The Effect of Mindfulness-Based Training on Stress, Anxiety, Depression, and Job Satisfaction Among Ward Nurses: A Randomized Control Trial

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Conflict of Interest

This article has been accepted for publication and undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the Version of Record. Please cite this article as doi: 10.1111/JONM.13049

Phang Cheng Kar is the president of the "Malaysia Association for Mindfulness Practice & Research". The other authors have no conflict of interest.

Acknowledgements

The authors are grateful to the Nursing Management and Staff at the "University of Malaya Medical Centre" for the precious cooperation in this research.

Source of Funding

There was no source of funding.

Ethical Approval

Ethical approval was acquired from the Ethical Review Committee at University of Malaya Medical Centre (UMMC); (MRECID. No.: 2017924-5586).

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Article type : Original Article

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ABSTRACT

Aim: To assess the effect of a 4-week Mindfulness-Based Training intervention on improving stress, anxiety, depression, and job satisfaction among ward nurses.

Background: Previous literature showed that mindfulness training is useful for helping nurses cope with stress.

Method: Nurses who have mild to moderate levels of stress, anxiety, and depression identified from a teaching hospital were invited to a randomized control trial. The intervention group had a 2-hour Mindfulness-Based Training workshop, followed by 4 weeks of guided self-practice Mindfulness-Based Training website. Both the intervention group (n=118) and the control group (n=106) were evaluated pre- and post-intervention, and 8 weeks later (follow-up) using the Depression, Anxiety, and Stress Scale-21, Job Satisfaction Scale, and Mindful Attention Awareness Scale.

Results: There was a significant effect over time on stress, anxiety, depression and mindful level ($p<.05$). Regarding the difference between the groups and interaction between time and group, there was a significant effect for anxiety ($p=.037$ $p=.008$) and job satisfaction ($p<.001$, $p=0,40$) respectively, with moderate effect size for anxiety reduction (0.465) and small for job satisfaction increment (0.221).

Conclusion: Mindfulness-Based Training is effective in improving anxiety and job satisfaction among nurses.

Clinical Implications for Nursing Management: Mindfulness-Based Training can be included as hospital policy to reduce anxiety and increase job satisfaction among nurses.

Key Words: Nurses, Mindfulness, Stress, Anxiety, Depression, Job Satisfaction.

1 | INTRODUCTION

Previous literature showed that stress (54%), anxiety (71.5%), and depression (35.1%) (SAD) levels were high among nurses (Amin, Quek, Oxley, Noah, & Nordin, 2018), as a result of job-related challenges (Haslinda & Tyng, 2016). The emotional distress affects nurses' job satisfaction (Suni, Nirmala, & Sikkandar, 2017), increases job burnout (Amin, Vankar, Nimbalkar, & Phatak, 2015), reduces the quality of patient care (Gärtner, Nieuwenhuijsen, Dijk, & Sluiter, 2012), and decreases nursing productivity (Letvak, Ruhm, & Gupta, 2012).

Mindfulness practice is among the psychological interventions which are useful in reducing stress among health care professionals, like nurses (Guillaumie, Boiral, & Champagne, 2017), doctors (Pflugeisen, Drummond, Ebersole, Mundell, & Chen, 2016), social workers (Trowbridge & Lawson, 2016), physiotherapists (Mohammed, Pappous, Muthumayandi, & Sharma, 2018), occupational therapists (Reid, Farragher, & Ok, 2013), psychotherapists (Aggs, Bambling, & Research, 2010), mental health care providers (Dobie, Tucker, Ferrari, & Rogers, 2016), and health care professionals in general (Lomas, Medina, Ivtzan, Rupprecht, & Eiroa-Orosa, 2019).

