

Research Article**Burning Cities, Burning Brains: Prevalence of Post-Traumatic Stress Disorder in Survivors of Urban Violence in Pakistan – A Neuro Perspective**
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Abstract: Urban violence in Pakistan constitutes a profound assault on both structure and psyche, yet neuro-specific investigations remain scarce. This experimental study aimed to determine the prevalence of post-traumatic stress disorder (PTSD) and examine associated neuro-psychological correlates in survivors of urban violence in a major Pakistani city. Using a stratified random sample of 420 adult survivors (aged 18-55) of documented urban violent incidents (assaults, bombings, gang attacks) recruited from Sargodha and adjacent districts, validated scales (PCL-5) and neuro-cognitive tests (working memory, attention, executive-function) were administered three months post-exposure. Preliminary results indicate a PTSD prevalence of 38.6% (n=162). Survivors with PTSD exhibited significantly lower mean scores in working memory (M=48.2, SD=10.3) and executive-function (M=43.7, SD=12.1) compared to non-PTSD survivors (M=57.4, SD=9.5; M=52.3, SD=11.4 respectively), with $p < 0.001$. Additionally, PTSD severity correlated negatively with attention accuracy ($r = -0.42$, $p < 0.001$). These findings underscore the remarkable neuro-cognitive burden in urban violence survivors—highlighting that PTSD in this context is not merely psychological but has measurable cognitive sequelae. The study fills a critical gap by integrating neuro-cognitive assessment in this population and suggests the need for trauma interventions in urban settings to incorporate cognitive rehabilitation. Keywords: urban violence, post-traumatic stress disorder, neuro-cognition.

Introduction: Urban violence has emerged as a predominant public-health challenge across many low- and middle-income countries, and Pakistan is no exception. Rapid urbanisation, socio-economic disparities, sectarian tensions and inadequate governance combine to render city environments increasingly hazardous for many residents. In such settings, exposure to assaults, bombings, gang fights, and other forms of interpersonal violence constitute not only discrete traumatic events but also operate as chronic stressors that erode the sense of safety and agency. The psychological impact of these exposures has been documented in other contexts, but in Pakistan, empirical studies investigating the neurological and cognitive ramifications of surviving urban violence remain exceptionally sparse.¹⁻⁴

Survivors of traumatic exposure often develop Post-Traumatic Stress Disorder (PTSD), a condition characterised by intrusive memories, avoidance behaviours, hyperarousal and negative mood or cognitive changes. While PTSD has been studied in Pakistan in contexts such as terrorism, natural disaster and medical trauma, the specific domain of urban violence remains under-explored. Moreover, the focus has traditionally been on symptoms alone rather than neuro-cognitive outcomes. This is a critical oversight, because emerging research internationally shows that PTSD is associated with measurable deficits in attention, working memory, executive control and emotional regulation — deficits that can inhibit recovery, daily functioning and quality of life.⁵⁻⁸

In urban environments, the confluence of violence exposure and cognitive impairment may produce a self-perpetuating cycle: individuals with attention or executive-function deficits may struggle to navigate complex social settings, increasing risk of further victimisation or maladaptive coping. From a neuro-perspective, trauma exposure triggers dysregulation in neural circuits such as the amygdala, hippocampus and pre-frontal cortex. These changes underpin the cognitive and emotional sequelae of PTSD, yet such neuro-biological mechanisms have rarely been explored in the Pakistani urban-violence context.⁹⁻¹²

The prevalence of PTSD among violence survivors in Pakistan is variably reported; for example, one study found a prevalence of 34.8% among trauma survivors broadly exposed to domestic violence, terrorism and natural disaster. In contrast, among urban youth in Karachi exposed to

community violence, rates of probable PTSD exceeded 25%. These figures suggest a substantial mental-health burden, yet neuro-cognitive evaluations were absent from these investigations. Moreover, differing trauma types, settings and cultural contexts limit generalisability. As urban violence intensifies in Pakistan's cities, a detailed understanding of the neuro-cognitive impact is urgently needed.

This study therefore addresses a gap by assessing PTSD prevalence and neuro-cognitive functioning in survivors of urban violence in the Pakistani city of Sargodha and surrounding areas. The objectives are two-fold: first, to estimate the prevalence of PTSD among adult survivors of urban violence three months post-incident; second, to examine differences in cognitive domains (attention, working memory, executive function) between those with and without PTSD. The hypothesis posits that PTSD survivors will show significantly poorer neuro-cognitive performance than non-PTSD survivors. By integrating psychological and cognitive assessment, the research aims to provide a more holistic understanding of trauma consequence in urban violence survivors and inform targeted interventions that go beyond symptom relief to cognitive rehabilitation.

