



Original Article

Mindfulness Intervention Mitigates Trauma-Induced Cognitive Decline Among Healthcare Professionals

Shereen¹, Syeda Farah Batool², Ayesha Maryam¹ & Syed Akmal Sultan³¹Department of Medical Technology, Malir University of Science & Technology, Karachi-Pakistan.²Department of Psychology, Malir University of Science & Technology, Karachi-Pakistan.³Department of Orthopaedic Surgery & Physiotherapy, Shaheed Mohtarma Benazir Bhutto Institute of Trauma, Karachi-Pakistan.

Citation: Shereen, Batool SF. Mindfulness Intervention Mitigates Trauma-Induced Cognitive Decline Among Healthcare Professionals. APP. 2023;10(2): 84-90

Corresponding Author Email:
ayesha@maliruniversity.edu.pk

DOI: 10.29052/2412-3188.v10.i2.2023.84-90

Received 16/10/2023

Accepted 26/11/2023

Published 01/12/2023

Copyright © The Author(s). 2023. This is an open-access article distributed under the terms of the [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.



Funding: The author(s) received no specific funding for this work.

Conflicts of Interests: The authors have declared that no competing interests exist.

Abstract

Background: Healthcare professionals are vulnerable to trauma-induced cognitive decline due to their exposure to traumatic events in the workplace. Mindfulness-based interventions have shown promise in mitigating stress and improving cognitive function. This study aimed to investigate the impact of a mindfulness intervention on trauma-induced cognitive decline among healthcare professionals.

Methodology: A comparative cohort study was conducted with 54 participants randomly assigned to intervention (n=25) and control (n=24) groups. The intervention group received an eight-week mindfulness program, while the control group received no intervention. Cognitive function, burnout, and perceived stress were assessed using pre- and post-intervention standardized measures.

Results: The intervention group demonstrated significant improvements in cognitive function, evidenced by increased Montreal Cognitive Assessment (MOCA) scores ($p < 0.01$). Additionally, significant reductions were observed in emotional exhaustion and depersonalization scores, along with decreased perceived stress levels ($p < 0.01$). The control group showed marginal improvements in cognitive function but experienced a significant increase in depersonalization ($p < 0.05$). Both groups exhibited reduced perceived stress post-intervention.

Conclusion: The findings suggest that mindfulness practices effectively prevent cognitive impairment in trauma patients and enhance their cognitive and emotional well-being.

Keywords

Mindfulness Intervention, Trauma-Induced Cognitive Decline, Healthcare Professionals, Cognitive Function, Burnout, Perceived Stress



Introduction

Healthcare professionals face significant challenges in their daily work, often exposed to traumatic events that can profoundly impact their cognitive function and mental well-being¹. Instances such as patient deaths, medical errors, and encounters with violence can lead to trauma-induced cognitive decline among healthcare professionals, manifesting as memory impairment, diminished concentration, and reduced attention span. These consequences not only affect job performance but also jeopardize overall well-being².

In response to these challenges, mindfulness-based interventions have emerged as a promising avenue for mitigating stress and enhancing cognitive function across diverse populations³. It cultivates a nonjudgmental and accepting stance toward the present moment⁴. Through this practice, individuals can bolster attention, reduce emotional reactivity, and foster cognitive flexibility⁵.

Within the healthcare domain, an increasing body of research has explored the potential of mindfulness-based interventions in alleviating trauma-induced cognitive decline among professionals. Notable studies, such as the randomized controlled trial led by Duarte et al., have demonstrated the efficacy of mindfulness-based stress reduction programs in improving cognitive function and mitigating burnout symptoms among healthcare workers⁶. Similarly, investigations by Shute et al. have underscored the benefits of mindfulness interventions in ameliorating cognitive function and alleviating symptoms of post-traumatic stress disorder (PTSD) in healthcare professionals exposed to workplace trauma⁷.

Despite these promising findings, further exploration is warranted to delineate the long-term effects of mindfulness practices on cognitive function in healthcare professionals. Moreover, tailored interventions that effectively support the mental health and well-being of this critical workforce need to be developed. Thus, this study seeks to contribute to this growing body of knowledge by examining the impact of mindfulness on trauma-induced cognitive decline among healthcare professionals and elucidating pathways for enhancing their resilience and cognitive functioning.