Mindfulness was first introduced to behavioral medicine as the "Mindfulness-Based Stress Reduction (MBSR)" in the 1970s by Dr Jon Kabat-Zinn. The MBSR program was created to help patients with chronic pain and life conditions that were difficult to deal with in medical centres (Kabat-Zinn, 1990). In a recent systematic review on the use of MBSR among nurses for reducing SAD (Ghawadra, Abdullah, Choo, & Phang, 2019a), there were only a few RCTs (two out of nine). Most of the studies had no follow-up (six out of nine) and were with small sample sizes. For example, although Mackenzie, Poulin, and Seidman-Carlson (2006) reported improvement in burnout, life satisfaction, and relaxation in their RCT, only 30 nurses were recruited for the experimental groups. Similarly, Pipe et al. (2009) had just 32 nurses leaders in the intervention groups, even though their RCT showed a significant reduction in stress. Furthermore, previous studies among nurses mostly used either a traditional group MBSR with daily home practice (two to eight weeks duration) or modern ways of delivering mindfulness (e.g. teleconference call, smartphone application); mixed method was uncommon.

This RCT study consists of nurses with mild to moderate SAD scores identified from a previous research (instead of convenience sampling). The intervention of this study was delivered uniquely, which consists of a 2-hour face-to-face workshop (large group of 50 participants in each group) plus a website that guides and monitors daily mindfulness practice. The approach is intended to be practical, cost-effective, and less time consuming, especially for nurses with tight schedule. The study aimed to assess the effect of the MBT on improving SAD and job satisfaction among ward nurses in a teaching hospital.

2 | METHOD

This study followed the "Consolidated Standards Of Reporting Trials (CONSORT)" guideline (Schulz, Altman, & Moher, 2010); (See Supplementary File 1) and was registered with the National Medical Research Registry of Malaysia (NMRR-17-2572-39021).

2.1 | Study Design

A randomized control trial (RCT) was used in the study for nurses who were identified as having a mild or moderate level of either stress, anxiety, or depression (SAD), using DASS-21, from a previous cross-sectional survey (Ghawadra, Abdullah, Choo, & Phang, 2019b). The participants

were randomly assigned to the intervention and control groups using stratified blocked randomization.

2.2 | Participants

This study was conducted among ward nurses in one of the largest Malaysian teaching hospitals. The number of nurses who worked as ward nurses in the "critical care units, medical departments, surgical departments, pediatric departments, and obstetrics & gynecology departments" was 1170 (UMMC, 2016). Out of the 932 nurses who participated in an earlier first-phase study (cross-sectional survey) conducted among the ward nurses (Ghawadra et al., 2019b), 269 (28.9%) of them had a mild to moderate level of SAD. However, 20 of the nurses were excluded from the study due to missing data from unmatched code numbers, leaving 249 nurses who were invited to the RCT. They were distributed randomly into two groups – intervention and control (n=123, 126). However, during the recruitment, 25 nurses were not available, leaving the intervention group with 118 nurses and the control group with 106 (see Figure 1). For inclusion and exclusion criteria, refer to Table 1.

2.3 | Mindfulness-Based Training (MBT)

The MBT intervention in this study was MINDFULGym, which was adapted from the 8-week MBSR (Kabat-Zinn, 1990) for the multi-ethnic Malaysian population (Phang, Mukhtar, Ibrahim, Keng, & Mohd. Sidik, 2015). The intervention in this study (based on the original 5-week MINDFULGym) was a 2-hour workshop (by the author CKP), followed by 4 weeks of self-practice guided by a website (https://pckar39011.wixsite.com/mindfulgym-nurse). Two workshops were conducted with 50 participants in each workshop (Table 2). The website was the extension of the workshop, which gives a detailed explanation of the exercises, thus enabling the nurses to continue the remaining 4 weeks of the intervention at their own time and convenience. The participants were given code numbers to create as user, which only can be used once. The website was customized for smartphone and monitored as the participants' logged-in were recorded to ensure intervention adherence. A WhatsApp group for the intervention group was formed to guide, encourage, and give additional instructions if needed and for sending reminders twice weekly. The control group participants were given access to the MBT website upon completion of the study.

