Effect of Mindfulness-Based Stress Reduction (MBSR) Training on Perceived Stress of Intern Nursing Students: A Randomized Controlled Trail

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ABSTRACT

Objective: To investigate the effects of Mindfulness-Based Stress Reduction (MBSR) on the perceived stress of intern nursing students. **Methods:** A total of 151 intern nursing students from 3 first-class hospitals in Guangdong Province, China, were selected for an 8-week MBSR training program and randomly divided into two groups, including a control group (n=86) and an intervention group (n=65). The two groups were evaluated by the Self-Rating Anxiety Scale (SAS) and the Chinese Nurse Job Stressors Questionnaires (CNJSQ) a day before the intervention and at the end of the 8-week intervention period. **Results:** After the intervention, the SAS and CNJSQ of intern nursing students decreased significantly compared with those before the intervention ($P<0.05$). **Conclusion:** MBSR training alleviates the perceptual pressure of nursing students in clinical practice to some extent, improves their satisfaction with nursing work, actively mobilizes work motivation, and widely applies MBSR in clinical nursing work, which has feasibility and practical significance.

Keywords: Mindfulness-Based Stress Reduction (MBSR), intern nursing students, perceived stress

INTRODUCTION

The State of the World's Nursing Report (2020) shows that a shortage of nursing staff is prevalent, whereas the demand for high-quality nurses is intertwined with the shortage of nursing staff [1]. Clinical internship, as a national requirement for registered nurses to undergo, lays the foundation for subsequent entry into clinical work. As the reserve force of nurses, the internship experience has a significant impact on the improvement of their work ability, quality of care, and performance, as well as on the employment rate and turnover rate [2].

Perceived stress refers to the fact that the effect of objectively existing stressful stimuli on an individual depends to some extent on the perception of these stressful events [3]. Previous

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studies reported that intern nursing students are prone to experience negative emotions, such as anxiety and depression, because of newly entering the clinical environment, facing unfamiliar environments, role changes, internship pressures, practice exams, and employment pressures [4]. However, negative emotions may weaken performance under stress or even daily workloads [5]. High stress and anxiety will reduce their memory, concentration, analytical skills, and problem-solving ability, thus reducing the efficiency of the internship, and even some nursing students drop out of school and give up the nursing profession as a result. Thus, the perceived stress of intern nurse students is crucial.

Mindfulness-Based Stress Reduction (MBSR), is a stress management therapy based on mindfulness, and it aims to reduce individual stress by using the self-management method of mindfulness meditation training while allowing the practitioner to continue to focus on and perceive the current experience in an accepted and non-judgmental manner [6]. Several studies have demonstrated that MBSR applied to clinical and non-clinical populations can effectively alleviate conditions that seriously affect the quality of human life and well-being, as well as the feasibility of improving sub-healthy states [7]. MBSR is mature and widely used currently.

This study aims to investigate the relationship between MBSR and nursing students' perceived stress by measuring changes in anxiety and stress before and after the MBSR intervention, in order to reduce the stress of nursing students' clinical placements, improve their satisfaction with nursing care, and mobilize positive motivation at work.

METHODS

Design

This study adopted a randomized controlled trial with a repeated-measures design. Eligible subjects were randomly assigned to either the intervention group or the control group. Participants in the intervention group received MBSR for 8 weeks, whereas participants in the control group received the existing internship process provided by the study hospital. Outcome measures were completed the day before the study intervention and after 8 weeks of intervention.

Participants

Participants were recruited from 3 first-class hospitals in Guangdong province, China, by convenience sampling from October 2022 to January 2023. The inclusion criteria were people: (1) nurse students experiencing internship; (2) The duration of the internship is over 3 months; (3) can speak and read in Chinese. Exclusion Criteria: (1) those who had finished their internship or have not started placement; (2) Students with severe psychological disorders or major stressful events recently were excluded; (3) Students who refused to participate in this survey for other reasons. All the participants were informed of the purpose and significance of the survey and informed consent was obtained.

