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# The effects of a mindfulness training intervention on fatigue and job satisfaction among emergency nurses: A quasi-experimental study

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## Abstract

**Background:** Fatigue is a challenging problem for nurses working in the emergency department and makes them dissatisfied with their jobs.

**Objectives:** This study examined the effects of a mindfulness training intervention on fatigue and job satisfaction in emergency nurses.

**Methods**: A quasi-experimental study was conducted with 80 emergency department nurses in 2022. Participants were randomly assigned into an intervention group (n=40) and a control group (n=40). The intervention group received eight mindfulness training sessions, while the control group received no intervention. Data was collected using the Minnesota Satisfaction Questionnaire and the Multidimensional Fatigue Inventory a few days before the start and immediately after the end of the intervention. Descriptive statistics, t-test, paired t-test, and analysis of covariance (ANCOVA) were used to analyze the data.

**Results:** The two groups did not differ significantly in their pretest fatigue mean scores. However, all posttest fatigue mean scores decreased in the intervention group, and the between-group differences were statistically significant (P < 0.05). The two groups also did not differ significantly in their pretest scores for internal, external, and general job satisfaction (P> 0.05). However, all posttest job satisfaction mean scores increased in the intervention group, and the between-group differences were statistically significant (P < 0.05). The ANCOVA showed that the nurses' pretest scores had no significant effect on the posttest scores for fatigue and job satisfaction.

**Conclusion:** This study supports the potential benefits of the mindfulness intervention in overcoming fatigue and improving job satisfaction of nurses working in emergency department. Nurses are recommended to learn and implement mindfulness-based interventions to reduce their fatigue and improve their job satisfaction.

**Keywords:** Mindfulness, Fatigue, Job satisfaction, Emergencies, Nurses.

## Introduction

Nurses in emergency departments are under physical and mental pressure due to the high number of patients, and inappropriate working conditions. This situation brings emotional, mental, and physical exhaustion as well as feelings of depersonalization and low personal accomplishment.[1] Physical and mental fatigue have been shown to be associated with depersonalization, reduced personal success, decreased motivation[2] and job dissatisfaction in nurses.[3] Job dissatisfaction among nurses is mainly associated with job stresses such as role conflict, organizational and management issues, poor interaction with physicians, and low professional identity.[4-6] Many other factors, such as time constraints, difficult decision-making situations, and being unprepared to meet the needs of patients or families, can

also result in burnout and even physical illness in nurses.[7] Some studies have found that 60% of nurses in emergency departments suffer from high job-related demands, low job support, and prolonged fatigue.[3,8]

Interventions such as relaxation and cognitive-behavioral interventions not only help nurses cope with stress and improve their physiological state, but have also been shown to reduce depression and mental fatigue and increase job satisfaction and productivity.[9,10]

Mindfulness is an important concept for nursing with practical implications for nurses' well-being and quality of care. [11] Mindfulness interventions have been shown to reduce stress, anxiety, work-related burnout, depression, and negative attitudes, and improve coping skills in nurses and other healthcare professionals.[12-14] Mindfulness improves emotional adjustment by modulating perceived stress and anxiety, and enhancing self-awareness, attentiveness, empathy, cognitive flexibility, and compassion.[15] A study in the United States reported decreasing in emergency nurse practitioners' burnout, emotional exhaustion, and depersonalization after implementing four sessions of a mindfulness-based intervention.[16]

Several Iranian studies have investigated the effects of mindfulness interventions on the quality of life and mental health in cardiovascular patients,[17] drug-dependent males,[18] chemically injured veterans,[19] post-traumatic stress disorder in war victims,[20] anxiety, depression, and burden in caregivers of patients with multiple sclerosis,[21] emotional health and glycemic control of patients with diabetes,[22, 23] psychological health of older women with chronic pain,[24] and satisfaction with sexual identity in Iranian adolescents.[25] Some studies have also examined the effects of mindfulness techniques on nurses' cognitive failure, emotional maturity, teamwork, emotion regulation, emotional exhaustion, and occupational and traumatic stresses,[26, 27] anxiety, happiness,[28] and emotional adjustment.[29] However, most of the Iranian studies have been conducted on nurses working in general wards, or have not specified the wards where nurses were working. Nurses working in different departments are exposed to different types and intensities of occupational stress, raising questions about the impact of mindfulness-based interventions. Therefore, the question was raised, what effects do mindfulness-based interventions have on fatigue and job satisfaction among nurses working in the emergency departments?

