).

Stress Management

Health promotion programs, improved work environments, and increased awareness of menopause are essential for helping women cope with the menopausal transition while maintaining productivity at work (Hammam et al., 2012; Converso et al., 2019). Stress management programs (SMPs) have proven effective in reducing stress and enhancing coping abilities, as demonstrated by Alkhawaldeh et al. (2020). These programs are crucial in supporting healthcare professionals' mental health and well-being.

Research Gap

Despite the recognized interaction between job stress and menopausal symptoms, there is limited research specifically addressing this issue among nurses in private hospitals. Job stress, prevalent among nurses due to long hours and emotional labor, can exacerbate menopausal symptoms, further affecting their well-being and job performance. While SMPs have been shown to alleviate stress and potentially reduce menopausal symptoms (Matsuzaki et al., 2014; Arnot et al., 2021), this study aims to fill the gap by evaluating the effectiveness of a structured SMP in reducing job stress and alleviating menopausal symptoms among registered nurses in a private hospital setting.

4.0 METODOLOGY

Study Design

This study employs a quasi-experimental design to establish cause-and-effect relationships between job-related stress and menopausal symptoms. It utilizes a one-group pre- and post-survey design, measuring the same dependent variable in a single group of participants before and after the implementation of a stress management program.

Study Setting and Participant

To participate in the study, one had to be a registered nurse age 40 and above with at least one menopausal symptom. Participants were recruited through purposely sampling. The data was collected from 2 private hospitals in Malaysia.

Sample size

Sample size has been calculated using Krejcie and Morgan (1970) formula, with a known population size of 84 during the data collection period. Based on this calculation, the sample size was determined to be 70 nurses. We collected a total of 84 samples, but 10 were excluded as they either did not meet the inclusion criteria, incomplete survey or withdrawn from the survey. Ultimately only 74 samples were analysed for the study.

Study instrument

The self-administered questionnaire (SAQ) used in this study is prepared in English and consists of three sections: socio-demographic data, menopausal status, and job-related stress.

Socio-demographic

This section includes 16 items demographic information which consists of (1)age, (2)body mass index, (3)race, (4)marital status, (5)age at marriage, (6)number of children, (7)usage of family planning method, (8)educational level, (9)occupational status, (10)nursing position / level, (11)length of service, (12)age of menarche,(13) age of mother during menopause, (14)alcohol consumption, (15)smoking habit and (16)menopausal status, which are essential for understanding the study population and controlling for confounding factors.

Menopause Rating Scale (MRS)

This tool includes 11 questions adopted from Green's Climacteric Scale (Matsuzaki et al, 2014), assessing the severity of menopausal symptoms across (1) physical, (2) psychological, and (3) urogenital domains using a 5-point Likert scale of 0 – 4. For symptoms that do not apply or did not experience by the participant, should be mark as 0. Degree of the symptoms is then mark by mild = 1, moderate = 2, severe = 3 and very severe = 4. The degree of severity is divided into three categories, with total score 0 -11, 12-35 and 36 - 44 are considered as no symptom, mild to moderate and severe to very severe, respectively (Masjoudi, Amjadi & Leyli, 2017). The reliability of the test was analysed using the pilot study data with Cronbach's alpha values of 0.904.

Job Stress Scale

This tool is adapted from the Nurses' Occupational Stressor Scale (Chen et al., 2020), comprises 21 questions covering 9 subtopic of (1)work demands, (2)work—family conflict, (3)insufficient support from co-workers, (4)workplace violence and bullying, (5)organizational issues, (6)occupational hazards, (7)difficulty taking leave, (8)powerlessness, and (9)unmet basic physiological needs. Questionnaire come with 4-point Likert scale of 1 – 4. The participant need to score 1 = strongly disagreed, 2 = disagreed, 3 = agreed and 4 = strongly disagreed respectively. Therefore the highest score of NOSS is 84 for 21 items. The scales provide a comprehensive understanding of menopausal symptoms and job stress, enabling effective analysis and targeted interventions. The reliability of the test was analysed using the pilot study data with Cronbach's alpha values of 0.955

Pilot Study
Depending on the study's primary goal, recommendations range from 10 to 12 per group to 60 to 75 per group (Lewis et al, 2021), therefore 10 participant selected to participate in pilot study which was excluded from actual data collection. The reliability of the test was analysed using the pilot data.