Sample Size and Randomization

Based on the expected differences in outcomes recommended by Cohen [8], at least 128 participants (i.e., 64 per group) were required to reach a moderate effect size of the primary outcome at 80% efficacy and dominance levels of 0.05. A total of 151 intern nursing students were selected and randomly divided into two groups, including 86 in the control group and 65 in the intervention group.

A researcher not involved in participant recruitment and data collection generated a randomized list using the computerized randomization process and prepared group allocation based on the randomized list in sealed opaque envelopes. After recruitment, individuals were assigned a unique participant ID (ID) based on their order of registration. Envelopes based on participant ID were opened on site and participants were assigned to one of two groups based on the indicated allocation.

Intervention

All the internship nursing students participating in the control and intervention group normally attended the theoretical knowledge and operation skills of each internship department and were trained in ordinary nursing education. On this basis, the intervention group participated in MBSR training.

The intervention was applied by a psychology professor, a nurse-in-charge, and four nurse educators. The nurse in charge provided overall guidance on the conduct of the study and the implementation of the program; the psychology professor was the main lecturer of the course, and the four nurse educators were responsible for assisting with the course. The course schedule was distributed one or two days in advance to facilitate the scheduling of the participants and urge the participants through WeChat or phone calls to attend the course on time, actively complete the homework and fills out the questionnaire promptly. The training lasted for 8 weeks, with 1-1.5 hours per week for the first 6 weeks, and half an hour per day starting in the 7th week. The course outline is as follows:

Chart 1: The course outline.

Weeks	Content of the intervention
1	An introduction and interpretation of the theoretical knowledge
2	Meditation skills
3	Mindfulness breathing method
4	Body scanning method
5	Mindfulness Yoga
6	Mindfulness contemplation
7	Synthetic training
8	Review and maintenance

Outcome Measures

The Self-rating Anxiety Scale (SAS) was compiled by William W.K. Zung in 1971, and it is a norm-referenced scale that enjoys widespread use as a screener for anxiety disorders [9]. The scale evaluates the patients from four aspects: subjective mood, somatic disorder, psychological state, and sleep quality, with a total of 20 multiple-choice questions, and the scores are 1-4 according to the grades of never, seldom, more, and all. Among them, the reverse entries of 5, 9, 13, 17, and 19 are scored as 4-1. The total anxiety score was obtained by adding the scores for each of the 20 questions to obtain a crude score, multiplying by 1.25, and rounding to the nearest whole number to obtain the anxiety score. The alert value of the anxiety score was 50, with no significant anxiety below 50, mild anxiety from 50-59, moderate anxiety from 60-69, and severe anxiety from 70 and above. The higher anxiety score represents more pronounced the patient's anxiety.

The Chinese Nurse Job Stressors Questionnaires (CNJSQ) [10] was used to develop the Nurse Work Stressor Scale by Wang Shu, which was tested to have a Cronbach's alpha coefficient of 0.95, reliability of 0.97, and with well content validity. The scale consists of 5 dimensions and 35 entries from nursing problems and work-related topics (7 items), workload and time allocation problems (5 items), work environment and equipment problems (3 items) and patient care problems (11 items), and management and interpersonal problems (9 items). The scale was based on a four-point Liket scale, with a score of 1-2 indicating a light load, 2.01-3.00 indicating a moderate load, and 3.01-4.00 indicating a heavy load. The higher the score, the higher the stress.

Data collection

In this study, two questionnaires were administered to both groups of nursing students at the same time. The first one was to collect the general information and scores of anxiety and work stress of nurses from the two groups of trainee nurses who participated in the study on the day before the intervention was conducted, which was in January 2023. The last one was to evaluate the effect of the two groups of nursing students on the day after the intervention was completed, which was in March 2023. Uncompleted questionnaires were deemed invalid. In the first collection, a total of 65 questionnaires were distributed and 65 copies were retrieved in the intervention group. A total of 86 questionnaires were recovered from the control group.

The second questionnaire was distributed and 2 intern nurse students in the intervention group dropped out of the PMBSR program. Finally, a total of 63 questionnaires were recovered from the intervention group. A total of 86 questionnaires were returned from the control group.