## Objectives

This study examined the effect of a mindfulness training intervention on job satisfaction and fatigue among emergency nurses.

## Methods

### Study design and participants

A quasi-experimental, pre-test post-test study was conducted with 80 nurses working in the emergency departments of Shahid Rajaei and Ghaem Hospitals in Alborz, Iran. The study was conducted from October to November 2022. Inclusion criteria included at least five years of clinical experience in the emergency department, having a bachelor's degree or higher in nursing, no history of known mental disorders, taking psychoactive medications, or earlier participation in mindfulness or relaxation training, inclination to participate in the study, and low job satisfaction and high fatigue scores on the short form of the Minnesota Satisfaction Questionnaire (MSQ) and the Multidimensional Fatigue Inventory (MFI) (scores 19-38 and ≥ 12, respectively). Exclusion criteria included incomplete responses to the questionnaires, bereavement, sudden negative life changes during the intervention, and failure to complete the intervention.

The sample size was calculated based on the mean and standard deviation of mindfulness in the study by Phang et al.,[30] and using the online G Power sample size calculation software. Considering α=0.05, power=0.80, and a medium effect size, 35 nurses were needed in each group. However, to compensate for possible attrition, we recruited 40 samples in each group. To prevent data dissemination between study groups, emergency nurses from one hospital were assigned to the intervention group, and emergency nurses from the other hospital to the control group. This was done by lottery. Then, 40 eligible nurses from each hospital were invited to participate in the study.

### Data collection instruments

A questionnaire on demographic characteristics as well as the MFI and the MSQ were used to collect the study data. The demographic characteristics questionnaire included questions on participants' gender, marital status, education level, age, and clinical experience (years). The MFI is a self-administered questionnaire to assess fatigue. It includes 20 items in five subscales: general fatigue, physical fatigue, mental fatigue, reduced activity, and reduced motivation. Each subscale includes four items, which are rated on a five-point Likert scale from "zero: not at all" to "4: very much". Scores for each subscale range from zero to 16, and the total score ranges from zero to 80. Higher scores indicate greater fatigue.[31] The Persian

translation of the MFI was found to be valid and reliable. The content validity index of the MFI was above 0.79 and its Cronbach's alpha was 0.91.[32]

The MSQ is a self-administered questionnaire for assessing job satisfaction. It contains 20 items in two subscales namely internal satisfaction (items 1-12) and external satisfaction (items 13-20). All items are scored on a 5-point Likert scale from "1: I am completely dissatisfied" to "5: I am very satisfied". The total score ranges between from 20 to 100, with higher scores showing higher job satisfaction. Scores 19-38, 39-57, and >57 show low, average, and high job satisfaction, respectively.[33] The Persian translation of the MSQ presented suitable validity and reliability with a validity coefficient of 0.983 and a Cronbach's alpha of 0.79.[34]

### Intervention

Nurses in the intervention group received mindfulness training in eight weekly 90-minute sessions that were held over eight consecutive weeks. The training sessions were held in the hospital conference room. All training sessions were carried out by the first author, who was a certified nurse and specialist in psychology. The content of the training sessions was based on specific objectives and concepts of mindfulness.[13] The outline of the training sessions is presented in Table 1. The subjects were asked to practice at home at least once a day according to the content of each session. The participants' questions were answered before the start of each new session. The participants were informed that they could call the first author for their questions regarding the educational materials or share their questions via e-mail. The nurses in the intervention group completed the questionnaires a few days before the intervention and immediately after the eighth session. No intervention was performed for the control group, however, nurses in this group completed the questionnaires at times similar to the intervention group [Figure 1]. None of the participants simultaneously participated in similar mindfulness-based, or relaxation interventions such as yoga during the study.