Methodology

Study Design

This comparative cohort study aimed to investigate the efficacy of a mindfulness-based intervention in mitigating trauma-induced cognitive decline among healthcare professionals.

Setting

Participants were recruited from various healthcare settings, including hospitals, clinics, and other healthcare facilities, ensuring a diverse and representative sample of healthcare professionals who had experienced traumatic events in the workplace.

Participants

Healthcare professionals who had encountered traumatic events in their workplace environments and were at risk of developing trauma-induced cognitive decline were included in the study. Participants were selected based on predefined eligibility criteria, including professional experience in healthcare settings and exposure to traumatic incidents. Recruitment methods involved outreach through institutional channels, professional networks, and targeted advertisements.



Group Allocation

A total of 50 participants were randomly allocated to either the intervention or control group. The intervention group received a mindfulness-based program delivered by a trained instructor over eight weeks, consisting of mindfulness practices such as meditation, body scan, and mindful breathing. The control group received no intervention during the study period.

Variables:

The primary variable of interest was cognitive function, which was assessed using the Montreal Cognitive Assessment (MoCA), a standardized cognitive test widely used to evaluate various cognitive domains, including memory, attention, language, and visuospatial abilities. The maximum score is 30 points, and a score of 26 or above is generally considered normal. Scores below 26 may indicate mild cognitive impairment or other cognitive deficits.

Secondary variables encompassed psychological measures, including symptoms of burnout, stress, and depression. Perceived stress was measured using the Perceived Stress Scale (PSS), a 10-item scale designed to assess the degree of uncontrollable and unpredictable situations experienced in the past month. The PSS items are rated on a 5-point scale ranging from 0 (never) to 4 (very often), with higher scores indicating greater levels of perceived stress.

The Maslach Burnout Inventory (MBI), a 22-item questionnaire, was employed to evaluate burnout levels across three scales: emotional exhaustion (EE), depersonalization (DP), and professional achievement (PA). Each subscale consists of a series of statements to which respondents rate their agreement on a Likert scale (e.g., from 0 to 6). Higher scores on the subscales of Emotional Exhaustion and

Depersonalization and lower scores on Personal Accomplishment indicate higher levels of burnout.

Data Sources/Measurement

Data collection involved multiple sources and instruments. Cognitive function was evaluated using standardized tests administered at baseline, post-intervention, and during follow-up assessments. Self-report measures of burnout, stress, and depression were obtained through validated scales (MBI and PSS). Demographic and employment-related information was also collected to characterize the study population comprehensively.

Bias

To minimize bias, standardized instruments were used for outcome assessment, and random allocation of participants to intervention groups was employed.

Study Size

Sample size calculation determined that 50 participants would provide adequate statistical power to detect meaningful differences in cognitive function between intervention groups, considering a significance level of 0.05, a power of 80%, and a moderate effect size (Cohen's $d = 0.5$).

Quantitative Variables

Quantitative variables included age and outcome measures (e.g., cognitive test scores, burnout subscale scores, perceived stress levels).

Statistical Methods

Descriptive statistics summarized participant characteristics, while inferential statistics, such as paired sample t-tests and analysis of variance (ANOVA), were used to compare outcomes within and between groups. A significance level of $p < 0.05$ was applied. Statistical analyses were conducted using SPSS version 22.0.



Ethical Considerations

The study adhered to ethical principles, including obtaining informed consent from participants, ensuring confidentiality, and obtaining ethical approval from institutional review boards.

Result

Participants

The study included a total of 54 enrolled subjects, with 25 individuals allocated to the intervention group and 24 to the control group. Among the participants, a predominant proportion were females, representing 87.04% of the total cohort.

The majority of participants had attained secondary education (55.56%), with significant representation from the Islamic faith (55.56%), followed by Hindu (18.52%) and Christian (16.67%) religions. All participants were nurses (90.74%), and the majority resided in rural areas (53.70%), with a considerable proportion from lower socio-economic backgrounds (46.30%).

Descriptive Data

Table 1 provides a comprehensive overview of the demographic characteristics of the enrolled subjects, encompassing gender distribution, educational attainment, religious affiliation, occupation, residence, and socio-economic status.

Outcome Data

Table 2 presents the pre and post-intervention comparison of cognitive

function, burnout inventory, and perceived stress scale scores in both study groups.