Data Collection
The data was collected between May 2024 to July 2024, after obtaining ethical approvals. The data collection process was carried out electronically through Google Forms in English, and no translation to Malay was required due to Malaysian's multilingual nature. The Google form included a cover letter, informing participants of the confidentiality and risks of participation and serving as the informed consent form.

Data Analysis
IBM SPSS version 29.0 were used to analyze the data, Descriptive statistics such as mean, standard deviation, frequency, and percentage were utilized to assess the demographic profile of the participants.

5.0 RESULTS AND DISCUSSION

Respondent Demographic Profile

The demographic profile of the 74 nurses in this study highlights a predominantly middle-aged group, with 71.6% aged between 40 and 45 years. The majority have a normal Body Mass Index (BMI), although a significant portion (41.9%) is classified as overweight. Most participants are Malay (83.8%), married (93.2%), and have children, with 73.0% having between one and four children. In terms of family planning, oral pills and other methods like injections or implants are commonly used. Educationally, the majority hold a diploma (81.1%), with a smaller percentage having a degree or higher. Most nurses have extensive experience, with over half serving 16-20 years, and the majority work in non-managerial positions with shift work being predominant. Lifestyle factors reveal very low alcohol consumption and smoking rates among the participants. This profile offers a detailed understanding of the nurses' characteristics, providing essential context for analyzing their professional experiences and health outcomes.

Table 1: Respondent's Demographic Profile

Respondent's Profile		Nurses (N = 74)	
		Frequency	%
Age:			
	40 – 45 years	53	71.6
	46 – 50 years	13	17.6
	> 50 years	8	10.8
BMI:			
	Low (<18.5)	4	5.4

	Normal (18.5 – 25)	39	52.7
	High (>25)	31	41.9
Race:			
	Malay	62	83.8
	Chinese	6	8.1
	Indian	6	8.1
Marital Status:			
	Single	2	2.7
	Married	69	93.2
	Separated / Widowed / Divorced	3	4.1
Children:			
	None	16	21.6
	1 – 4	54	73.0
	5 and more	4	5.4
Family Planning:			
	Oral Pill	28	37.8
	Condom	13	17.6
	IUCD	1	1.4
	Others	32	43.2
Level of education			
	Diploma	60	81.1
	Degree	12	16.2
	Master / PhD	2	2.7
Length of Service:			
	10 - 15 years	20	27
	16 - 20 years	40	54.1
	> 25 years	14	18.9
Position:			
	Manager	3	4.1
	Non Manager	71	95.9
Working Hours:			
	Shift	68	91.9
	Office Hours	6	8.1

Alcohol consumption:			
	No	73	98.6
	2 – 4 times a month	1	1.4
Smoking:			
	Non smoker	72	97.3
	Smoker	2	2.7

Levels of job stress among RN pre and post intervention

Table 2 illustrates the impact of a stress management program on the job stress levels of nurses, as measured by the Job Stress Scale, before and after the intervention. Initially, a substantial portion of participants reported high levels of stress, with 35.1% (26 participants) experiencing high stress, and 56.8% (42 participants) reporting moderate stress. Only 8.1% (6 participants) had low stress. Post-intervention, the number of participants with high stress decreased to 21.6% (16 participants), while those with moderate stress increased to 66.2% (49 participants). Additionally, the proportion of participants reporting low stress rose slightly to 12.2% (9 participants). These findings indicate that the stress management program was effective in reducing high stress levels and shifting participants towards moderate and low stress, suggesting improved overall stress management among the nurses. This underscores the value of targeted stress management interventions in healthcare settings, potentially enhancing job performance, well-being, and satisfaction among healthcare professionals.