2.4 | Measurement tools

A self-administered questionnaire in English and Malay (the native language in Malaysia) was used to collect the data to ensure the optimal understanding for the nurses. The data were collected three times; pre-intervention, post-intervention (after the workshop and website), and the follow-up was 8 weeks after the post-intervention.

The questionnaire consists of four parts. Part 1: "Participants characteristics", containing 10 items, which were distributed on three subscales; demographic data "gender, age, marital status, ethnicity, educational level", health factors "medical illness and medication taken", and work factors "years of work experience, working shifts, and the department in which the participants worked".

Part 2: "Depression, Anxiety, and Stress Scale (DASS-21)", evaluates the severity of depression, anxiety, and stress symptoms. DASS-21 has three subscales: "depression (DASS-D), anxiety (DASS-A), and stress (DASS-S)". Every subscale has 7-items with a 4-points Likert scale for each subscale, ranging from 0 "did not apply to me at all" to 3 "apply to me very much or most of the time". The DASS-21 was validated (Antony, Bieling, Cox, Enns, & Swinson, 1998), and the subscales' reliability coefficients ranged from 0.81-0.97 (Lovibond & Lovibond, 1995). The Malay version of DASS-21; (M-DASS-21) was validated and had Cronbach's alpha for the subscales of 0.74-0.84 (Musa, Fadzil, & Zain, 2007).

Part 3: "Job Satisfaction Scale for Nurses (JSS)", measures nurses' satisfaction in seven elements of work: "administration, co-workers, career, patient's care, relation to a supervisor, nursing education, and communications". The scale consists of 24-items with a 7-point Likert scale; 1 "strongly agrees", to 7 "strongly disagree". The JSS scale was validated, and Cronbach's alpha was 0.84 (Ng, 1993). The Malay version was validated too and had Cronbach's Alpha of 0.86 (Ghawadra et al., 2019b).

Part 4: "Mindful Attention Awareness Scale (MAAS)", assesses the level of "awareness and attention". It contains 15-items using a 6-point Likert scale from 1 "almost always" to 6 "almost never". The MAAS scale was validated and the Cronbach's alpha was 0.89 (Brown &

Ryan, 2003). The Malay version used (M-MAAS) was validated as well and had Cronbach's alpha of 0.85 (Zainal, Nor-Aziyan, & Subramaniam, 2015).

2.5 | Procedure

2.5.1 | Randomization

First, the departments were categorized: "critical care units, medical departments, surgical departments, pediatric departments, and obstetrics & gynecology departments". Then, randomization was done by putting each ward/department name in a separate "container" (not the names of the participants); each category of the department had a separate container. Then, the wards were selected by randomly picking the ward until half of the participants were randomly picked for the intervention group; those not chosen remained as the control group. This approach was intended to minimize selection bias; each ward/department had an equal chance to be selected in either intervention groups.

2.5.2 | Blinding

This study was not blinded because the intervention was an "educational programme", which is difficult to blind (Cummings, Grady, & Hulley, 2013). However, the "post-randomization confounding (co-interventions)" was minimized through the random selection of the participants by the principal researcher, and not the nursing managers (prone to selection bias), as recommended by Cummings et al. (2013).

2.5.3 | Contamination Bias

The researchers tried to minimize contamination bias in two ways. First, the recruitment of participants was carried out through ward/department selection instead of through individuals. Therefore, it was more difficult for participants from both groups to mix and share experiences due to the ward location. Secondly, the website was protected by a username and password.

2.5.3 | Sample Size Calculation

The calculation of sample size was based on the effect sizes of a similar study by Duarte and Pinto-Gouveia (2016), using G*Power 3.1, a sample size calculator programme (Faul, Erdfelder, Buchner, & Lang, 2009) with "test family: F tests, statistical test: ANCOVA, with alpha error probability 0.05 and power of 95%". The largest calculated sample size for SAD was 224, i.e. 112 for each group.

