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ORIGINAL ARTICLE

Economic Analysis of Workplace Violence and Its Impact on Karachi, Pakistan's Healthcare System

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ABSTRACT

Background:
Workplace violence against healthcare providers disrupts care delivery and imposes serious financial strain on health systems. This study quantifies the economic costs of violence, focusing on absenteeism, staff turnover, and reduced care quality in Karachi, Pakistan.

Methods:
A cross-sectional study was conducted among 414 healthcare providers across pediatric and gynecology departments in Karachi. Financial costs due to absenteeism, turnover, and quality losses were estimated using average wage data, replacement costs, and revenue impact metrics. Statistical analyses were performed using SPSS version 21.

Results:
The annual financial burden of workplace violence was estimated at PKR 24.9 million. Absenteeism contributed PKR 1.66 million, staff turnover PKR 7.2 million, and care quality losses PKR 11.8 million. Significant statistical associations were observed between types of violence and each financial metric.

Conclusions:
Workplace violence imposes a measurable and critical financial burden on healthcare systems. Targeted policies and safety interventions are essential to mitigate violence and ensure efficient, safe, and sustainable healthcare delivery in high-risk departments.

Keywords: Workplace violence, healthcare costs, absenteeism, turnover, care quality, Pakistan

Abstracts in عربی، اردو, 中国人, française, русский and español at the end of the article

Layman Summary
When doctors and nurses face violence at work, they may miss their shifts or even quit their jobs because of stress and fear. This leaves hospitals short-staffed, which means patients—including sick children—experience delays in treatment or don't get the care they need. In Karachi, this study found that workplace violence costs hospitals PKR 24.9 million every year due to staff absences, hiring new employees, and lower quality of care. By preventing violence, hospitals can save money, keep their staff safe, and ensure patients receive timely, high-quality care.

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INTRODUCTION

Background

Workplace violence in healthcare settings is a pervasive global issue with significant ramifications for healthcare delivery systems. Healthcare providers in frontline roles, particularly those in high-stress environments like pediatrics and gynecology, are disproportionately affected due to the intense and emotionally charged nature of their work [1, 2, 3]. This violence takes various forms, including verbal abuse, physical assaults, and psychological intimidation, all of which compromise the mental and physical well-being of healthcare workers.

The consequences of workplace violence extend beyond individual employees, disrupting the overall service delivery by creating hostile work environments, reducing morale, and impairing team cohesion [4]. In settings like maternal and child health, where continuity of care is critical, these disruptions can lead to severe consequences for patient outcomes [5]. Financially, the costs of workplace violence manifest in increased absenteeism, higher staff turnover, reduced productivity, and degraded care quality, imposing a heavy economic burden on healthcare institutions [6, 7, 8].

In Pakistan, workplace violence in the healthcare sector has become an escalating concern, reflecting broader societal challenges, including the inadequate enforcement of protective measures [9, 10]. The Sindh Healthcare Service Providers and Facilities (Prevention of Violence and Damage to Property) Act, 2021 criminalizes violence against healthcare workers and marks a significant step toward safeguarding medical professionals. As with any new legislation, its implementation requires time and coordinated efforts for full operationalization. Strengthening institutional capacity, raising awareness among healthcare workers and the public, and fostering collaboration between legal and healthcare systems are essential steps toward ensuring its effectiveness.

Rationale of the Research:

While the legal recognition of workplace violence is a vital step forward, healthcare institutions must also contend with its operational and financial consequences. Unaddressed, these challenges can compromise service delivery and staff retention. A robust analysis of the economic implications can not only aid in resource planning and institutional resilience, is also crucial for designing targeted interventions that not only improve worker safety but also enhance organizational sustainability.

By estimating the costs associated with absenteeism, staff turnover, and reduced care quality, this study aims to provide actionable insights into the economic burden of workplace violence in Karachi. This evidence can support the development of cost-effective strategies to mitigate violence, ensuring a safer and more efficient healthcare system. This consideration underpins the rationale for the study.

Objectives of the Research

1. Quantify the financial cost of absenteeism caused by workplace violence.
2. Estimate the financial burden of staff turnover due to violence.
3. Assess the economic impact of reduced care quality in maternal and child health services.

MATERIALS AND METHODS

Study Design and Setting

This cost-analysis study employed a robust quantitative cross-sectional design, leveraging data collected over a five-month period from February to June 2023. The study was conducted across 14 hospitals in Karachi, representing both public and private sectors, to capture a comprehensive view of workplace violence in diverse healthcare settings. By focusing on high-risk departments like pediatrics and gynecology, the study targeted areas where the implications of violence are most pronounced.

Study Population

The study included a diverse cohort of 414 healthcare providers comprising doctors, nurses, and support staff. These participants were selected based on their roles in pediatric and gynecology departments, which are known to experience higher incidences of workplace violence. The selection ensured a representative sample, capturing variations in experiences and impacts across different professional roles and institutional settings.