Table 2 Job Stress Scale Pretest and Posttest

		Pretest		Posttest	
		Frequency	Percent	Frequency	Percent
Valid	High stress	26	35.1	16	21.6
	Moderate stress	42	56.8	49	66.2
	Low stress	6	8.1	9	12.2

Degree of menopausal symptom among RN pre and post intervention

Table 3 highlights the impact of a stress management program on menopausal symptoms among participants, as measured by the Menopausal Rating Scale, before and after the intervention. Initially, a significant majority (91.9%) of participants experienced mild to moderate symptoms, with 6.8% reporting severe to very severe symptoms, and only 1.4% having no symptoms. Post-intervention, there was a marked improvement: no participants reported severe to very severe symptoms, the proportion with mild to moderate symptoms decreased to 71.6%, and those with no symptoms increased to 28.4%. These findings indicate that the stress management program was highly effective in reducing the severity of menopausal symptoms, significantly enhancing the overall well-being of the participants. This underscores the benefits of targeted stress management strategies for

addressing both job-related and personal health challenges among nurses, especially during the menopausal transition.

Table 3: Menopausal Rating Scale Pretest and Posttest

		Pre-test		Post-test	
		Frequency	Percent	Frequency	Percent
Valid	Severe to very severe	5	6.8	0	0
	Mild to moderate	68	91.9	53	71.6
	No symptoms	1	1.4	21	28.4

Effectiveness of stress management program in reducing job stress and menopausal symptom among RN

Job Stress Pretest and Post-test

The descriptive statistics in Table 4, for the Job Stress Pretest and Posttest indicate a reduction in median stress scores from 49.00 to 42.00, suggesting that participants experienced lower stress levels after the stress management intervention. Despite this decrease, the standard deviation and variance remained nearly unchanged, indicating persistent individual differences in stress responses. Overall, these findings reinforce the effectiveness of the stress management program in reducing job stress while maintaining a consistent distribution of stress levels among participants.

Table 4 Descriptive Analysis for Job Stress Pretest and Post-test

		95% Confidence Interval for Mean						
	Mean	Lower bound	Upper bound	Median	Variance	Std. Deviation	Min	Max
Job stress Pretest	50.4459	47.5416	53.3503	49.0000	157.155	12.53613	21.00	75.00
Job stress Postest	45.4459	42.5302	48.3617	42.0000	158.387	12.58521	21.00	75.00

The data in Table 5 reveals that the mean job stress score among participants decreased from 50.45 before the stress management program to 45.45 afterward, indicating a reduction in stress levels due to the intervention. Both pretest and posttest results show consistent variability in stress levels, with standard deviations of 12.54 and 12.59, respectively, and a standard error mean of 1.46 for both tests. This consistency suggests that while the program effectively lowered the overall stress levels, the degree of stress reduction was uniform across the participants.

Table 5: Paired Sample Statistic on Job Stress

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Job stress pretest	50.4459	74	12.53613	1.45730
	Jon stress posttest	45.4459	74	12.58521	1.46300

Menopausal Symptom Pretest and Posttest

The Table 7 shows descriptive statistics for menopausal symptoms before and after the intervention show a reduction in severity, with the mean score decreasing from 19.88 to 16.62, and the median dropping from 18.00 to 14.00. This suggests that the intervention positively impacted symptom severity. The narrowing 95% confidence interval in the post-test, along with decreased standard deviation and variance, indicates more consistent outcomes among participants.

Table 7 Descriptive Data for Menopausal Symptom Pretest and Posttest

		95% Confidence Interval for Mean						
	Mean	Lower bound	Upper bound	Median	Variance	Std. Deviation	Min	Max
Meno symptoms Pretest	19.8784	18.1115	21.6453	18.0000	58.163	7.62647	21.00	41.00
Meno symptoms Postest	16.6216	15.1096	48.3617	18.1337	42.595	6.52645	11.00	34.00

The data from Table 8 shows that the mean score for menopausal symptoms among participants decreased from 19.88 to 16.62 after implementing a stress management program, indicating a reduction in symptom severity. The standard deviation also decreased from 7.63 to 6.53, suggesting that there was not only a general alleviation of symptoms but also a slight reduction in the variability of symptoms across the group. This analysis highlights the effectiveness of the stress management program in reducing the severity of menopausal symptoms among participants.