2.5.4 | Data collection

After ethical approval was obtained, a verbal and written information sheet was given to the participants before obtaining the participants' written consent. The intervention group was given the MBT intervention via a 2-hour workshop and a website for four weeks. Both groups were requested to complete the questionnaires before the workshop, immediately after the website intervention, and 8 weeks later, as a follow-up.

2.6 | Data analysis

The data were analysed using the SPSS software programme Version 25.0. Descriptive statistics, Chi-Square test, and Independent T-test were conducted to compare both groups for **"**participants characteristics" and study outcomes at baseline.

Intention-to-treat (ITT) analyses (Gupta, 2011) were performed on who participants who were available and allocated to the study (n=224). The missing data (n=36) from participants who were lost to follow-up in both groups (see Figure 1), were imputed by "Multiple Imputation" (Jakobsen, Gluud, Wetterslev, & Winkel, 2017). Then, the multiple five imputed data sets were "aggregated" to one data set.

The Generalized Estimating Equations (GEE) was used to evaluate the effect of MBT over time, between the interventional and control groups, and in the interaction between the time and group. There are two reasons for using GEE analysis in this study. First, as blocked randomisation was used in this study, it is more suitable to account for the cluster effect. The other reason is that the data is not normally distributed; GEE can be used in normally and not normally distributed data.

The effect size was calculated using (Lenhard & Lenhard, 2016; Morris, 2008) effect size formula, and evaluated according to Cohen's *d*, the small value of effect size was 0.2, medium 0.5, and large 0.8 (Cohen, 1988). The "number needed to treat (NNT)" was calculated for categorized DASS (normal versus mild to extremely severe) and JSS (satisfied versus un-satisfied), which evaluated the clinical importance of the variation as an outcome of the intervention. The definition of NNT is the anticipated number of people requiring an intervention, rather than the condition of the control for a specified effect through a certain period (Cook & Sackett, 1995; Pinson & Gray, 2003).

3 | RESULTS

3.1 | Participants Characteristics

Table 3 shows the participants' characteristics. The Chi-Square test and Independent T-test showed no significant difference between both groups in the baseline scores for any of the study outcomes, except in medication taken (p=.047), and years of work experience (p=.042).

3.2 | The Effect of Mindfulness-Based Training on Study Outcomes

Generalized Estimating Equations (GEE) analysis showed a significant effect over time on stress (p<.001), anxiety (p=.001), depression (p<.001), and mindfulness levels (p<.001). However, it was not significant for job satisfaction. Regarding the difference between the groups, the results showed significant effects on anxiety (p=.037) and job satisfaction (p<.001), but there was no significant effect on stress, depression, and mindfulness. The results also showed significant effects in the interaction between time and group for anxiety reduction (p=.008) and job

satisfaction increment (p=.040), but not for stress, depression, and mindfulness (see Table 4). The effect size was moderate (0.465) for anxiety and small (0.221) for job satisfaction.

3.3 | Number Needed to Treat for improvement in anxiety and job satisfaction

Eight weeks after the intervention, the percentage of participants with normal levels of stress, anxiety, depression, and job satisfaction were 98%, 77%, 92%, and 98%, respectively for the intervention group, and the control group were 93%, 69%, 92%, and 87%, respectively. The absolute risk reduction was calculated for the significant results; 0.050 (stress), 0.082 (anxiety), and 0.107 (job satisfaction), with a corresponding NNT of about 20, 12, and 9.

3.4 | Per-Protocol (PP) analysis

Per-Protocol (PP) analysis was performed for (n=136) participants who completed all the intervention (workshop and website), and for those who completed the three-point questionnaires; the intervention and control group in PP analysis were n=37 and 99 respectively. The results of the PP using GEE were similar to ITT, which strengthens the validity of the results (Gupta, 2011). Further analysis was conducted on the "participants characteristics" between the PP and ITT, which showed that there were no significant differences between them.

4 | DISCUSSION

This study showed that the MBT significantly reduced anxiety with moderate effect size, and improved job satisfaction with small effect size. Overall, the MBT used in this study seems to be more effective for reducing anxiety compared to the stress and depression symptoms.