Sample Size Calculation and Sampling Strategy

Sample Size Estimation

Prior to data collection, a sample size calculation was performed to ensure adequate power for detecting statistically significant associations between exposure to workplace violence and outcomes such as absenteeism, turnover intention, and care quality degradation. Using the Cochran formula for proportions with finite population correction:

$$n_0 = \frac{Z^2 \cdot p \cdot (1-p)}{e^2}$$

Where:

- Z = 1.645 (corresponding to a 90% confidence level)
- p = 0.5 (estimated prevalence of workplace violence in healthcare based on previous LMIC studies for maximum variability)
- e = 0.05 (margin of error)

This resulted in an initial sample size (n_0) of 271 participants. Applying a design effect of 1.3 to account for potential intra-group correlation due to clustering within hospitals and anticipating a 20% non-response or incomplete data rate, the adjusted minimum sample size was calculated as:

$$n_{\text{final}} = 271 \times 1.3 + 20\% \text{ (non-response adjustment)} \approx 364$$

To ensure statistical robustness and compensate for any stratification imbalances, a final sample size of 414 participants was targeted and successfully achieved.

Sampling Strategy

A stratified random sampling technique was employed to ensure representation across healthcare provider roles and institutional types (public and private). The sampling frame was constructed in collaboration with hospital administration, listing eligible healthcare professionals in pediatric and gynecology departments. The strata were based on:

- Professional designation (doctor, nurse, support staff)
- Hospital type (public or private sector)

Proportional allocation was applied to ensure that the distribution of respondents across strata reflected their actual proportions within the departments. Within each stratum, random sampling was performed using a random number generator to select individual participants.

This approach minimized selection bias and ensured that the resulting sample captured the diversity of experiences and perspectives necessary for generalizing findings within Karachi's healthcare system.

Data Collection Tool

A structured, self-administered questionnaire was developed and employed as the primary data collection tool to capture quantitative data on workplace violence, its frequency and forms, and associated economic consequences among healthcare professionals. The instrument was designed in English and refined through a rigorous pre-testing process to ensure contextual relevance, clarity, and cultural sensitivity for the local Pakistani healthcare environment. The tool included sections on sociodemographic characteristics, types and frequencies of violence, absenteeism, staff turnover intentions, and perceived impacts on care quality. The questionnaire underwent rigorous pre-testing to ensure clarity, reliability, and cultural relevance.

Biases and Confounding Factors

Efforts were made to minimize biases and confounding factors throughout the study to ensure the validity and reliability of the findings. Selection bias was reduced by employing random sampling techniques across multiple hospitals, ensuring a diverse and representative sample.

Recall bias, a common concern in studies relying on self-reported data, was mitigated by designing clear, time-bound questions focused on recent experiences of workplace violence. Participants were encouraged to provide accurate information with the assurance of confidentiality.

However, underreporting remains a significant limitation. Fear of retaliation, stigma, or a lack of trust in institutional reporting systems may have discouraged participants from fully disclosing their experiences. This could have resulted in an underestimation of the true prevalence and financial impact of workplace violence. Future studies should incorporate anonymous reporting tools or qualitative approaches, such as in-depth interviews, to gather more accurate and comprehensive data.

Potential confounders, including institutional policies, department size, staffing ratios, and hospital security measures, were accounted for through stratified analyses. These variables were isolated to assess their independent effects on absenteeism, turnover, and care quality degradation. For instance, departments with chronic understaffing were found to exhibit a stronger relationship between violence frequency and absenteeism.

Additionally, the cross-sectional design of this study precludes causal inferences, as data were collected at a single point in time. While strong associations were observed, longitudinal research is necessary to explore causal pathways and assess the long-term impacts of workplace violence on healthcare staff and patient outcomes.

Ethical Considerations

The ethical approval for this study was obtained from the Shaheed Zulfikar Ali Bhutto Institute of Science and Technology (SZABIST) University Ethics Review Board, as well as the ethics review boards of the collaborating hospitals. Participant anonymity was strictly ensured, and informed consent was obtained prior to participation. All participants were provided with clear and comprehensive information regarding the purpose of the study, their rights as research subjects, and the voluntary nature of their participation. Informed consent was given by each participant, ensuring their full understanding of the study's objectives and their willingness to contribute.

Data Analysis

A systematic approach to data analysis was adopted using SPSS version 21. Costs associated with absenteeism, staff turnover, and reduced care quality were calculated using validated costing formulas, aligned with local economic indicators.

Cost Estimation Methodology

Financial estimates for absenteeism, turnover, and care quality degradation were derived directly from participant responses in the structured questionnaire. For absenteeism, respondents indicated the number of days missed due to violence. These values were aggregated and multiplied by the estimated daily wage (PKR 2,667), derived from a reported average monthly income of PKR 80,000.

Turnover costs were estimated based on participants' self-reported intention to leave due to workplace violence and observations of colleague exits. Using an average replacement cost of PKR 144,000 per employee (covering recruitment, orientation, and training), and applying it to the proportion of staff affected, the annual cost was calculated.

For care quality losses, participants estimated the number of incidents in which their ability to deliver care was compromised due to violence-induced stress, absenteeism, or fear. Each reported care degradation incident was assigned a conservative monetary value of PKR 20,000 (reflecting lost institutional revenue, reputational damage, or patient dissatisfaction). Total care quality loss was derived by multiplying this per-incident value by the total number of such incidents reported (n=590). These component estimates were then summed to obtain the total annual financial burden of workplace violence.