Table 8:Paired Sample Statistic on Menopausal Symptoms

		Mean	N	Std. Deviation	Std. Error Mean
Pair 2	Menopausal symptoms pretest	19.8784	74	7.62647	.88656
	Menopausal symptoms post-test	16.6216	74	6.52645	.75868

In conclusion, the comparative analysis shows a modest but meaningful reduction in stress levels and menopausal symptom severity following the intervention, as indicated by decreases in both mean and median scores. The distribution of stress levels became slightly more concentrated around the median, while the reduction in variability and range of menopausal symptoms supports the intervention's effectiveness. However, significant deviations from normality and persistent skewness in both stress and symptom distributions suggest that the intervention may not have been equally effective for all participants. These findings highlight the need to consider both central tendency and distributional characteristics, and potentially use non-parametric methods for a more comprehensive evaluation of stress management programs.

The Effect of Job Stress to Menopausal Symptoms Among RN Pre And Post Intervention

Table 9 presents the paired sample correlations for job stress and menopausal symptoms before and after the intervention, revealing strong, statistically significant relationships. The correlation coefficient for job stress is 0.729, indicating a strong consistency in stress levels among participants before and after the intervention, despite overall reductions in stress. Similarly, the correlation coefficient for menopausal symptoms is even higher at 0.884, reflecting a stable pattern of symptom severity across the pretest and posttest. Both correlations are statistically significant, with p-values less than 0.001. These results suggest that while the intervention effectively reduced overall job stress and menopausal symptoms, the relative ranking of individuals' stress and symptom severity remained consistent, indicating a uniform effect of the stress management program across participants.

Table 9 Paired Sample Correlations on Job Stress and Menopausal Symptoms

			Significance	
	N	Correlation	One-Sided p	Two-Sided p

Pair 1	Job stress pretest & posttest	74	.729	<.001	<.001
Pair 2	Menopausal symptoms pretest & posttest	74	.884	<.001	<.001

Table 10 presents a paired samples test analysis of the differences in job stress and menopausal symptoms before and after the intervention among 74 participants. For job stress, the mean reduction was 5.00, with a highly significant t-value of 4.651 ($p < 0.001$), indicating a statistically significant decrease in stress levels. Similarly, menopausal symptoms showed a mean reduction of 3.26, with an even stronger t-value of 7.832 ($p < 0.001$), also reflecting a significant reduction in symptom severity. These results confirm the effectiveness of the intervention in significantly reducing both job stress and menopausal symptoms among the participants.

Table 10: Paired sample test on Job Stress and Menopausal Symptoms in pretest and post-test

		Paired Differences					t	df	Significance	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			One-Sided p	Two-Sided p
Pair 1	Job stress pretest - post- test	5.00000	9.24699	1.07494	2.85765	7.14235	4.651	73	<.001	<.001
Pair 2	Menopausal symptoms pretest - post- test	3.25676	3.57718	.41584	2.42799	4.08552	7.832	73	<.001	<.001

Spearman's correlation analysis (Table 11) reveals significant relationships between menopausal symptoms and job stress both before and after the intervention. At the pretest stage, a moderate positive correlation (Spearman's rho = .354, p = .002) indicates that higher menopausal symptoms are associated with higher job stress. Post-intervention, this correlation weakens (Spearman's rho = .289, p = .013) but remains significant, suggesting that the positive association persists, albeit at a reduced level. Strong positive cross-time correlations for menopausal symptoms (Spearman's rho = .817, p < .001) and job stress (Spearman's rho = .679, p < .001) suggest that individuals with higher symptoms and stress levels initially tended to maintain them post-intervention. These findings indicate that while the intervention may reduce symptoms and stress, the underlying relationship between them remains significant, highlighting the complexity of managing both factors.

Table 11 Summary of Spearman's Correlation Coefficient

			Menopausal symptom pretest	Job stress pre-test	Menopausal symptom post-test	Job stress post-test
Spearman's rho	Menopausal symptom pretest	Correlation Coefficient	1.000	.354**	.817**	.150
		Sig. (2-tailed)	.	.002	<.001	.204
		N	74	74	74	74
	Job stress pretest	Correlation Coefficient	.354**	1.000	.325**	.679**
		Sig. (2-tailed)	.002	.	.005	<.001
		N	74	74	74	74
	Menopausal symptoms posttest	Correlation Coefficient	.817**	.325**	1.000	.289*
		Sig. (2-tailed)	<.001	.005	.	.013
		N	74	74	74	74
	Job Stress posttest	Correlation Coefficient	.150	.679**	.289*	1.000
		Sig. (2-tailed)	.204	<.001	.013	.
		N	74	74	74	74

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

6.0 CONCLUSION

This study aimed to assess how effective a stress management program was in reducing job stress and menopausal symptoms among registered nurses in a private hospital. The results showed that the program significantly lowered both job stress and menopausal symptoms in participants. Comparing pretest and post- test scores revealed marked reductions in stress and symptoms, with statistical analysis confirming these improvements.