### Ethical considerations

Ethical approval for this study was from the Ethics Committee of Qom University of Medical Sciences (approval code: IR.MUQ.REC.1399.307). All emergency nurses provided written informed consent, and were informed of the purpose of the study. The researcher assured the nurses of voluntary participation, anonymity, and the right to withdraw from the study at any time. All methods were conducted in compliance with the relevant ethical guidelines and regulations.

### Data analysis

The SPSS software, ver. 16 (SPSS Inc, Chicago, IL, USA), was used for all data analyses. Descriptive statistics were used to summarize demographic and clinical characteristics. The normality of the quantitative data was checked using the Kolmogorov–Smirnov test. As the data were normally distributed, the t-test was used to compare the mean of job satisfaction and fatigue between the intervention and control groups. The paired t-test was also used to compare the mean scores of the groups before and after the intervention. Analysis of covariance (along with Box's M, Levene, and Wilks's Lambda tests) was used to examine the effect of the pretest scores on the posttest scores. The significance level was set at < 0.05.

**Table 1.** Outline of the mindfulness intervention

| Practice | Home practice |
|---|---|
| **An explanation about mindfulness** | |
| Defining mindfulness and its stages, Explanation of self-guidance, Meditation and whole-body inspection | Whole body scanning |
| **Mindfulness and body** | |
| Conducting body scan meditation, Ten minutes of breathing with mindfulness and mind meditation, Practicing eating with mindfulness, Discovering pleasant experiences using the form for recording pleasant events, Reviewing the previous session | Whole-body scanning Practicing mindful eating Practicing mindful breathing Discovering and recalling Pleasant life events Practice changing routine behavior and habits |

**Mindfulness and movement**

    Mindful breathing,

    Keeping thoughts and mind wide by following meditative exercises,

    Focusing on mindful breathing and body parts,

    Three minutes of breathing with mindfulness,

    Discovering daily unpleasant experiences using the form for recording unpleasant events,

    Reviewing the tasks of the previous session

Practicing mindful breathing

Discovering and recalling unpleasant life events

**Developing mindfulness**

    Five minutes of mindful seeing and hearing,

    Three minutes of mindful breathing,

    Doing body scan exercises,

    Explaining the relationship between mind and body,

    Discovering and defining the problem of fatigue (expressing the symptoms of fatigue),

    Using problem-solving techniques to relieve fatigue,

    Helping people in preparing a list of activities that make them feel useful and enjoyable and doing them when thoughts or feelings related to fatigue come to them,

    Helping people in regular planning of activities

Focus on seeing, hearing, and thoughts

**Dealing with discovered problems**

    Practicing permission to attend when thoughts of fatigue come to them,

    Review of problems related to fatigue and their complications,

    Review of problem-solving techniques,

    Discovering content that fits their goals in the group

Practice on an experienced fatigue

**Mindfulness and emotion**

    Teaching thoughts have no real origin,

    Mindful breathing,

    Raising people's problems during practices and discovering its effects on the body and mind,

    Three minutes of mindful breathing practice,

    Review of problem-solving techniques in dealing with tired thoughts and states,

    Teaching the technique of returning attention in times of fatigue,

    Helping them to identify the perfectionistic thoughts associated with fatigue,

    Members talk about the experiences gained during the courses

Exercising problem-solving to relieve fatigue

**Mindful Compassion**

    How to take care of yourself in the best way?

    Mindful breathing, body parts, sounds, thoughts, and emotions,

    Practicing body scans,

    Review of topics related to fatigue,

    Getting feedback from people,

    Investigating ways to increase useful activity

Practicing self-compassion in a frustrating situation

**Living mindfully**

    Meditation and body scan,

    Summarizing the previous sessions.