The outcomes are measured using the Montreal Cognitive Assessment (MOCA) for cognitive function, the Maslach Burnout Inventory (MBI) for burnout assessment (specifically emotional exhaustion, depersonalization, and personal accomplishment), and the Perceived Stress Scale (PSS) for stress evaluation.

Main Results

The intervention group exhibited significant improvements across all measured outcomes. Specifically, participants in the intervention group demonstrated a notable increase in MOCA scores, indicating enhanced cognitive function ($p < 0.01$).

Additionally, significant reductions were observed in MBI scores for emotional exhaustion and depersonalization, as well as a significant decrease in PSS scores ($p < 0.01$).

In contrast, the control group displayed marginal improvements in cognitive function but exhibited no significant changes in emotional exhaustion and personal accomplishment. However, a significant increase in depersonalization scores was noted ($p < 0.05$).

Similar to the intervention group, the control group also experienced a significant reduction in perceived stress ($p < 0.01$).

**Table 1: Demographic data of the enrolled subjects.**

Variables		Total (N=54)	Intervention Group (N=25)	Control Group (N=24)
Gender	Male	02(3.70)	01(4.00)	01(4.17)
	Female	47(87.04)	24(96.00)	23(95.83)
Education	None	-	-	-
	Primary	09(16.67)	05(20.00)	04(16.67)
	Secondary	30(55.56)	15(60.00)	15(62.50)
	Higher Secondary	10(18.52)	05(20.00)	05(20.83)
Religion	Islam	30(55.56)	15(60.00)	15(62.50)
	Hindu	10(18.52)	10(40.00)	10(41.67)
	Christian	09(16.67)	04(16.00)	05(20.83)
Occupation	Nurse	49(90.74)	24(96.00)	24(100)
	Midwives	-	-	-
Residence	Rural	29(53.70)	15(60.00)	14(58.33)
	Urban	20(37.04)	10(40.00)	10(41.67)
Socio-economic Status	Lower	25(46.30)	13(52.00)	12(50.00)
	Middle	17(31.48)	09(36.00)	08(33.33)
	Upper	07(12.96)	04(16.00)	03(12.50)

Table 2: Pre and Post-Intervention Comparison of Cognitive Function and Psychological Measures.

Variables		Intervention Group (N=25)			Control Group (N=24)			p-value ²
		Pre	Post	p-value ¹	Pre	Post	p-value ¹	
		Mean ± SD			Mean ± SD			
MOCA		24.8±2.1	26.0±2.0	<0.01	24.5± 2.3	24.8±2.2	<0.01	0.034
MBI	EE	29.8±4.1	28.0±3.2	<0.01	30.2±4.5	30.2±3.5	0.012	0.012
	D	15.2±2.0	14.5±1.8	<0.01	15.5±2.2	15.8±2.0	0.027	<0.01
	PA	33.2±3.2	34.0±3.5	0.015	32.8±3.5	32.5±3.0	0.018	0.018
PSS		28.5±3.5	25.0±2.8	<0.01	28.1±5.35	28.0±3.2	<0.01	<0.01

MOCA-Montreal Cognitive Assessment; MBI-Maslach Burnout Inventory; PSS-Perceived Stress Scale; EE-Emotional Exhaustion; D-Depersonalization; PA-Personal Accomplishment

¹Intergroup comparison before and after intervention

²Between group comparison after intervention

Discussion

The findings of this study highlight the positive effects of a mindfulness-based stress reduction intervention on various outcomes related to cognitive function, burnout, and perceived stress among healthcare professionals.

Firstly, the intervention group demonstrated significant improvements in cognitive function, as evidenced by the notable increase in Montreal Cognitive Assessment scores. This suggests that engaging in mindfulness practices may enhance cognitive abilities, such as memory, attention, and executive function, among healthcare professionals who have



experienced traumatic events in the workplace^{8,9}.

Furthermore, participants in the intervention group experienced significant reductions in emotional exhaustion and depersonalization, as measured by the MBI. These findings are in line with the existing literature^{10,11} indicating that the mindfulness intervention effectively mitigates symptoms of burnout, which are commonly observed among healthcare professionals due to the demanding nature of their work and exposure to traumatic events.

Additionally, the significant decrease in perceived stress, as indicated by the PSS scores, suggests that the mindfulness intervention may help healthcare professionals manage stress more effectively and improve their overall psychological well-being, which is also reported in other studies¹²⁻¹⁴. This finding is particularly noteworthy given the high levels of stress commonly experienced by healthcare professionals, which can adversely affect job performance and quality of life.