Data analysis

A total of 151 valid data were imported into SPSS 20.0 software for analysis. According to the characteristics of the data, anxiety scores before and after the control and intervention groups, and stress scores before and after the

intervention group were consistent with normal distribution, thus, a paired-sample t-test was used. Stress scores before and after non-intervention in the control group violate the normal distribution and were analyzed using the non-parametric paired Wilcoxon test. Anxiety and stress scores between the two groups breached a normal distribution before and after the intervention, non-parametric independent Mann-Whitney U-test was used.

RESULTS

Before the intervention, there was no statistically significant difference in SAS and CNJSQ in the two groups (P>0.05) (Table 1). After the intervention, the anxiety and stress scores of the intervention group were lower than those of the control group, which was statistically significant (P<0.05) (Table 2).

Table 1: Comparison of stress and anxiety between the intervention and control group before intervention.

variable	variable value	sample size	Median(standard deviation)	statistic	*P*
stress score	Intervention group	65	108.00 (19.72)	2615.500	0.500
	control group	86	109.50 (21.67)		
	total	151	109.00 (20.51)		
anxiety score	Intervention group	65	40.00 (10.57)	3150.000	0.182
	control group	86	37.50 (11.04)		
	total	151	39.00 (10.84)		

Table 2: Comparison of stress and anxiety between the intervention and control groups after the intervention.

variable	variable value	sample size	Median(standard deviation)	statistic	*P*
stress score	Intervention group	63	91.00 (19.86)	1333.500	<0.001
	control group	86	110.00 (21.26)		
	total	149	105.00 (22.81)		
anxiety score	Intervention group	63	36.00 (11.12)	2124.000	0.024
	control group	86	38.50 (9.92)		
	total	149	37.00 (10.56)		

Before and after the intervention, the intervention group's SAS and CNJSQ scores were compared with a significant difference, which was statistically significant (P<0.05) (Table 3). Before and after the non-intervention in the control group, there was no significant difference between the two scale scores (P>0.05) (Table 4).

Table 3: Comparison of stress and anxiety before and after the intervention in the intervention group.

paired variable	sample	mean ± standard deviation			t	*P*
		pre-intervention	post-intervention	pairwise difference (pair 1 - pair 2)		
anxiety score	63	41.571±10.435	36.444±11.116	5.127±-0.681	2.710	0.009
stress score	63	108.857±17.963	94.317±22.147	14.540±-4.184	4.714	<0.001

Table 4: Comparison of stress and anxiety in the control group before and after non-intervention.

paired variable	sample	mean ± standard deviation			t/z	*P*
		pre-intervention	post-intervention	pairwise difference (pair 1 - pair 2)		
anxiety score	86	40.849±11.843	40.035±9.920	0.814±1.922	0.428	0.670
stress score	86	109.500±22.710	110.000±21.255	0±34.535	0.234	0.815

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Comparative analysis of the two groups before the intervention

The median pre-intervention stress in the intervention and control groups was: 108.0/109.5; p-value of 0.500 for the test, and the median anxiety was: 40.0/37.5; with a p-value of 0.182 for the test, which was not statistically significant ($p>0.05$), indicating that there was no significant relationship between the two pre-intervention independent samples. It can be assumed that the non-intervention control and intervention groups have preferentiality.

Contrastive analysis of the two groups after the intervention

The median stress scores of the intervention group and the control group after the intervention were 91.0/110.0 respectively and the p-value of the test result was <0.001, which had statistical significance. The median anxiety scores of the intervention group and the control group after the intervention were 36.0/38.5 respectively and the p-value of the test result was 0.024, which was statistically significant ($p<0.05$), indicating that there was a significant difference in anxiety and stress scores between the two groups after intervention.

Comparative analysis of the intervention group before and after

The significant p-value of anxiety scores before and after the intervention in the intervention group is 0.009, which was statistically significant ($p<0.05$). There was a significant difference between before and after the intervention and the significant p-value of stress scores was <0.001, which had statistical significance. There was a significant difference between before and after the intervention. It indicates that there was a significant difference between the data between the two paired samples before and after the intervention group, which means that there was a significant improvement in the anxiety and stress levels of the intern nursing students after applying the intervention.