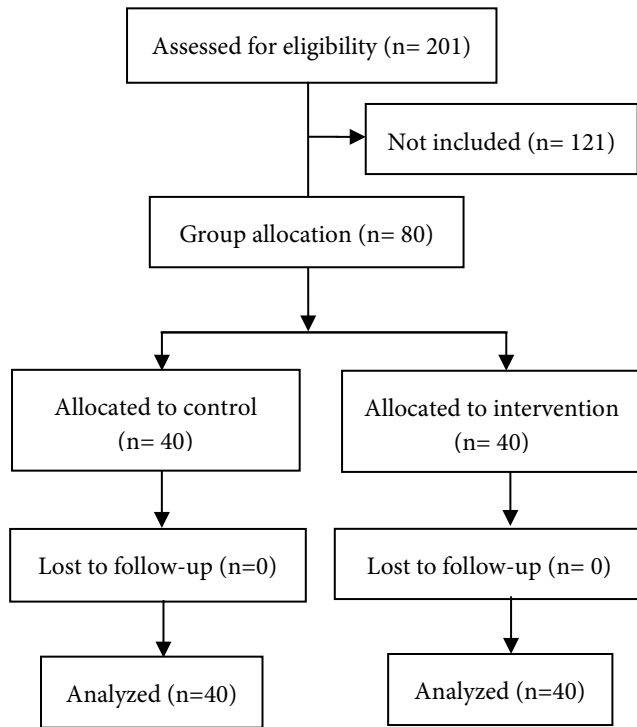Continuation of exercises in personal life

**Figure 1.** Consort Flow Diagram

## Results

The intervention and control groups were homogenous in terms of gender, age, clinical experience, and education level. However, significant difference was found between the two groups regarding marital status (P=0.03) [Table 2].

The t-test showed that the two groups did not differ significantly in their pretest fatigue scores. However, all posttest fatigue mean scores decreased in the intervention group, and all the between-group differences were statistically significant (P<0.005). An ANCOVA was conducted to examine the confounding effects of demographic characteristics and pretest on posttest scores. The Box's M test confirmed the assumption of homogeneity of the covariance matrix (P=0.057). The Levene test also confirmed the homogeneity of the variances (P>0.05). The Wilks's Lambda test was also significant for controlling the pre-test effect (Wilks Lambda=0.008, $\eta2$=0.92, P=0.001). The one-way ANCOVA showed that nurses in the intervention group experienced a significant decrease in the mean fatigue scores. However, the mean fatigue scores did not change significantly in the control group [Table 3].

The t-test showed that the two groups did not differ significantly in their pretest scores for internal and external satisfaction. However, all posttest job satisfaction mean scores increased in the intervention group, and all the between-group differences were statistically significant (P<0.001). An ANCOVA was conducted to examine the confounding effects of demographic characteristics and pretests on the results. The Box's M test did not confirm the assumption of homogeneity of the covariance matrix (P=0.048). Levene's test, however, indicated that the assumption of homogeneity of variances was violated for the external satisfaction component (P=0.105). However, as the number of groups was equal, this assumption can be ignored. The Wilks's Lambda test was significant for controlling the pre-test effect (Wilks Lambda=0.384, $\eta2$=0.661, P=0.001). The one-way ANCOVA revealed that nurses in the intervention group had significant increases in mean posttest internal and external satisfaction scores. However, the mean scores of job satisfaction did not change significantly in the control group [Table 4].