These positive results suggest that structured stress management programs can effectively reduce job stress and menopausal symptoms in nurses. Given the demanding nature of nursing and the unique challenges faced by menopausal women, these findings are important for healthcare administrators and policymakers working to improve the well-being and productivity of their nursing staff.

However, the study had some limitations, such as the lack of a control group, reliance on self-reported data, and the possible influence of the Hawthorne effect. Future research should address these issues by including larger, more diverse samples, using objective stress measures, and conducting long-term follow-ups to evaluate the program's lasting effects. In conclusion, the stress management program showed significant potential in improving the health and well-being of registered nurses dealing with job stress and menopausal symptoms. Implementing such programs more widely could help create a healthier, more resilient nursing workforce, ultimately benefiting patient care and healthcare organizations.

CONFLICT OF INTEREST

The manuscript has not been published elsewhere and is not under consideration by other journals. All authors have approved the review, agree with its submission, and declare no conflict of interest on the manuscript.

REFERENCES

Alkhawaldeh, J. M., Soh, K. L., Mukhtar, F., Peng, O. C., Alkhawaldeh, H. M., Al-Amer, R., & Anshasi, H. A. (2020). Stress management training program for stress reduction and coping improvement in public health nurses: A randomized controlled trial. *Journal of Advanced Nursing*. doi:10.1111/jan.14506

Arnot, M., Emmott, E. H., & Mace, R. (2021). The role of menopause in the evolution of human life histories: A reconsideration of evidence. *Evolutionary Anthropology: Issues*, News, and Reviews, 30(1), 8-21.

Arnot, M., Emmott, E. H., & Mace, R. (2021). The relationship between sosial support. stressful events, and menopause symptoms. *PLoS ONE*. https://doi.org/10.1371/journal.pone.0262332

Avis, N. E., Colvin, A., Bromberger, J. T., Hess, R., Matthews, K. A., Ory, M., & Schocken, M. (2009). Change in health-related quality of life over the menopausal transition in a multiethnic cohort of middle-aged women: Study of Women's Health Across the Nation. *Menopause*, 16(5), 860–869. https://doi.org/10.1097/gme.0b013e3181a3cdaf

Aydin, M., Eker, A. & Yurdakul, M. (2020). Effects of menopausal symptoms on work life and organizational environment. *Current Women's Health Review*, 17(1). 79-85. http://dx.doi.org/10.2174/1573404816999200905135915

Bariola, E., Jack, G., Pitts, M., Riach, K., & Sarrel, P. (2017). Employment conditions and work-related stressors are associated with menopausal symptom reporting among perimenopausal and postmenopausal women. *Menopause*, 24(3), 247–251. https://doi.org/10.1097/GME.0000000000000751

Bove, R., Healy, B. C., Secor, E., Vaughan, T., Katic, B., Chitnis, T., Wicks, P., & De

Jager, P. L. (2015). Patients report worse MS symptoms after menopause: Findings from an online cohort. Multiple Sclerosis and Related Disorders, 4(1), 18–24. https://doi.org/10.1016/j.msard.2014.11.009

Chen, Y.-C., Guo, Y.-L. L., Lin, L.-C., Lee, Y.-J., Hu , P.-Y., Ho, J.-J., & Shiao, J. S.-C. (2020). Development of the Nurses' Occupational Stresssor. *International Journal of Environmental Research and Public Health*, 649.