Methodology: A cross-sectional analytical design was employed among adult survivors of documented urban violence incidents in Punjab Institute of Mental Health Pakistan. The required sample size was computed using Epi Info™ software: assuming an expected PTSD prevalence of 30 %, precision of ± 5 %, confidence level of 95 % and design effect 1, the minimum sample required was 323. To account for potential non-response and data attrition, the sample was increased to 420 participants. Inclusion criteria were: aged 18–55 years, resident of the city region, direct exposure to an urban violence incident (assault, bombing, gang attack) within the prior 3–6 months, able to provide verbal consent and sufficient literacy to complete assessments. Exclusion criteria included: pre-existing diagnosed major neuro-cognitive disorder, severe head injury or neurological disease, current psychotic disorder, or inability to complete cognitive tests. Verbal informed consent was obtained from all participants after explanation of study objectives, voluntary participation and confidentiality assurances. Assessments were conducted in quiet rooms at local health-centre outreach sites. PTSD was screened using the PTSD Checklist for DSM-5 (PCL-5) administered by trained interviewers, with a threshold of 33 for probable PTSD. Neuro-cognitive functioning was assessed via standardised tasks: an attention accuracy and

reaction-time test, a working-memory span task, and an executive-function task (trail-making variant). Demographic and trauma-exposure data (type, severity, number of incidents) were collected via structured questionnaire. Data were entered into SPSS v26.0; descriptive statistics summarised demographic and exposure variables; group comparisons (PTSD vs non-PTSD) on cognitive scores used independent-samples t-tests; correlation analyses examined associations between PTSD severity and cognitive metrics. A p-value <0.05 was considered statistically significant. All procedures adhered to ethical standards and the Helsinki declaration for human research.

Results

Table 1. Demographic and exposure characteristics of participants*

Variable	PTSD group (n=162)	Non-PTSD group (n=258)	p-value
Mean age (years)	32.4 ± 8.6	30.8 ± 7.9	0.045
Male gender (%)	58.0	62.4	0.38
Monthly income < PKR 50,000 (%)	47.5	34.1	0.009
≥2 violence incidents (%)	39.5	24.0	0.001

Table 2. Neuro-cognitive performance: attention and working memory

Cognitive domain	PTSD group	Non-PTSD group	p-value
Attention accuracy (%)	78.3 ± 9.4	85.6 ± 8.1	<0.001
Working-memory score (0-100)	48.2 ± 10.3	57.4 ± 9.5	<0.001

Table 3. Executive-function performance and correlation with PTSD severity*

Measure PTSD group Non-PTSD group p-value
Executive-function score (0-100) 43.7 ± 12.1 52.3 ± 11.4 <0.001
Correlation r (PTSD severity vs exec-score) -0.42 — <0.001

Table 1 Summarises participant demographics and trauma-exposure indicators, showing significant differences in age, income and multiple-incident exposure between groups. Table 2 shows significantly diminished attention accuracy and working-memory scores in the PTSD group. Table 3 indicates markedly poorer executive-function performance among PTSD survivors and demonstrates a moderate negative correlation between PTSD severity and executive-function ($r = -0.42$).

Discussion: The observed prevalence of PTSD (38.6 %) among survivors of urban violence aligns with—and indeed slightly exceeds—prior reports in Pakistani trauma-exposed populations, underscoring the magnitude of psychological burden in urban violence settings. The demographic profile revealed that survivors with PTSD were modestly older and more likely to report lower income and multiple violence exposures; this reinforces the notion that cumulative and socio-economic stressors exacerbate trauma impact.¹³⁻¹⁵

Crucially, the cognitive data reveal substantial neuro-cognitive deficits in attention, working memory and executive control among those with PTSD. These findings extend the classical symptom-centric view of PTSD by demonstrating that survivors endure measurable cognitive impairments, which may hinder functional recovery. The moderate negative correlation between PTSD severity and executive-function suggests that more intense trauma symptomology is associated with poorer cognitive control—implying a dose-response relationship.¹⁶⁻¹⁸

From a neuro-biological standpoint, trauma exposure is known to disrupt neural circuits including the hippocampus and pre-frontal cortex, impairing memory and executive domains. The current results reflect this mechanistic pathway in a previously under-studied population: urban violence survivors in Pakistan. By demonstrating cognitive deficits alongside psychological symptoms, the

study emphasises the need for integrated interventions that include cognitive rehabilitation, not merely psychotherapeutic support. 19-20

Socio-economic disparities emerged as relevant modifiers: survivors with lower income were significantly more likely to develop PTSD. This underscores the role of resource constraints, limited access to mental-health services and ongoing exposure to stress in the urban-violence milieu. Accordingly, targeted trauma-care policies must account for these structural inequities.

The multi-incident exposure finding is also notable: individuals reporting two or more violent episodes had significantly higher PTSD prevalence. This speaks to a cumulative-trauma model and suggests that urban policy must aim not just at single incidents but at the broader ecosystem of violence, insecurity and repeated trauma. In practice, screening programmes in urban clinics should prioritise survivors with multiple exposures and lower socio-economic status.

The results have implications for service design: mental health screening in urban survivors should include cognitive assessment; trauma-informed care must incorporate interventions aimed at restoring attention and executive functioning (such as computerised cognitive training, mindfulness-based strategies, occupational therapy). Without addressing the neuro-cognitive burden, symptom relief alone may be insufficient to restore full functioning, integrate survivors back into society and reduce risk of secondary victimisation.

Limitations must also be acknowledged: the cross-sectional design prohibits causal inference, and the neuro-cognitive tests, while standardised, may be influenced by cultural or educational factors. Future longitudinal work is needed to track cognitive recovery over time and to evaluate intervention effectiveness. Nonetheless, the present investigation fills a critical gap by focusing on urban violence survivors, assessing PTSD prevalence and embedding neuro-cognitive evaluation in a Pakistani context.

Conclusion: This study reveals a notably high prevalence of PTSD among survivors of urban violence in Pakistan and demonstrates distinct neuro-cognitive impairments in attention, working memory and executive function. By highlighting cognitive sequelae, the research addresses an important gap in trauma literature and supports the integration of cognitive rehabilitation into

urban-trauma care. Future investigations should pursue longitudinal designs and evaluate targeted interventions to enhance recovery and resilience.

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