There was no significant improvement for the stress and depression symptoms in this study. The result is consistent with the findings from a systematic review of MBSR intervention for nurses (Ghawadra et al., 2019a), whereby two studies had no improvement or no sustained improvement for stress (Bazarko, Cate, Azocar, & Kreitzer, 2013; dos Santos et al., 2016), and only three studies showed a significant improvement for depression (Ando, Natsume, Kukihara, Shibata, & Ito, 2011; dos Santos et al., 2016; Hee, Pathmawati, Norsiah, & Phang, 2014). This is not surprising since the primary aim of mindfulness and acceptance-based training is mainly to increase coping with SAD (Smith, 2014), enhance job functioning (Chaskalson, 2011), and

improve job satisfaction (Mackenzie et al., 2006), instead of symptoms reduction, which is the secondary aim.

In comparison, the quasi-experimental study of Duarte and Pinto-Gouveia (2016) on oncology nurses (6-week MBSR) showed a reduction in stress, but not for anxiety and depression symptoms at post-intervention. Our study showed a reduction in anxiety. The discrepancy could be due to the different methods of delivering the interventions. Duarte and Pinto-Gouveia (2016) used a face-to-face method to deliver MBSR, which provided direct contact with the therapist, leading to more immediate stress symptoms reduction. Another possible explanation for the differences between the results is that the measurement in this study was collected at three points while Duarte and Pinto-Gouveia (2016) just collected the data before and after the intervention, which might not have captured the delayed effect of the intervention.

An important finding in this study is the improvement in job satisfaction among nurses with the effect size between small and medium, and NNT of 9. However, there was only one mindfulness intervention study among nurses that evaluated job satisfaction among nurses in previous literature (Ghawadra et al., 2019a). In the study however, it did not find a positive significant effect on job satisfaction. This may be because the delayed effect of the intervention was not measured, and they used a different measurement scale than this study (Intrinsic Job Satisfaction Scale) (Mackenzie et al., 2006).

However, the mindfulness level was not significant in this study, compared to the RCT of Cohen-Katz, Wiley, Capuano, Baker, and Shapiro (2005) who conducted an 8-week MBSR intervention on nurses using the MAAS scale. It should be noted that in their study, the mindfulness was delivered for eight weeks, giving the nurses the opportunity to become more mindful than the nurses in this study. The eight weeks' face-to-face intervention may have allowed them to build skills incrementally with feedback each week. The intervention in the current study was guided with a WhatsApp group, which gave the participants the opportunity to communicate with one another or with the instructor. But this interaction might not be sufficient as compared to the face-to-face intervention. The MAAS does not measure all facets of mindfulness. It only measures the "attention/awareness" or "acting with awareness" facet of

mindfulness. Retrospectively, it is wondered if the MBT used in this study could improve the other facets of mindfulness. To answer that question, for future studies, the use of the "Five-Facet Mindfulness Questionnaire (FFMQ)" (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006) is proposed.

The "number needed to treat (NNT)" in this study for the significant outcome measures (stress, anxiety, and job satisfaction) was 20, 12, and 9, respectively, which means for about every 12 nurses who received the MBT, their anxiety and job satisfaction returned to normal level. The implication is huge as this is a practical, cost-effective, and time-saving MBT; it was offered through a big class (50 participants in a 2-hour workshop), plus website and WhatsApp support for 4 weeks. In the current era of technology, mindfulness training that includes non-traditional ways of teaching for nurses, like teleconference (Bazarko et al., 2013) and smartphones (Wylde, Mahrer, Meyer, & Gold, 2017) are widespread. These online-based mindfulness interventions were found to be effective in reducing SAD and improving the mindfulness and well-being in a systematic review and meta-analysis (Spijkerman, Pots, & Bohlmeijer, 2016). The current study adds on to the scientific support for creative ways of delivering mindfulness training.