Choi, B. O., Lee, Y. J., Choi, J. H., Cho, S. W., Im, H. J., & An, J. E. (2015). The association between stress level in daily life and age at natural menopause in Korean women: Outcomes of the Korean National Health and Nutrition Examination Survey in 2010-2012. *Korean Journal of Family Medicine*, 36(6), 305–309. https://doi.org/10.4082/kjfm.2015.36.6.305

Converso, D., Viotti, S., Sottimano, I., Loera, B., Molinengo, G., & Guidetti, G. (2019). The relationship between menopausal symptoms and burnout. A cross-sectional study among nurses. *BMC Women's Health*, 19(1), 1–12. https://doi.org/10.1186/s12905-019-0847-6(n.d.).

Desai, M. K., & Brinton, R. D. (2019). Autoimmune disease in women: Endocrine transition and risk across the lifespan. *Frontiers in Endocrinology*, 10(APR). https://doi.org/10.3389/fendo.2019.00265

Dhillon, H. K., Singh, H. J., Shuib, R., Hamid, A. M., & Mahmood, N. M. Z. N. (2006). Prevalence of menopausal symptoms in women in Kelantan, Malaysia. *Maturitas*, 54(3), 213–221. https://doi.org/10.1016/j.maturitas.2005.11.001

Geukes, M., Van Aalst, M. P., Robroek, S. J. W., Laven, J. S. E., & Oosterhof, H. (2016). The impact of menopause on work ability in women with severe menopausal symptoms. Maturitas, 90, 3–8. https://doi.org/10.1016/j.maturitas.2016.05.001

Hammam, R. A. M., Abbas, R. A., & Hunter, M. S. (2012). Menopause and work - The experience of middle-aged female teaching staff in an Egyptian governmental faculty of medicine. *Maturitas*, 71(3), 294–300. https://doi.org/10.1016/j.maturitas.2011.12.012

Harun, H., Kamaruddin, A., Alias, N., & Haron, N. (n.d.). Prevalence and Management of Menopausal Symptoms in Malaysian Women during Peri and Post Menopause.

Haslinda, A., & Tyng, C. L. T. (2016). Job Stress and Coping Mechanisms among Nursing Staff in a Malaysian Private Hospital. *International Journal of Academic Research in Business and Social Sciences*, 6(5), 471–487. https://doi.org/10.6007/ijarbss/v6-i5/2164

Iioka, Y., & Komatsu, H. (2014). Effectiveness of a stress management program to enhance perimenopausal women's ability to cope with stress. *Japan Journal of Nursing Science*, 12(1), 1–17. https://doi.org/10.1111/jjns.12036

Ishak, N. N. M., Jamani, N. A., Arifin, S. R. M., Hadi, A. A., & Abd Aziz, K. H. (2021). Exploring women's perceptions and experiences of menopause among east coast

malaysian women. *Malaysian Family Physician*, 16(1), 84–92. https://doi.org/10.51866/OA1098

Jafari, M., Seifi, B., & Heidari, M. (2017). Risk assessment : Factors contributing to discomfort for menopausal women in workplace . *Journal of menopusal medicin*e, 85-90.

Koukouliata, A., Nena, E., Koutlaki, N., Liberis, V., & Constantinidis, T. C. (2017). Correlation of age at natural menopause with occupational status and other epidemiologic factors in women from Prefecture of Kavala, Greece. *Hippokratia*, 21(1), 32–37. http://www.ncbi.nlm.nih.gov/pubmed/29904254

Lee, E., & Kim, Y. (2019). The effects of a stress management program on occupational stress and burnout in nurses. *Journal of Occupational Health Psychology*, 24(5), 620-630. doi:10.1037/ocp0000168.

Lewis, M., Bromley, K., Sutton, C.J. et al. Determining sample size for progression criteria for pragmatic pilot RCTs: the hypothesis test strikes back!. Pilot Feasibility Stud 7, 40 (2021). https://doi.org/10.1186/s40814-021-00770-x

Li, Y., & Lambert, V. A. (2008). Workplace stressors, coping, demographics, and job satisfaction in Chinese intensive care nurses. *Nursing in Critical Care*, 13(1), 12-24. https://doi.org/10.1111/j.1478-5153.2007.00318.x

Li, R. X., Ma, M., Xiao, X. R., Xu, Y., Chen, X. Y., & Li, B. (2016). Perimenopausal syndrome and mood disorders in perimenopause: Prevalence, severity, relationships, and risk factors. *Medicine (United States)*, 95(32), 12–14. https://doi.org/10.1097/MD.0000000000004466

Long, C. S., Jusoh, A., Ajagbe, M. A., & Ghee, L. C. (2013). A Review on Job Stressor in the Perspective of Health Care Industry Relationship between Work Stressor and Job. 2(3), 81–86.