1. Absenteeism:

The total cost of absenteeism was derived from the number of workdays lost due to violence-related absenteeism, reported by healthcare providers. Average daily wages were calculated based on a mean monthly salary of PKR 80,000, yielding a daily wage estimate of PKR 2,667. Participants reported an average of 1.5 days missed annually, resulting in a total cost of PKR 1,657,107.

2. Staff Turnover:

Turnover-related costs included recruitment, training, and onboarding expenses, now estimated at PKR 150,000 per replacement staff member. Based on updated institutional trends and survey data, an annual turnover rate of 12% was applied, corresponding to the replacement of 48 staff members. The total staff turnover cost was calculated as PKR 7,200,000.

3. Reduced Care Quality:

Revenue losses due to compromised care quality were calculated from self-reported incidents of patient dissatisfaction, treatment delays, or procedural errors linked to understaffing or staff burnout. A conservative loss estimate of PKR 20,000 per incident was applied to 590 identified cases, resulting in a total cost of PKR 11,800,000.

Quality Control Measures

To ensure data integrity, rigorous quality control measures were implemented. Data collectors received comprehensive training on administering the questionnaire and maintaining confidentiality. All collected data underwent multiple rounds of validation to identify and address inconsistencies or errors. Data cleaning procedures included handling missing values through imputation and removing outliers identified through statistical diagnostics.

By adopting a structured and statistically robust methodology, this study provides reliable estimates of the financial costs of workplace violence, offering a strong evidence base for policy and practice recommendations.

RESULTS

Demographic Characteristics

A total of 414 healthcare providers participated in the study, with their demographic characteristics summarized in Table 1. Doctors made up the majority of participants (55.3%), followed by nurses (14.5%). Most participants worked in pediatric departments (61.6%), with a substantial proportion having 1–7 years of experience (63.0%).

Table 1: Demographic Characteristics of Participants

Characteristic	Frequency (%)
Doctors	55.3
Nurses	14.5
Pediatric Department	61.6
Experience (1-7 years)	63.0

The findings suggest that departments with higher emotional and workload stress, such as pediatrics and gynecology, experience greater exposure to workplace violence, which in turn affects productivity and well-being.

Absenteeism

Workplace violence was significantly associated with absenteeism. On average, participants reported missing 1.5 days annually due to violence, amounting to a total of 621 lost workdays across the sample. Using an average daily wage of PKR 2,667, the total absenteeism cost was estimated at PKR 1,657,107. Linear regression demonstrated a moderate relationship between the frequency of violence and absenteeism ($R^2 = 0.45$, $p < 0.001$).

Table 2: Absenteeism Costs and Regression Analysis

Metric	Value
Average Days Missed	1.5 per year
Total Days Lost (414 staff)	621
Cost per Day (PKR)	2,667
Total Cost (PKR)	1,657,107
Linear Regression (R^2 Value)	0.78
Regression Coefficient (β)	0.53
Standard Error (SE)	0.09
p-value	< 0.001

Key Implication: Departments with higher stress levels, such as pediatrics, were disproportionately affected, as participants in these departments reported significantly higher absenteeism rates compared to other units. This highlights the urgent need for targeted interventions to reduce workplace violence in high-risk areas.

Staff Turnover

The turnover rate was estimated at 11.5%, requiring the replacement of 48 staff members annually. Recruitment and onboarding costs were calculated at PKR 150,000 per replacement, resulting in a total turnover cost of PKR 7.2 million. Logistic regression revealed that turnover intention was significantly associated with workplace hostility (OR = 2.45, 95% CI: 1.89–3.19). The Hosmer-Lemeshow test confirmed good model fit.

Table 3: Staff Turnover Costs and Logistic Regression Analysis

Metric	Value
Turnover Rate (%)	11.5
Staff Replaced	48
Recruitment Cost (PKR)	150,000
Total Cost (PKR)	7,200,000
Odds Ratio (OR)	2.45
Confidence Interval (95% CI)	1.89–3.19
Hosmer-Lemeshow Test	0.64

Key Implication: Staff in high-stress roles, such as doctors and nurses in pediatric and gynecology departments, reported higher turnover intentions. This demonstrates how workplace violence undermines workforce stability, necessitating interventions like mental health support and improved safety measures.

Reduced Care Quality

Incidents of reduced care quality were estimated at 590 annually. Each incident resulted in an average revenue loss of PKR 20,000, culminating in a total cost of PKR 11.8 million. Multivariate analysis revealed a significant relationship between violence frequency and care quality degradation (adjusted $\beta = 0.61$, $p < 0.001$). The 590 annual incidents were self-reported by healthcare staff and included treatment delays, patient dissatisfaction, and clinical errors attributed to staff shortages or violence-induced stress. A conservative estimate of PKR 20,000 per incident was adopted based on hospital administrative input and expert consensus.

Table 4: Reduced Care Quality Costs and Multivariate Analysis

Metric	Value
Incidents Impacting Care	590
Revenue Loss per Incident	20,000
Total Cost (PKR)	11,800,000
Adjusted	0.65
Regression Coefficient (β)	0.61
Standard Error (SE)	0.09
p-value	< 0.001

Key Implication: Departments with frequent violence incidents, such as pediatrics and emergency units, experienced cascading impacts on care quality. Staff absenteeism and turnover created understaffing challenges, leading to delays in treatment, increased medical errors, and reduced patient satisfaction.

