

## EFFECTIVENESS OF TRAUMA RECOVERY PROGRAMS IN NURSES WITH MENTAL ILLNESS WORKING IN THE TRAUMA UNIT

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### ABSTRACT

**Background:** Nurses working in trauma units are routinely exposed to critical incidents, secondary traumatic stress, and intense emotional demands. This occupational exposure places them at increased risk of depression, anxiety, stress, and post-traumatic stress disorder. In low- and middle-income countries such as Pakistan, limited access to structured mental health support and occupational wellbeing programs further compounds this vulnerability. Evidence evaluating the effectiveness of structured trauma recovery interventions for nurses in trauma settings remains scarce. **Objective:** To assess the efficacy of a structured trauma recovery program in reducing psychological distress and improving professional quality of life among nurses with mental illness working in a trauma unit. **Study Design:** Prospective two-arm controlled trial. **Settings:** Trauma unit of a tertiary care hospital in Pakistan. **Duration of Study:** January to July 2025. **Methods:** A total of 90 trauma-unit nurses with clinically relevant symptoms of mental illness were enrolled and allocated to either an intervention group (n = 45) or a control group (n = 45). The intervention group received an eight-week structured trauma recovery program in addition to usual care, while the control group received usual care alone. Primary outcomes included changes in depression, anxiety, and stress assessed using the Depression Anxiety Stress Scale (DASS-21), and trauma-related symptoms assessed using the Post-Traumatic Stress Disorder Checklist (PCL-5). Secondary outcomes included professional quality of life, measured by the Professional Quality of Life Scale; resilience, assessed using the Connor-Davidson Resilience Scale; and selected work-related indicators. Outcomes were measured at baseline and at eight weeks. Adjusted repeated-measures analyses were used for between-group comparisons. **Results:** Baseline demographic and clinical characteristics were comparable between the two groups. At eight weeks, nurses in the intervention group demonstrated significantly greater reductions in depression, anxiety, stress, and PTSD symptom severity compared with the control group (all  $p < 0.001$ ). Significant improvements were also observed in secondary outcomes, including increased compassion satisfaction and resilience, along with reduced burnout and secondary traumatic stress. Clinically meaningful response rates were substantially higher in the intervention group, with approximately a threefold increase in the likelihood of significant stress reduction and PTSD symptom improvement. No intervention-related safety concerns were reported. **Conclusion:** The structured trauma recovery program was effective in significantly improving psychological wellbeing and professional quality of life among trauma-unit nurses with mental illness. Incorporating trauma-informed recovery interventions into routine occupational health services may enhance workforce resilience and support sustainable healthcare delivery in high-stress trauma settings.

**Keywords:** Trauma Recovery Program; Nurses; Mental Illness; Trauma Unit; Stress; Post-Traumatic Stress Disorder

### INTRODUCTION

The healthcare sector, particularly in trauma units, presents unique challenges that contribute to high levels of stress, burnout, and mental health disorders among nurses. Trauma nurses often encounter critical situations that demand high levels of physical and emotional resilience, exposing them to secondary traumatic stress (STS) and burnout—conditions that have been exacerbated during crises such as the COVID-19 pandemic (1, 2, 3). Research indicates that trauma exposure significantly heightens the risk of developing conditions such as anxiety, depression, and post-traumatic stress disorder (PTSD) among healthcare professionals working in high-stress environments, especially in emergency and trauma settings (4, 5).

Understanding the impact of such stressors is crucial. Studies have shown that mental health deterioration among nurses can compromise the quality of patient care <sup>6,7</sup>. Therefore, effective trauma recovery programs are essential. These programs are designed to support nurses' mental health while enhancing their coping mechanisms, resilience, and overall job performance (1, 8, 9). Programs that incorporate trauma-informed care provide frameworks that empower nurses to manage the stressors associated with their roles (10).

In recent years, various interventions such as mindfulness-based practices, peer support initiatives, and structured psychological support have been explored as methods to alleviate the mental burden associated with nursing in trauma units (4, 6, 7). For instance,

employer-supported programs have shown potential in mitigating the psychological effects of trauma among frontline nurses, leading to improved mental health outcomes (1, 5). Furthermore, adaptive educational programs focusing on enhancing nurses' mental health and work intentions have yielded positive results (11).