Comparative analysis of the control group before and after non-intervention

The significant p-value for anxiety scores before and after no intervention in the control group was 0.670, which was not statistically significant ($p>0.05$). The p-value of the significance of stress scores before and after non-intervention in the control group was 0.815, which was not statistically significant ($p>0.05$), and there was no significant difference between the control group before and after non-intervention. This indicates that there was no significant difference between the two paired samples of the control group before and after. Since there was no intervention imposed on the control group before and after the intervention, there was only a change in the sample size. Therefore, it can be concluded that the change in sample size before and after the intervention had no significant effect on the results of the intervention.

DISCUSSION

The necessity of mindfulness MBSR for intern nursing students

Compared with studying in the university, the growth of the internship has laid the foundation for clinical thinking and operation in future clinical work. In the face of complex and changeable clinical work, interns are instinctively at a loss, and the perceptual pressure will increase [2]. However, many nursing students do not know how to effectively relieve the pressure, accordingly producing negative emotions and affecting the quality of the internship. This study showed that MBSR can effectively relieve the perceptual stress of intern nursing students. Therefore, it is necessary and important for intern nursing students to conduct MBSR-related training and practice.

Positive Effects of MBSR on regulating perceptual stress

Stress refers to the psychological confusion and threat caused by people when experiencing stimulating events or adverse factors in life, manifested as mental tension and discomfort. The study pointed out that interns usually face patient distrust and rejection in the clinic, resulting in low value [11], as well as heavy learning tasks, shift work, no income, and other factors, It is prone to produce pressure from mental and academic. The results of this study showed that the SAS and CNJSQ scores in the intervention group were lower than those in the control groups and pre-intervention ($p <0.05$). This is in line with the results of Song et al. investigators utilized MBSR to Korean nursing students [12]. It suggested that MBSR participants reported significantly greater decreases in depression, anxiety, and stress, and a greater increase in mindfulness.

According to the Kabat-Zinn study, mindfulness is the ability to focus on the experience of what is happening in the present moment, in a non-judgmental and accepting way [13]. Mindfulness is a stable state of mind, where attention is consciously focused on an event, and in the moment of facing the event, there is continuous attention, non-judgment, and non-acceptance of the internal and external stimuli of the event, in order to keep the mind clear, the thoughts clear, and to pay attention to the inner self with a neutral attitude to deal with stress and illness. During the practice of mindfulness, the nursing students' brains will gradually calm down, thus reducing the sense of perceived stress during the internship [14]. The restorative mood and mentality encourages them to adapt to the nursing work environment with an optimistic and confident attitude.

Positive effect of MBSR on improving anxiety

The positive effect of MBSR on improving anxiety symptoms in the present study was consistent with the study by Goldin PR, et al. [15]. In recent years with the intensive study of MBSR, it has been found to produce physiological changes in the human brain. HÖlzel, et al. suggest that participation in MBSR is associated with changes in gray matter concentration in regions involved in learning and memory processes, emotion regulation, self-referential processing, and perspective taking. At the same time, MBSR guides nursing interns to conduct self-control and focus training, which can not only promote nursing interns to relax, relieve negative emotions, and reduce perceptual pressure but also make nursing interns feel a variety of internal experiences with a peaceful mind.

LIMITATION

Due to objective constraints, only intern nursing students were surveyed in this study, and the scope of the study could be further expanded in the future. The results of this study are based on self-reported scale data from the study participants, which is prone to type II errors, and future studies may add evaluation instruments and objective evaluation indicators. As this study has only completed the first round of intervention and has a small sample size, conclusions on the efficacy of the training still need to be fully validated with the inclusion of a larger sample size studies in the future.

CONCLUSION

The positive effect of MBSR in alleviating mood disorders has been repeatedly certified. As a critical period for the transformation of students into nurses, intern nursing students face considerable perceived pressure. This study confirmed that MBSR has a positive effect on reducing stress and relieving anxiety in intern nursing students. This suggests that MBSR therapy can be vigorously promoted by clinical educators.

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