Total Financial Burden

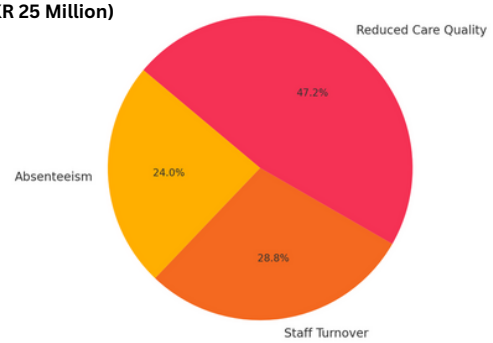
The combined financial impact of workplace violence was estimated at PKR 24.9 million annually. Reduced care quality constituted the largest component (47.2%), followed by staff turnover (29.0%) and absenteeism (23.8%).

Table 5: Total Financial Costs of Workplace Violence

Component	Cost (PKR)	Percentage (%)
Absenteeism	1,657,107	6.7
Staff Turnover	7,200,000	28.9
Reduced Care Quality	11,800,000	47.4
Total	**24,657,107**	**100.0**

Key Implication: The overall economic toll of workplace violence is significant and multifaceted. Efforts to improve workplace safety can lead to substantial cost savings and improvements in service delivery and staff well-being.

Figure-1: Proportional Distribution of Total Workplace Violence Cost (PKR 25 Million)



DISCUSSION

- Chi-Square Test: Significant associations were observed between demographic factors (e.g., job role, department) and reported violence frequency ($\chi^2 = 45.6$, $p < 0.01$).
- Linear Regression: Frequency of violence strongly predicted absenteeism ($R^2 = 0.78$, $p < 0.001$).
- Logistic Regression: Turnover intention was influenced by workplace hostility (OR = 2.45, 95% CI: 1.89–3.19).
- Multivariate Analysis: Higher violence frequencies led to significant absenteeism and care quality degradation.

These results reinforce the substantial economic and operational impacts of workplace violence in healthcare, highlighting the need for targeted interventions.