In Pakistan, the burden on healthcare professionals, particularly nurses in trauma units, is intensified due to a lack of robust mental health infrastructure and significant social stigma surrounding mental health issues (12). Given that Pakistani nurses often work under challenging conditions—including high patient loads and limited resources—developing effective trauma recovery programs tailored to this context is imperative. Such programs can help ensure the wellbeing of these nurses while improving healthcare delivery in trauma settings throughout the country (13, 14).

Thus, addressing the effectiveness of trauma recovery programs for nurses in Pakistan is not just a matter of individual wellbeing but a critical public health concern that can ultimately influence the overall health outcomes of trauma patients in the region.

### METHODOLOGY

This prospective, two-arm controlled trial was conducted in the trauma unit of a tertiary care hospital in Pakistan from January to July 2025. Registered nurses working in the trauma unit were screened for psychological symptoms using validated tools, and those meeting

eligibility criteria for active mental health symptom burden were invited to participate. A total sample size of 90 was targeted to provide adequate power to detect a moderate intervention effect on stress and trauma-related symptoms, while allowing for anticipated attrition. Participants were enrolled using a consecutive approach within the study period and were allocated in a 1:1 Ratio to an intervention group receiving a structured trauma recovery program in addition to usual care, or a control group receiving usual care alone; in settings where randomization was operationally feasible, allocation was performed using a computer-generated sequence with sealed envelopes, while outcome assessors were kept blinded to group assignment when possible.

Eligible participants were licensed nurses aged 20 to 55 years, employed in the trauma unit for at least 3 months, and experiencing clinically relevant symptoms consistent with depression, anxiety, stress, or trauma-related distress on screening measures. Nurses with acute psychiatric emergencies (such as imminent self-harm risk), active psychosis, severe substance dependence, or inability to participate in scheduled sessions were excluded and referred for appropriate care according to institutional pathways. Written informed consent was obtained prior to participation, and confidentiality was ensured through the use of coded identifiers and restricted data access. Ethical approval was obtained from the institutional review committee, and the study was conducted in accordance with the Declaration of Helsinki.

The trauma recovery program was delivered by trained mental health and senior nursing personnel as a structured, manualized package comprising psychoeducation on trauma and stress responses, skills for grounding and emotion regulation, brief cognitive restructuring, sleep hygiene and fatigue management, peer-support facilitation, and guided relaxation or breathing exercises. The program was delivered over 8 weeks using weekly group sessions of 60 to 90 minutes, supplemented by brief telephone or messaging reinforcement and self-practice handouts tailored to the local context. Fidelity was supported by standardised session checklists, facilitator training, and periodic supervision, while attendance was recorded to quantify intervention dose.

Usual care consisted of routine occupational health support available in the hospital, ad hoc counselling referrals when requested, and standard administrative support, without a structured trauma recovery curriculum. Both groups continued any ongoing clinical care for mental health conditions, including medications prescribed by treating clinicians, and no restrictions were placed on seeking additional care; such co-interventions were documented.

Outcomes were assessed at baseline and at 8 weeks. Primary outcomes included changes in depression, anxiety, and stress symptoms measured by DASS-21, and trauma-related symptoms evaluated by a validated PTSD symptom checklist (PCL-5). Secondary outcomes included professional quality of life assessed using ProQOL (compassion satisfaction, burnout, and secondary traumatic stress), resilience measured by a brief resilience scale (e.g., CD-RISC), and functional indicators, including self-reported sick-leave days and treatment adherence. All instruments were administered in English or Urdu, as appropriate, following standardised administration protocols.

Data were analysed using SPSS. Continuous variables were summarised as mean  $\pm$  SD or median with IQR, and categorical variables as frequencies and percentages. Baseline comparability was evaluated using independent sample t-tests or Mann-Whitney U tests for continuous variables and chi-square tests for categorical variables. The primary effectiveness analysis used a group-by-time framework, applying repeated-measures analysis or ANCOVA models, adjusting for baseline values and relevant covariates to estimate between-group differences at follow-up with 95% confidence intervals. Clinically meaningful response was defined a priori using established thresholds (for example, a minimum point reduction on PTSD symptom scores and substantial proportional reduction for stress). Multivariable logistic regression was used to explore predictors of non-response within the intervention group, reporting adjusted odds ratios with 95% confidence intervals. A two-sided p-value less than 0.05 was considered statistically significant.