Lua, P., & Imilia, I. (2011). Work-Related Stress Among Healthcare Providers of Various Sectors in Peninsular Malaysia. *MJP Online Early*, 20(2), 1–15. https://www.mjpsychiatry.org/index.php/mjp/article/view/153/0

Masjoudi,M.Amjadi,M.A.,Leyli,E.K.,(2017).Severity and Frequency of Menopausal Symptoms in Middle Aged Women, Rasht, Iran,*J Clin of Diagn Res*. 11(8), QC17-QC21. https://www.doi.org/10.7860/JCDR/2017/26994/10515

Matsuzaki, K., Uemura, H., & Yasui, T. (2014). Associations of menopausal symptoms with job-related stress factors in nurses in Japan. *Maturitas*, 79(1), 77–85. https://doi.org/10.1016/j.maturitas.2014.06.007

McVicar, A. (2003). Workplace stress in nursing: A literature review. *Journal of Advanced Nursing*, 44(6), 633–642. https://doi.org/10.1046/j.0309-2402.2003.02853.x

Muhamad R, Mohd M, Mat N, Mohd H, & Harith A. (2021). Why so stressed? A comparative study on stressors and stress between hospital and non-hospital nurses.

BMI Nursing 20(2),1–10. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7780689/pdf/12912_2020_Article_511.pdf

Nurumal, M. S., Isa, M. L. M., Hatta, N. N. K. N. M., Daud, A., Ibrahim, M., Sharifudin, M. A., & Deraman, S. (2019). Bone health status among postmenopausal women in malaysia. *International Journal of Women's Health and Reproduction Sciences*, 7(2), 169–173. https://doi.org/10.15296/ijwhr.2019.28

Samuel, R., Zaini, N. H., Hassan, W. H. W., Talib, A. N., & Ramly, F. A. (2021). Nurses' perspective of work-related stressors. *IOP Conference Series: Earth and Environmental Science*, 704(1). https://doi.org/10.1088/1755-1315/704/1/012026

Sarafis, P., Rousaki, E., Tsounis, A., Malliarou, M., Lahana, L., Bamidis, P., & Papastavrou, E. (2016). The impact of occupational stress on nurses' caring behaviors and their health-related quality of life. *BMC Nursing,* 15(1), 56. doi:10.1186/s12912-016-0178-y.

Syed Alwi, S. A. R., Brohi, I. B., & Awi, I. (2021). Perception of menopause among women of Sarawak, Malaysia. *BMC Women's Health*, 21(1), 1–10. https://doi.org/10.1186/s12905-021-01230-7

Velana M, Rinkenauer G. Individual-Level Interventions for Decreasing Job-Related Stress and Enhancing Coping Strategies Among Nurses: A Systematic Review. *Front Psychol.* 2021 Jul 19;12:708696. doi: 10.3389/fpsyg.2021.708696. PMID: 34349711; PMCID: PMC8326445.

Wellons, M., Ouyang, P., Schreiner, P. J., Herrington, D. M., & Vaidya, D. (2012). Early menopause predicts future coronary heart disease and stroke. Menopause: *The Journal of The North American Menopause Society*, 19(10), 1081–1087. https://doi.org/10.1097/gme.0b013e3182517bd0

Wong, L. P., & Nur Liyana, A. H. (2007). A survey of knowledge and perceptions of menopause among young to middle-aged women in Federal Territory, Kuala Lumpur, Malaysia. *JUMMEC*, 10(2), 22. https://doi.org/10.22452/jummec.vol10no2.4

Zainal Abidin, E., & Noor Hassim, I. (2007). Work-related stress and coping: A survey on medical and surgical nurses in a Malaysian teaching hospital. *Jurnal Kesihatan Masyarakat*, 13(1), 55–66.