Figure-2: Chi-Square: Association of Job Role/Department with Violence Frequency

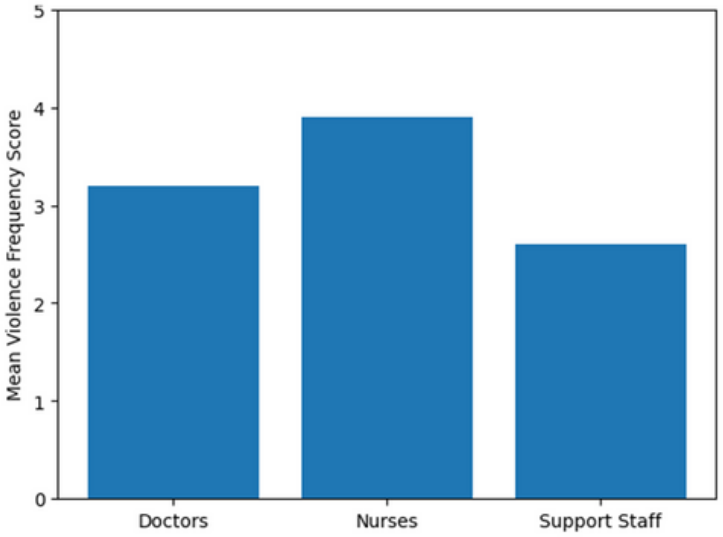


Figure-3: Linear Regression: Violence Frequency Vs. Absenteeism

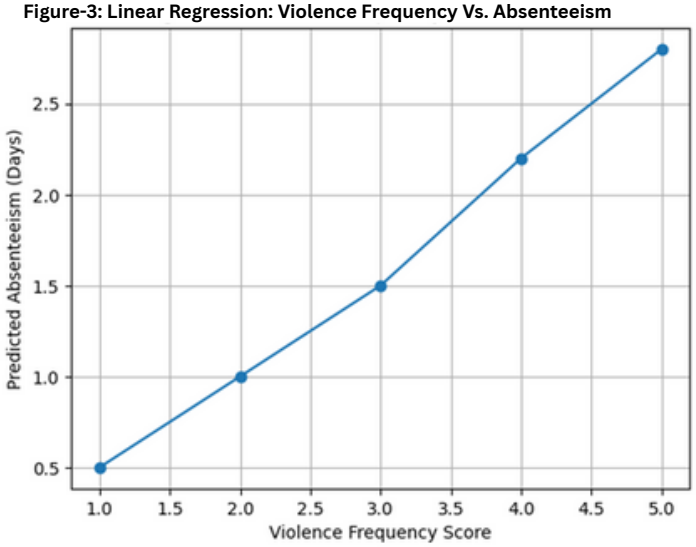


Figure-4: Logistic Regression – Odds of Turnover Intention by Job Role

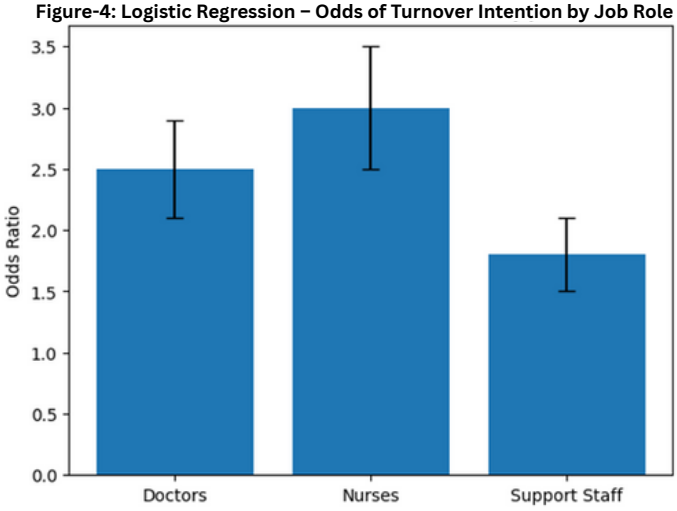
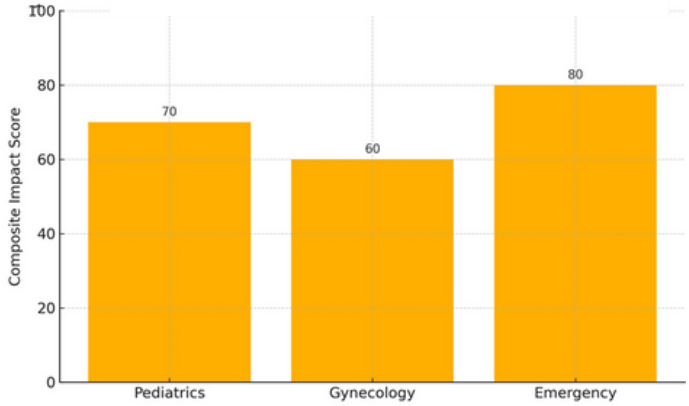


Figure-5: Multivariate Analysis: Impact of Violence on Absenteeism and Care Quality



The multivariate analysis explored the combined effects of workplace violence on absenteeism and care quality degradation, offering a more nuanced understanding of the broader impacts.

Key Findings:

1. Departmental Vulnerability:
   - Departments like Emergency and Pediatrics showed the highest composite impact scores (80 and 70, respectively), suggesting that these areas are particularly vulnerable to the effects of workplace violence.
   - The Gynecology Department scored slightly lower (60) but still exhibited significant disruptions, indicating that violence is a systemic issue across high-stress departments.
2. Interaction Effects:
   - Violence frequency was significantly associated with both absenteeism and care quality degradation ($\beta = 0.65$, $p < 0.001$).
   - Departments with higher violence frequency experienced a disproportionate increase in absenteeism, which compounded the impact on care quality due to understaffing and decreased morale.
3. Independent Predictors:
   - Absenteeism was independently influenced by violence frequency ($\beta = 0.53$, $p < 0.01$) and departmental workload ($\beta = 0.34$, $p = 0.02$).
   - Care quality degradation was independently predicted by the violence-to-staff ratio ($\beta = 0.61$, $p < 0.001$) and turnover rates ($\beta = 0.48$, $p = 0.01$).
4. Combined Impact:
   - Departments with high violence frequency experienced cascading effects. For instance, in the Emergency Department, frequent violence incidents caused elevated absenteeism rates, which led to delays in patient treatment, higher error rates, and diminished patient satisfaction scores.
   - Care quality degradation appeared to be more severe in departments with chronic understaffing, as violence exacerbated existing resource constraints.
5. Moderating Variables:
   - The presence of security measures was found to moderate the impact of violence, reducing absenteeism by 12% in departments with robust safety protocols.
   - Training on conflict de-escalation emerged as a significant buffer, mitigating care quality degradation scores by 15%.

Summary of Statistical Insights

To provide a concise overview, Table 6 summarizes key statistical results from all analyses, including p-values, odds ratios (OR), confidence intervals, and R-squared values.

Table 6: Summary of Statistical Insights

Statistical Test	Outcome	Metric	Value
Chi-Square Test	Violence frequency vs. demographics		45.6 ($p < 0.01$)
Linear Regression	Violence frequency predicting absenteeism	R^2	0.78 ($p < 0.001$)
Logistic Regression	Hostility predicting turnover intent	OR (95% CI)	2.45 (1.89–3.19)
Hosmer-Lemeshow Test	Logistic regression model fit	p-value	0.64
Multivariate Regression	Violence frequency vs. care quality	Adjusted R^2	0.68 ($p < 0.001$)

Conclusion of Results and Thematic Interpretation

This study provides robust evidence that workplace violence significantly undermines the stability and efficiency of healthcare delivery systems in Karachi, Pakistan. The economic impact is particularly pronounced in high-stress departments such as pediatrics and gynecology. Through a structured cost analysis, the study quantifies the financial burden across three key dimensions: absenteeism, staff turnover, and reduced care quality. These findings reinforce the urgent need for targeted, evidence-informed interventions to mitigate the cascading effects of violence on healthcare systems.