Although the intervention in this study was effective in improving anxiety and nurses' job satisfaction, the drop-out rate was high, especially for the website intervention (48.3%). But this high drop-out rate finding is not isolated. In fact, previous studies reported a higher rate of drop-out. The study of Morledge et al. (2013) and the systematic review study of Melville, Casey, and Kavanagh (2010) on a website delivered intervention reported a drop-out rate of 74.5% and 83%, respectively. Moreover, the similarity between the ITT and PP results indicated that the effect of MBT was not significantly affected by ITT, which means that there was no over or underestimation of treatment effect (Hernán & Hernández-Díaz, 2012).

The relatively lower drop-out rate in this study could be due the inclusion of a 2-hour face-to-face workshop in the intervention, which was recommended to help reduce the drop-out rate in guided website interventions (Fernández-Álvarez et al., 2017). Furthermore, the website intervention in this study was a guided website intervention, which was found to be more

effective than an unguided website intervention (Titov, Andrews, Choi, Schwencke, & Mahoney, 2008).

5 | LIMITATIONS

This study is a RCT with a large sample size of nurses with SAD and used a combined method of delivering mindfulness training – face-to-face workshop (big class-50 participants) workshop followed by a guided website intervention. This makes the study unique and one of the first few studies of its kind among nurses worldwide. Nonetheless, one of the limitations of this study was the use of self-reported questionnaires to evaluate SAD. Thus, the level of SAD might not be completely accurate, compared to clinical diagnosis, or biological stress indicator – like saliva cortisol level, or "event-related brain potentials (ERPs)" (Bostanov, Ohlrogge, Britz, Hautzinger, & Kotchoubey, 2018). Furthermore, this study had a high rate of drop-out from the website intervention although still in an acceptable range. The reason for the high drop-out is unknown, which makes it one of the study's limitations. Another limitation was due to only using a quantitative design, rather than using a mixed method of data collection. In addition, there was no monitoring for nurses' practice of mindfulness during and after the intervention. Future research using a qualitative method could be utilized to explore in detail the best delivery technique for the mindfulness intervention, and the factors that affect the nurses' compliance with the intervention. Monitoring of compliance with daily mindfulness practice is also recommended to enable dose-response relationship analysis.

6 | CONCLUSION

This study revealed that the MBT intervention was effective in improving anxiety, and job satisfaction among ward nurses. The combined method of delivering the MBT (workshop and website) is a practical, cost-effective, and less time-consuming way to teach mindfulness to nurses with busy schedules.

7 | IMPLICATIONS FOR NURSING MANAGERS

The nursing managers have the opportunity to introduce MBT to nurses as part of hospital policy and continuing professional education (CPD) to help them improve anxiety and job satisfaction.

This may eventually enhance the quality of patient care among nurses and reduce the financial losses for the hospitals by reducing medical sick leave and health insurance.

Ethical Approval

Ethical approval was acquired from the Ethical Review Committee at University of Malaya Medical Centre (UMMC); (MRECID. No.: 2017924-5586).

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TABLE 1 Inclusion and exclusion criteria

Inclusion Criteria	Exclusion Criteria
Nurses who work in wards.	Nurses who work in the out-patient clinic, or nursing managers, due to the different types of patient care, roles, and responsibilities.
	Nurses who have a history of mental illness (n=3) were excluded in the first study.
The nurses who had mild to moderate levels of SAD* (according to DASS-21) in an earlier cross-sectional survey.	The nurses who had severe and extremely severe levels of SAD (according to DASS-21). They were advised to seek professional help** at the psychiatric/psychology clinic in the hospital.

*Mild to moderate scores of stress (15-25), anxiety (8-14), depression (10-20); after multiplied the scores by two (Lovibond & Lovibond, 1995). **This is recommendation by both the University of Massachusetts Mindfulness Centre and Oxford Mindfulness Centre (Kuyken, Crane, & Williams, 2012; Santorelli, 2014).