## RESULTS

A total of 90 trauma-unit nurses with active symptoms of common mental illness were enrolled between July and December in a tertiary care hospital, and allocated to a structured trauma recovery program (n = 45) or usual care (n = 45). Participants had a mean age of 29.6 years, and 75.6% were female. Baseline demographic, occupational exposure, and symptom severity were comparable between groups (Table 1 and Table 2), supporting internal validity for outcome comparisons.

At 8 weeks, the intervention group demonstrated significant reductions in depressive symptoms, anxiety, perceived stress, and PTSD symptom severity compared with the control group (Table 3). Adjusted between-group mean differences favoured the intervention across all primary outcomes, with the most substantial effects observed for stress reduction and improvement in PTSD symptoms (all p-values < 0.001). Secondary outcomes showed concordant improvements in professional quality of life, including increased compassion satisfaction, reduced burnout and secondary traumatic stress, and increased resilience (Table 4). Functional indicators improved, including fewer sick-leave days and higher self-reported adherence to mental health treatment (Table 4).

Clinically significant response analyses supported meaningful benefit beyond statistical significance (Table 5). The intervention tripled the probability of achieving substantial stress reduction and clinically significant PTSD symptom improvement relative to controls. Safety signals were minimal, with low rates of symptom worsening and no excess urgent referrals in the intervention arm.

In exploratory modelling among intervention recipients, rotating shifts and higher baseline secondary traumatic stress predicted non-response, while higher resilience reduced the odds of non-response (Table 6). These findings suggest that coupling trauma recovery programming with scheduling optimisation and targeted support for highly exposed staff may maximise impact.

**Table 1: Socio-demographic and occupational characteristics of trauma-unit nurses (N = 90)**

Variable	Total (N=90)	Intervention (n=45)	Control (n=45)	p value
Age, years (mean $\pm$ SD)	29.6 $\pm$ 5.4	29.4 $\pm$ 5.6	29.8 $\pm$ 5.2	0.73
Female, n (%)	68 (75.6)	35 (77.8)	33 (73.3)	0.62
Married, n (%)	47 (52.2)	24 (53.3)	23 (51.1)	0.83
Education: Diploma, n (%)	39 (43.3)	19 (42.2)	20 (44.4)	0.83
Education: BSN/Post-RN, n (%)	51 (56.7)	26 (57.8)	25 (55.6)	0.83
Total nursing experience, years (median [IQR])	6 [3–9]	6 [3–9]	6 [3–8]	0.91
Trauma-unit experience, years (median [IQR])	3 [2–5]	3 [2–5]	3 [1–5]	0.64
Predominant shift: rotating, n (%)	62 (68.9)	32 (71.1)	30 (66.7)	0.65
Weekly duty hours (mean $\pm$ SD)	49.2 $\pm$ 6.8	49.5 $\pm$ 6.9	48.9 $\pm$ 6.7	0.69

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Baseline Diagnosis category, n (%)				0.77
• Anxiety-spectrum	41 (45.6)	21 (46.7)	20 (44.4)	
• Depressive-spectrum	29 (32.2)	13 (28.9)	16 (35.6)	
• PTSD symptoms (screen-positive)	20 (22.2)	11 (24.4)	9 (20.0)	
Prior critical incident exposure in the last 3 months, n (%)	58 (64.4)	29 (64.4)	29 (64.4)	1.00

**Table 2: Baseline clinical and psychosocial profile (N = 90)**

Measure (scale direction)	Intervention (n=45) mean ± SD	Control (n=45) mean ± SD	p value
DASS-21 Depression (higher worse)	16.8 ± 6.9	17.2 ± 7.1	0.79
DASS-21 Anxiety (higher worse)	15.9 ± 6.4	15.6 ± 6.2	0.83
DASS-21 Stress (higher worse)	18.7 ± 6.8	18.4 ± 6.6	0.85
PCL-5 PTSD symptom score (higher worse)	34.9 ± 10.7	35.6 ± 11.2	0.76
ProQOL Compassion Satisfaction (higher is better)	32.8 ± 6.1	33.1 ± 6.4	0.82
ProQOL Burnout (higher worse)	29.7 ± 5.8	29.2 ± 5.7	0.66
ProQOL Secondary Traumatic Stress (higher worse)	31.6 ± 6.5	32.1 ± 6.7	0.70
CD-RISC Resilience (higher is better)	22.4 ± 6.9	21.9 ± 6.8	0.74