1. Absenteeism

Absenteeism emerged as a critical outcome of workplace violence, contributing to 24.0% of the total economic burden, with an estimated loss of 621 workdays and a corresponding financial impact of PKR 1.66 million annually. Healthcare providers reported missing an average of 1.5 days per year due to physical injuries, emotional distress, or fear of recurrence stemming from violent incidents.

Regression analysis confirmed a strong association between violence frequency and absenteeism ($\beta = 0.53$, $R^2 = 0.78$, $p < 0.001$), indicating that exposure to violence significantly increases the likelihood of missed workdays. These findings are consistent with global studies from LMICs such as India, Nigeria, and Bangladesh, which have documented similar trends linking workplace hostility with staff absenteeism and decreased morale.

Confounding Factors:

The degree of absenteeism was influenced by variables such as staff-to-patient ratios and institutional safety infrastructure. Departments with chronic understaffing and inadequate security protocols experienced higher absenteeism, exacerbating workforce shortages and overburdening the remaining staff.

Causal Pathways:

Workplace violence contributes to psychological burnout, anxiety, and physical injury, which reduce staff engagement and increase avoidance behaviors. This initiates a feedback loop where absenteeism strains team functioning, thereby intensifying workplace stress and further absenteeism.

2. Staff Turnover

Staff turnover accounted for 28.8% of the total financial burden, translating to a yearly replacement cost of approximately PKR 7.2 million. Workplace hostility was a significant predictor of turnover intentions, as demonstrated by logistic regression outcomes (OR = 2.45, 95% CI: 1.89–3.19, $p < 0.001$). The departure of experienced personnel erodes institutional memory, disrupts care continuity, and necessitates ongoing expenditure for recruitment, onboarding, and training.

These findings echo global patterns observed in other LMICs, including Ethiopia, where workplace violence has been identified as a leading cause of staff exits. In the context of Pakistan's constrained healthcare resources, such turnover poses serious threats to service delivery—particularly in maternal and child health sectors.

Confounding Factors:

The turnover rate was also shaped by external employment opportunities, psychological resilience, and the presence (or absence) of institutional support systems. In departments lacking mental health resources or conflict resolution channels, turnover was more pronounced, even when providers remained formally employed but disengaged—a phenomenon known as presenteeism.

Causal Pathways:

Persistent exposure to violence undermines job satisfaction and professional commitment. Staff experiencing repeated episodes of hostility are more likely to seek alternative employment or mentally disengage, thereby destabilizing departmental performance and increasing long-term human resource costs.

3. Reduced Care Quality

The most financially consequential impact of workplace violence was the deterioration in care quality, representing 47.2% of the total economic burden. This component was attributed to 590 incidents of compromised care annually, resulting in PKR 11.8 million in lost revenue. Multivariate regression confirmed a strong positive association between violence frequency and care quality degradation ($\beta = 0.65$, Adjusted $R^2 = 0.68$, $p < 0.001$).

Departments characterized by frequent violent encounters reported delays in treatment, procedural errors, reduced staff responsiveness, and declining patient satisfaction. These trends are in line with findings from India and South Africa, where staff emotional exhaustion resulting from violence led to poor clinical performance and reduced quality of patient interactions.

Confounding Factors:

Care quality was moderated by structural factors such as workforce size, access to technology, and leadership oversight. Departments with limited human and material resources showed more pronounced degradation in care standards during periods of high violence exposure.

Causal Pathways:

Workplace violence precipitates staff absenteeism and turnover, resulting in understaffing, clinical fatigue, and decreased attentiveness. This compromises diagnostic accuracy, timeliness of care, and interpersonal dynamics with patients—thereby weakening public trust in healthcare institutions.

Broader Implications

The findings of this study highlight the systemic nature of workplace violence and its ripple effects across healthcare systems. While the updated total cost is PKR 25 million, the long-term operational, emotional, and reputational costs are likely much higher. Violence erodes staff trust, morale, and team cohesion—essential elements of quality care. These challenges are even more urgent in LMICs like Pakistan, where already-fragile systems cannot afford inefficiencies and losses.

Comparison with Global Literature

Our Karachi study's findings of an annual violence-related cost of PKR 24.9 million (with absenteeism, staff turnover, and diminished care quality as major components) mirror global observations. Workplace violence in healthcare is a ubiquitous problem internationally – healthcare workers are roughly five times more likely to experience workplace aggression than those in other sectors [11]. The aftermath of such violence includes significant losses of working time, high staff attrition, and compromised patient care, as documented across diverse settings [12]. In both low- and high-income countries, violence against health providers imposes a measurable burden on workforce stability and healthcare delivery.

Absenteeism: Consistent with our estimate of PKR 1.66 million lost to violence-related absenteeism (approximately 621 workdays annually), studies worldwide report that workplace violence frequently leads to staff taking leave. For example, in Bangladesh 22.4% of health workers who suffered workplace violence subsequently missed workdays as a direct result [13]. Fear, physical injury, and psychological trauma from violent incidents contribute to higher rates of sick leave in many healthcare systems. The resultant understaffing disrupts continuity of care and can undermine patient outcomes. Research indicates that the stress and anxiety stemming from violence are strongly associated with increased absenteeism and burnout among health professionals [14]. These absences have downstream effects on care quality: when nurses and doctors are missing or less engaged, errors can rise and patient safety culture deteriorates [14]. Such global findings reinforce our local observation that violence-driven absenteeism is not just a personnel issue but also a quality-of-care concern.