**Table 2**. Characteristics of Participants (n = 80)

| Variables [a] | Group | | P- value |
| --- | --- | --- | --- |
| | Intervention | Control | |
| **Gender** | | | |
| Male | 22 (55) | 24 (60) | 0.41 |
| Female | 18 (45) | 16 (40) | |
| **Marital status** | | | |
| Single | 6 (15) | 15 (37.5) | 0.04 |
| Married | 34 (85) | 25 (62.5) | |
| **Education** | | | |
| Bachelor's degree | 33 (82.5) | 35 (87.5) | 0.37 |
| Master's degree | 7 (17.5) | 5 (12.5) | |
| **Age** (years) | 34.4±5.7 | 35.9±5.9 | 0.424 |
| **Clinical experience** (years) | 9.5±4.8 | 9.7±4.1 | 0.861 |

[a] Data presented as n (%) or Mean ±SD

**Table 3.** Between- and within-group comparisons of the fatigue mean scores

| Fatigue subscales | Group [a] | | P-value [b] | Results of ANCOVA | | |
|---|---|---|---|---|---|---|
| | Intervention | Control | | F | P-value | Partial eta squared |
| **General fatigue** | | | | | | |
| Before | 18.2±5.65 | 17.6±2.41 | 0.381 | 57.2 | <0.001 | 0.634 |
| After | 16.6±1.69 | 18.1±2.13 | 0.018 | 75.1 | <0.001 | 0.695 |
| P-value [c] | < 0.001 | 0.002 | | | | |
| **Physical fatigue** | | | | | | |
| Before | 17.6±1.95 | 17.1±2.44 | 0.437 | 62.2 | <0.001 | 0.654 |
| After | 15.8±1.84 | 17.5±2.35 | 0.018 | 69.7 | <0.001 | 0.679 |
| P-value [c] | < 0.001 | 0.008 | | | | |
| **Fatigue mental** | | | | | | |
| Before | 17.1±2.56 | 16.7±3.13 | 0.661 | 116.6 | <0.001 | 0.78 |
| After | 15.3±2.07 | 17.8±2.77 | 0.002 | 57.2 | <0.001 | 0.634 |
| P-value [c] | < 0.001 | < 0.001 | | | | |
| **Reduced activity** | | | | | | |
| Before | 16.8±2.05 | 16.2±2.17 | 0.376 | 75.1 | <0.001 | 0.695 |
| After | 15.05±2.06 | 17.05±1.95 | 0.003 | 62.2 | <0.001 | 0.654 |
| P-value [c] | < 0.001 | 0.002 | | | | |
| **Reduced motivation** | | | | | | |
| Before | 17.9±2.13 | 17.6±2.64 | 0.648 | 69.7 | <0.001 | 0.679 |
| After | 16.1±2.12 | 18.6±2.2 | 0.001 | | | |
| P-value [c] | < 0.001 | < 0.001 | | | | |
| **Total fatigue score** | | | | | | |
| Before | 87.35±8.66 | 85.30±11.65 | 0.532 | | | |
| After | 90.40±7.50 | 85.25±11.38 | 0.099 | | | |
| P-value [c] | < 0.001 | 0.858 | | | | |

[a] Data presented as Mean ± Standard deviation [b] t-test, [c] paired t-test

**Table 4.** Between- and within-group comparisons of the job satisfaction mean scores

| Job satisfaction | Group [a] | | P-value [b] | Results of ANCOVA | | |
|---|---|---|---|---|---|---|
| | Intervention | Control | | F | P-value | Partial eta squared |
| **Internal satisfaction** | | | | | | |
| Before | 53.1±5.65 | 52.05±6.49 | 0.571 | 22.4 | <0.001 | 0.384 |
| After | 55±5.71 | 51.9±6.31 | 0.112 | | | |
| P-value [c] | < 0.001 | 0.527 | | | | |
| **Eternal satisfaction** | | | | | | |
| Before | 25.9±3.08 | 24.8±4.76 | 0.391 | 20.6 | <0.001 | 0.365 |
| After | 27.4±2.66 | 24.9±4.67 | 0.044 | | | |
| P-value [c] | < 0.001 | 0.428 | | | | |
| **Total** | | | | | | |
| Before | 79.10±7.72 | 76.90±10.71 | 0.462 | | | |
| After | 82.45±7.10 | 76.85±10.43 | 0.049 | | | |
| P-value [c] | < 0.001 | 0.858 | | | | |