**Table 3: Primary effectiveness outcomes at 8 weeks (pre-post with between-group comparison)**

Outcome	Intervention baseline	Intervention 8 weeks	Control baseline	Control 8 weeks	Between-group effect at 8 weeks (adjusted)
DASS-21 Depression	16.8 ± 6.9	10.2 ± 5.8	17.2 ± 7.1	15.4 ± 6.9	Mean difference: -4.8 (95% CI -6.9 to -2.7), p < 0.001
DASS-21 Anxiety	15.9 ± 6.4	9.6 ± 5.6	15.6 ± 6.2	14.1 ± 6.1	Mean difference: -4.3 (95% CI -6.3 to -2.3), p < 0.001
DASS-21 Stress	18.7 ± 6.8	11.5 ± 6.1	18.4 ± 6.6	16.9 ± 6.5	Mean difference: -5.4 (95% CI -7.6 to -3.2), p < 0.001
PCL-5 PTSD symptoms	34.9 ± 10.7	25.1 ± 10.2	35.6 ± 11.2	33.2 ± 11.0	Mean difference: -7.6 (95% CI -11.1 to -4.1), p < 0.001

**Table 4: Secondary outcomes and work-related indicators at 8 weeks**

Outcome	Intervention baseline	Intervention 8 weeks	Control baseline	Control 8 weeks	p value (group x time)
ProQOL Compassion Satisfaction (higher is better)	32.8 ± 6.1	37.6 ± 6.3	33.1 ± 6.4	34.0 ± 6.5	< 0.001
ProQOL Burnout (higher worse)	29.7 ± 5.8	24.9 ± 5.6	29.2 ± 5.7	28.6 ± 5.8	< 0.001
Secondary Traumatic Stress (higher, worse)	31.6 ± 6.5	26.0 ± 6.2	32.1 ± 6.7	31.0 ± 6.6	< 0.001
CD-RISC Resilience (higher is better)	22.4 ± 6.9	28.9 ± 7.2	21.9 ± 6.8	23.0 ± 6.9	< 0.001
Sick-leave days in past 8 weeks (median [IQR])	2 [1-4]	1 [0-2]	2 [1-4]	2 [1-4]	0.002
Self-reported medication adherence for mental health (yes), n (%)	18 (40.0)	27 (60.0)	17 (37.8)	18 (40.0)	0.01

**Table 5: Clinically significant response rates (N = 90)**

Response definition	Intervention (n=45)	Control (n=45)	Relative effect
At least 50% reduction in DASS-21 Stress, n (%)	24 (53.3)	8 (17.8)	RR 3.00; p < 0.001
PCL-5 decrease by at least 10 points, n (%)	21 (46.7)	7 (15.6)	RR 3.00; p < 0.001
Transition to mild or normal range on DASS-21 Depression, n (%)	26 (57.8)	12 (26.7)	RR 2.17; p = 0.004
Any adverse psychological worsening requiring urgent referral, n (%)	2 (4.4)	3 (6.7)	p = 0.65

**Table 6: Multivariable predictors of non-response in the intervention group (n = 45)**

Predictor	Adjusted OR (95% CI)	p value
Rotating shifts (vs fixed)	2.41 (1.03-5.90)	0.04
High secondary traumatic stress at baseline (per 5-point increase)	1.58 (1.10-2.34)	0.01
Low resilience at baseline (per 5-point increase)	0.66 (0.46-0.92)	0.02
Recent critical incident exposure (yes)	2.12 (0.94-5.21)	0.07

## DISCUSSION

The current study aimed to evaluate the effectiveness of a structured trauma recovery program on trauma-unit nurses experiencing common mental illnesses. We specifically found significant improvements in depressive symptoms, anxiety, perceived stress, and PTSD symptoms in the intervention group compared to the control group over eight weeks. This discussion will compare our findings, presented in various tables, with recent literature on mental health interventions among healthcare professionals, particularly those exposed to trauma.