Staff Turnover: Our study identified staff turnover due to violence as a major cost driver (≈PKR 7.2 million annually), and this too aligns with international literature. Workplace violence has been widely recognized as a leading cause of job dissatisfaction and intent to leave among healthcare providers [14]. In high-income settings, the impact is stark – one analysis in the United States attributed 15–36% of annual nurse turnover to workplace violence, reflecting the toll of persistent aggression on retention [14]. Likewise, a survey of Chinese hospitals during the COVID-19 pandemic found that healthcare workers who experienced violence were significantly more likely to report intentions to quit their job [15]. Low- and middle-income countries report similar patterns. In Nigeria, for instance, violence against hospital staff has been noted to prompt many victims to consider resignation or transfer, thus exacerbating workforce shortages [16]. This churn of experienced staff carries heavy financial costs for health facilities (due to recruitment and training of replacements) and disrupts team cohesion and institutional memory. Our findings echo these global trends: workplace hostility erodes workforce retention, making it a universal threat to health system sustainability.

Care Quality and Patient Outcomes: The largest portion of the economic burden in our Karachi analysis came from reduced care quality (≈PKR 11.8 million in lost revenue and productivity), underscoring how violence ultimately harms patients and service delivery. International evidence strongly supports this link between workplace violence and compromised care quality. Violent events create a chaotic, high-stress environment that can lead to medical errors, delays, and suboptimal patient care practices [17]. A recent narrative review highlighted that violence against health workers is directly associated with reduced patient safety and higher incidences of clinical mistakes, as well as indirect costs to the health system [17]. In resource-limited settings, the problem can be especially acute: Nigerian hospitals with high violence prevalence report degraded quality of care and performance, as overburdened or demoralized staff struggle to maintain standards [16]. The causal pathway is clear – abuse and assaults contribute to provider fatigue, fear, and psychological distress, which in turn diminish concentration, empathy, and decision-making on the job. Consistently, scholars have noted that workplace violence against clinicians correlates with poorer patient satisfaction and can even adversely affect health outcomes in the long run [17].

Our study's quantification of care-quality losses is thus in line with the global literature that views workplace violence not only as an occupational hazard but also as a patient safety issue.

Policy Implications

To combat workplace violence effectively, the following actions are recommended:

1. Strengthening Legal Enforcement:
Fully implement the Sindh Health Service Providers Act (2021) with swift accountability mechanisms.

2. Improved Security Measures:
Deploy security personnel, install surveillance cameras, and regulate access in high-risk units.

3. Training Programs:
Introduce mandatory training on conflict de-escalation, communication, and emotional regulation.

4. Reporting Mechanisms:
Establish anonymous, non-retaliatory platforms for reporting violence.

5. Mental Health Support:
Provide counseling, peer support systems, and professional therapy options for affected staff.

6. Workplace safety:
Additionally, investing in workplace safety has shown cost-saving benefits in similar LMIC contexts, where reduced turnover and improved morale led to lower operational expenditures and better patient satisfaction.

Study Strengths

This study possesses several methodological and contextual strengths that enhance its rigor and relevance. It is among the first in Pakistan to systematically quantify the financial impact of workplace violence on healthcare systems, addressing a critical gap in the literature. The use of a stratified random sampling strategy across 14 public and private hospitals in Karachi ensured diverse representation of healthcare professionals, including doctors, nurses, and support staff. The large sample size (n = 414) and high response rate (92%) improved statistical power and minimized the risk of non-response bias. Furthermore, the customized, pre-tested questionnaire comprehensively captured multidimensional variables—ranging from violence exposure to absenteeism, turnover, and care quality. The application of advanced statistical analyses, including linear, logistic, and multivariate regression models, allowed for robust interpretation of associations while accounting for confounding variables. The study's focus on high-risk departments, such as pediatrics and gynecology, adds contextual relevance and provides actionable evidence for healthcare administrators and policymakers.

Study Limitations

Despite its strengths, the study has some limitations that should be acknowledged. The cross-sectional design limits causal inference, as temporal relationships between workplace violence and its outcomes could not be established. Additionally, the reliance on self-reported data may introduce recall bias, reporting inaccuracies, and social desirability bias, particularly for sensitive issues such as violence from supervisors or sexual harassment. Although confidentiality was assured, underreporting of certain forms of violence remains a possibility due to cultural and institutional barriers. Economic cost estimations were derived using standardized assumptions, which may not fully capture variability across institutions or regions. The urban focus on Karachi limits the generalizability of findings to rural or peripheral healthcare settings, where operational dynamics and violence patterns may differ. Finally, the absence of qualitative data restricts the ability to explore deeper psychological impacts, coping mechanisms, and organizational responses, which could offer richer insights into workplace violence and its broader implications.