TABLE 2 The description of the MINDFULGym intervention

Activities	Description
ABC of Stress	Stress, anxiety, and depression (SAD) in nurses. Importance of managing emotional health.
Introduction to Mindfulness	Mindfulness history and definition. Benefits of mindfulness practice for nurses.
Mindful Body Stretching (relaxing the body)	Aim: relieving muscular tension and bodily aches. Demonstration and group practice.
Mindful Breathing (calming the mind)	Aim: calming the mind. Demonstration and group practice.
NOW-ing the Present Moment (focusing on the present moment)	Aim: helping nurses to stay focused and to minimize mistakes at work.
Google-WWW-Yahoo (paying attention to wellness)	Aim: enhancing job satisfaction. Group sharing of grateful moments and memories.
'Rasa Sayang' Loving-Kindness Practice (cultivating compassion)	Aim: cultivating friendliness and kindness. Singing 'Rasa Sayang' song (MINDFULGym version) with positive wishing.

TABLE 3 Comparison of the participants' characteristics between the experimental groups at baseline for intention-to-treat (ITT) analysis

Participants' Characteristics		Intervention Group		Control Group		$\chi 2$	P-Value
		n=118	%	n=106	%		
Gender	Female	112	52.6	101	47.4	0.016	0.899
	Male	6	54.5	45.5	4.7		
Age (Years)	≤25	42	48.8	44	51.2		
	26 - 30	18.8	46.6	19.6	53.4	5.315	0.070
	≥31	42	64.6	23	35.4		
Marital Status	Married	73	55.7	58	44.3		
	Single	45	48.9	47	51.1	2.124	0.308
	Widow	0	00	1	100		
Ethnicity	Malay	112	53.6	97	46.4		
	Chinese	2	33.3	4	66.7	1.247	0.781
	Indian	3	42.9	4	57.1		
	Others	1	50.0	1	50.0		
Education Level	Diploma	97	52.4	88	47.6		
	Post Basic Courses	19	52.8	17	47.2	0.240	1.000
	Bachelor's degree	2	66.7	1	33.3		
History of Medical Illness	Yes	18	64.3	10	35.7	1.729	0.188
	No	100	51.0	96	49.0		
Medication Taken	Yes	9	81.8	2	18.2	3.940	0.047
	No	109	51.2	104	48.8		
Years of Work Experience	≤5	57	49.6	58	50.4		
	6 - 10	31	47.0	35	53.0	6.347	0.042
	≥11	30	69.8	13	30.2		
Working Shifts	Rotation	111	54.7	92	45.3	3.479	0.062

Participants' Characteristics		Intervention Group		Control Group		χ^2	P-Value
	Shifts						
	Straight Shift	7	33.3	14	66.7		
Working Department	Critical Care	26	50	26	50	4.736	0.315
	Medical Departments	34	47.2	38	52.8		
	Surgical Departments	30	63.8	17	36.2		
	Pediatric Departments	22	57.9	16	42.1		
	Obstetrics & Gynecology	6	40.0	9	60.0		

χ2= Chi-square; **P-value**= level of statistical significance (p< .05).

TABLE 4 Intention-to-treat (ITT) analysis for all the study outcomes using generalized estimating equations (GEE)

Source	Study Outcome	Type III		
		Wald Chi-Square	df	P-value
Time	**Stress**	26.828	2	<.001
	Anxiety	14.246	2	.001
	Depression	20.873	2	<.001
	JSS	0.239	2	.887
	MAAS	27.595	2	<.001
Group	**Stress**	2.024	1	.155
	Anxiety	10.179	1	.037
	Depression	0.301	1	.584
	JSS	15.186	1	<.001
	MAAS	0.128	1	.720
Time * Group	**Stress**	3.673	2	.159
	Anxiety	9.694	2	.008
	Depression	0.686	2	.709
	JSS	7.594	2	.040
	MAAS	0.066	2	.967

Adjusted for medication taken and years of work experience; ***p*=** level of statistical significance; **JSS**= Job Satisfaction Scale; **MAAS**= Mindful Attention Awareness Scale.