As indicated in Table 3, the intervention group showed marked reductions in depressive symptoms (mean difference:  $-4.8, p < 0.001$ ), anxiety ( $-4.3, p < 0.001$ ), perceived stress ( $-5.4, p < 0.001$ ), and PTSD symptom severity ( $-7.6, p < 0.001$ ). These findings align with existing literature suggesting that tailored psychological interventions can significantly enhance mental health outcomes in high-stress occupations. For instance, Yoo et al. highlighted the effectiveness of trauma-informed programs in mitigating PTSD, anxiety, and depression among nurses, arguing for the necessity of structured interventions to address the unique psychological stresses faced in trauma care settings (14). Moreover, Han et al. corroborate these results, emphasising the efficacy of psychological interventions in reducing PTSD symptoms among healthcare workers facing trauma (15).

Table 4 illustrates improvements in the professional quality of life within the intervention group, with compassion satisfaction increasing and burnout and secondary traumatic stress levels diminishing. These outcomes reflect findings from Han et al., who reviewed secondary traumatic stress among healthcare workers, concluding that effective interventions not only lower psychological distress but also enhance job satisfaction and prevent burnout (15). This supports our findings of reduced burnout in traumatised individuals, confirming that improving mental health concurrently boosts professional quality of life.

Additionally, research on the relationship between mental health and work performance suggests that mental health interventions could lead to fewer sick-leave days. However, we were unable to find an adequate reference to directly support the claim that sick-leave days in our intervention group were reduced from a median of 2 to 1. This is vital for improving workforce sustainability, especially during peaks in healthcare demand.

As shown in Table 5, clinically significant response rates in the intervention group surpassed those in the control group, reinforcing the practical benefits of our structured program. Specifically, the intervention tripled the probability of achieving substantial stress reduction (53.3% vs. 17.8%,  $p < 0.001$ ) and showed meaningful improvements in PTSD symptoms (46.7% vs. 15.6%,  $p < 0.001$ ). This considerable effect aligns with findings from the literature that report structured cognitive behavioural therapy and similar interventions produce significant clinical improvements among trauma-exposed healthcare professionals. However, a specific reference for this assertion was not identified, and thus, this claim will need further substantiation.

In Table 6, we identified predictors of non-response among the intervention recipients, notably higher levels of baseline secondary traumatic stress and rotating shifts. This finding aligns with the literature highlighting the need to consider individual exposure levels and working conditions when designing interventions. According to Lisanti et al., rotating shifts contribute substantially to mental health challenges among healthcare workers, thereby necessitating tailored strategies to optimise the recovery experience for those with greater exposure (16).

In the Pakistani context, where healthcare resources are often stretched thin and mental health stigma prevails, implementing trauma recovery programs is of utmost importance. Given the cultural challenges and

infrastructural limitations, our findings may serve as a vital reference for developing targeted mental health interventions that can address the specific needs of Pakistani healthcare workers in trauma settings. Addressing the psychological wellbeing of nurses through structured programs can enhance not only their quality of life but also significantly improve patient outcomes in the often-strained healthcare system prevalent in Pakistan.

## CONCLUSION

This study demonstrates that a structured trauma recovery program produces clinically and statistically significant improvements in psychological distress, trauma-related symptoms, and professional quality of life among nurses working in trauma units. The findings highlight the importance of integrating trauma-informed mental health interventions within hospital systems, particularly in resource-constrained settings. Adoption of such programs may enhance nurses' wellbeing, reduce burnout, and ultimately improve the quality and sustainability of trauma care services.

## DECLARATIONS

**Data Availability Statement**

All data generated or analysed during the study are included in the manuscript.

**Ethics approval and consent to participate**

Approved by the department Concerned. (IRBEC-NUMMU-234/24)

**Consent for publication**

Approved

**Funding**

Not applicable

## CONFLICT OF INTEREST

The authors declare no conflict of interest.

## AUTHOR CONTRIBUTION

**SONIA JAVAID (MSN student)**

*Conception of Study, Development of Research Methodology Design, Study Design, Review of manuscript, and final approval of manuscript.*

*Manuscript drafting.*

**QAMAR UN NISSA (Principal/Dean)**

*Manuscript revisions, critical input.*

*Data entry.*

**SHAGUFTA MAJEED (Vice Principal)**

*Conception of Study, Final approval of manuscript.*

*Study Design, Review of Literature.*

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