[a] Data presented as Mean ± Standard deviation, [b] t-test, [c] paired t-test

## Discussion

The present study showed the effectiveness of a mindfulness intervention in reducing fatigue and increasing job satisfaction in nurses working in the emergency department. Evidence shows that mindfulness-based interventions reduce nurses' burnout by strengthening their psychological aspects and promoting positive responses to stress.[16,35] Mindfulness-based interventions can help relieve mental and physical fatigue by decreasing the heart rate and creating a relaxed state. [16]

Reducing mental and physical fatigue can then increase situational awareness and improve nurses' decision-making power.[35] The improvement in internal and external dimensions of job satisfaction in this study was consistent with a study in China where nurses had moderate levels of mindfulness and job satisfaction. However, mindfulness and job satisfaction were directly and indirectly correlated.[36] On the other hand, our findings were inconsistent with a Korean study, where although nurses' job satisfaction was correlated with their self-efficacy, neither self-efficacy nor mindfulness was associated with job satisfaction.[37]

The present study also showed that the mindfulness-based intervention could significantly reduce all physical and mental fatigue scores in the intervention group. Similarly, a systematic review concluded that mindfulness training can effectively reduce burnout and emotional exhaustion in nurses.[38] A qualitative study of nurses who had participated in a mindfulness-based intervention also reported that they experienced less fatigue and more flexibility after the mindfulness-based intervention. The authors of the latter study concluded that mindfulness helps nurses gain perspective and insight, create a feeling of inner calm, take time to care for themselves, and apply self-care strategies.[39] Mindfulness has also been shown to alleviate the symptoms of compassion fatigue,[40] and prevent demotivation in nurses, although the mechanism is not clear. It also reduces stress, increases awareness of the moment, strengthens spirituality, and helps nurses find meaning and purpose in life.[41] It is unclear whether the nurses' fatigue is due to physical pressure or to psychological and emotional issues that have accumulated over many years of work. What is certain is that a two-month mindfulness-based intervention could significantly reduce the nurses' physical and mental fatigue.

This study has some limitations. First, we only studied a limited number of nurses working in emergency departments. Second, due to the time constraint, we could not assess the long-term effects of the intervention. Therefore, further studies with larger sample sizes and longer and more frequent follow-ups are suggested.

## Conclusions

This study demonstrated the effectiveness of a mindfulness intervention in improving fatigue and job satisfaction among emergency nurses. Since fatigue is a barrier to optimal professional performance and personal life, nurses are recommended to learn and implement mindfulness-based interventions as a practical, relatively easy, and straightforward measure to reduce their fatigue and stress, and prevent job burnout. Nursing managers are recommended to hold short- and long-term mindfulness training for their nurses to help them reduce their fatigue and increase their job satisfaction.

## Competing interests

The authors declare that they have no competing interests.

## Abbreviations

Minnesota Satisfaction Questionnaire: MSQ;
Multidimensional Fatigue Inventory: MFI;
Analysis of Covariance: ANCOVA.

## Authors' contributions

AJK, MA and BA: Conceptualization, methodology, writing original draft and editing. RN, BA, ZH, and NM: Conceptualization, methodology, data curation, validation, and editing. AK, MT, ZH and MA: Methodology, supervision, data curation, visualization, investigation, validation. All authors read and approved the final manuscript. All authors take responsibility for the integrity of the data and the accuracy of the data analysis.

## Role of the funding source

None.

## Availability of data and materials

The data used in this study are available from the corresponding author on request.

## Ethics approval and consent to participate

The study was conducted in accordance with the Declaration of Helsinki. This study was approved by Ethics Committee of Qom University of Medical Sciences (approval code: IR.MUQ.REC.1399.307).

## Consent for publication

By submitting this document, the authors declare their consent for the final accepted version of the manuscript to be considered for publication.

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