In contrast, the control group exhibited only marginal improvements in cognitive function and no significant changes in emotional exhaustion and personal accomplishment. However, a concerning increase in depersonalization scores was noted in the control group, which may indicate a worsening of interpersonal relationships and emotional detachment among healthcare professionals.

Overall, these results underscore the potential benefits of mindfulness-based interventions in reducing trauma-induced cognitive decline and promoting well-being among healthcare professionals. By enhancing cognitive function, reducing burnout symptoms, and alleviating perceived stress, MBSR interventions have

the potential to improve the overall resilience and mental health of healthcare professionals in high-stress work environments.

Conclusion

The findings suggest that mindfulness interventions improve trauma-induced cognitive decline and well-being among healthcare professionals.

Acknowledgment

The authors are grateful to the Koochi Hospital and the healthcare workers who took part in the study.

References

1. Altaf M, Noushad S, Ahmed S, Azher SZ, Shaikh Muhammad Tariq. Emotional stress estimation in general population. *Int. j. endorsing health sci. res.* 2014;2(1):34-47.
2. Bonanno GA, Mancini AD, Horton JL, Powell TM, LeardMann CA, Boyko EJ, Wells TS, Hooper TI, Gackstetter GD, Smith TC, Millennium Cohort Study Team. Trajectories of trauma symptoms and resilience in deployed US military service members: prospective cohort study. *BMJ Open* 2019;9:e030007.
3. Khoury B, Sharma M, Rush SE, Fournier C. Mindfulness-based stress reduction for healthy individuals: A meta-analysis. *J Psychosom Res.* 2015;78(6):519-528.
4. Kabat-Zinn J. Mindfulness-based interventions in context: Past, present, and future. *Clin Psychol Sci Pract.* 2003;10(2):144-156.
5. Creswell JD, Mindfulness Interventions. *Annu Rev Psychol.* 2017;68:491-516.
6. Duarte J, Pinto-Gouveia J, Cruz B, Matos M, Luís G, Batista D. Mindfulness-based program for healthcare professionals: evaluating its effectiveness in a Portuguese hospital. *J Child Adolesc Trauma.* 2021;14(2):277.
7. Shute RJ, Maynard R, Zwack J, Patel C, DuPree E, Lord R. A Brief Mindfulness Intervention Reduces Symptoms of Post-



- traumatic Stress Disorder and Improves Coping Among Nurses Employed in a Level I Trauma Center: A Pilot Study. *J Trauma Nurs.* 2020;27(4):184-190.
8. Charness G, Le Bihan Y, Villeval MC. Mindfulness training, cognitive performance and stress reduction. *J. Econ. Behav. Organ.* 2024;217:207-226.
 9. Kimbrough E, Magyari T, Langenberg P, Chesney M, Berman B. Mindfulness intervention for child abuse survivors. *J Clin Psychol.* 2010;66:17-33.
 10. Othman SY, Hassan NI, Mohamed AM. Effectiveness of mindfulness-based interventions on burnout and self-compassion among critical care nurses caring for patients with COVID-19: a quasi-experimental study. *BMC Nurs.* 2023;22(1):305.
 11. Bodini L, Bonetto C, Cheli S, Del Piccolo L, Rimondini M, Rossi A, Carta A, Porru S, Amaddeo F, Lasalvia A. Effectiveness of a Mindful Compassion Care Program in reducing burnout and psychological distress amongst frontline hospital nurses during the COVID-19 pandemic: a study protocol for a randomized controlled trial. *Trials.* 2022;23(1):734.
 12. Oró P, Esquerda M, Mas B, Viñas J, Yuguero O, Pifarré J. Effectiveness of a mindfulness-based programme on perceived stress, psychopathological symptomatology and burnout in medical students. *Mindfulness.* 2021;12:1138-1147.
 13. Kaisti I, Kulmala P, Hintsanen M, Hurtig T, Repo S, Paunio T, Miettunen J, Halt AH, Jääskeläinen E. The effects of mindfulness-based interventions in medical students: a systematic review. *Adv Health Sci Educ.* 2023;1-27.
 14. Carmody J, Baer RA. Relationships between mindfulness practice and levels of mindfulness, medical and psychological symptoms and well-being in a mindfulness-based stress reduction program. *J Behav Med.* 2008;31:23-33.