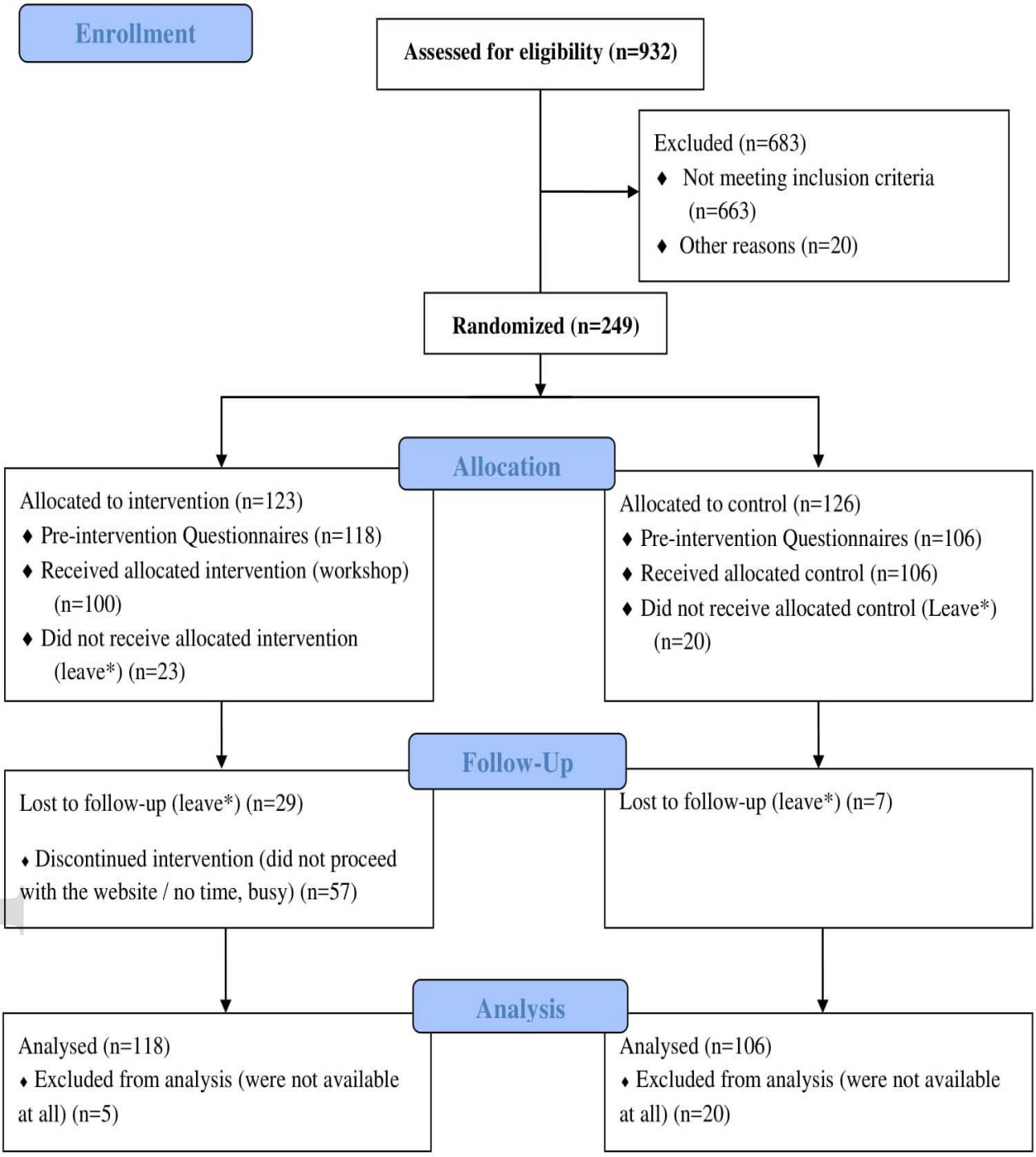

FIGURE 1 CONSORT Flow chart of nurses participating in the study.

***=** Leave means: maternity leave, sick leave, or long personal leave.