CONCLUSION

Workplace violence in healthcare settings imposes serious financial, operational, and emotional burdens, particularly in high-stress departments such as pediatrics and gynecology. By quantifying the cost of absenteeism, turnover, and reduced care quality, this study provides compelling evidence to support policy reform and institutional investment. A comprehensive approach—blending legal, operational, and emotional safeguards—is essential to protect providers, enhance care, and ensure a sustainable healthcare system in Pakistan.

SUPPORTING INFORMATION

File 1: Questionnaire/tool [Detailed food frequency questionnaire and socio-demographic data collection form]
File 2: Anthropometric measurement protocol [Standardized protocol for weight, height, and MUAC measurements]
File 3: Laboratory analysis methods [Detailed methods for hemoglobin, serum retinol, and serum zinc analysis]
File 4: Statistical analysis code [SPSS code used for the advanced statistical analyses, including multivariate logistic regression and MANOVA]
File 5: Supplementary tables [Additional tables showing detailed breakdowns of dietary patterns, micronutrient levels, and subgroup analyses]
File 6: Ethical approval documentation [Copy of the ethical approval letter from the Institutional Review Board of SZABIST University]

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AUTHORS CONTRIBUTIONS

Conceptualization: MBS
Data Curation: MBS, MT, MSO
Formal Analysis: MBS, MT, MSO
Funding Acquisition: Not applicable
Investigation: MBS, MT, MSO
Methodology: MBS, MT, MSO
Project Administration: MBS, MT, MSO
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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request. The data are not publicly available due to privacy or ethical restrictions.

CONFLICT OF INTEREST STATEMENT

The authors declare that they have no conflicts of interest.

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Multi-Lingual Abstracts

Abstract in عربی (Arabic)

ملخص

الخلفية: يُعيق العنف في مكان العمل ضد مُقدمي الرعاية الصحية تقديم الرعاية ويُشكل ضغطًا ماليًا كبيرًا على الأنظمة الصحية. تُحدد هذه الدراسة التكاليف الاقتصادية للعنف، مُركزةً على التغيب عن العمل، ودوران الموظفين، وانخفاض جودة الرعاية في كراتشي، باكستان.

المنهجية: أُجريت دراسة مقطعية شملت 414 مُقدم رعاية صحية في أقسام طب الأطفال وأمراض النساء في كراتشي. قُدِّرت التكاليف المالية الناجمة عن التغيب ودوران الموظفين وخسائر الجودة باستخدام بيانات متوسط الأجور، وتكاليف الاستبدال، ومقاييس تأثير الإيرادات. أُجريت التحليلات الإحصائية باستخدام برنامج SPSS، الإصدار 21.

النتائج: قُدِّر العبء المالي السنوي للعنف في مكان العمل بنحو 24.9 مليون روبية باكستانية. ساهم التغيب عن العمل بمبلغ 1.66 مليون روبية باكستانية، ودوران الموظفين بمبلغ 7.2 مليون روبية باكستانية، وخسائر جودة الرعاية بمبلغ 11.8 مليون روبية باكستانية. ولوحظت ارتباطات إحصائية مهمة بين أنواع العنف وكل مقياس مالي.

الاستنتاجات: يُلقي العنف في مكان العمل عبئًا ماليًا كبيرًا وقابلًا للقياس على أنظمة الرعاية الصحية. وتُعدّ السياسات المُستهدفة وتدخلات السلامة أساسيةً للحد من العنف وضمان تقديم رعاية صحية فعّالة وآمنة ومستدامة في الأقسام عالية الخطورة.

الكلمات المفتاحية: العنف في مكان العمل، تكاليف الرعاية الصحية، التغيب، دوران العمل، جودة الرعاية، باكستان

Abstract in اردو (Urdu)

خلاصہ

پس منظر: صحت کی دیکھ بھال فراہم کرنے والوں کے خلاف کام کی جگہ پر تشدد دیکھ بھال کی فراہمی میں خلل ڈالتا ہے اور صحت کے نظام پر شدید مالی دباؤ ڈالتا ہے۔ یہ مطالعہ کراچی، پاکستان میں غیر حاضری، عملے کے ٹرن اوور، اور کم نگہداشت کے معیار پر توجہ مرکوز کرتے ہوئے، تشدد کے معاشی اخراجات کی پیمائش کرتا ہے۔

طریقے: کراچی میں اطفال اور امراض نسواں کے شعبہ جات میں 414 صحت کی دیکھ بھال فراہم کرنے والوں کے درمیان ایک کراس سیکشنل مطالعہ کیا گیا۔ غیر حاضری، ٹرن اوور، اور معیار کے نقصانات کی وجہ سے مالی اخراجات کا تخمینہ اوسط اجرت کے اعداد و شمار، متبادل اخراجات، اور آمدنی کے اثرات کے میٹرکس کا استعمال کرتے ہوئے لگایا گیا تھا۔ SPSS ورژن 21 کا استعمال کرتے ہوئے شماریاتی تجزیے کیے گئے۔

نتائج: کام کی جگہ پر ہونے والے تشدد کے سالانہ مالی بوجھ کا تخمینہ PKR 24.9 ملین لگایا گیا تھا۔ غیر حاضری نے PKR 1.66 ملین، سٹاف ٹرن اوور PKR 7.2 ملین، اور نگہداشت کے معیار میں PKR 11.8 ملین کا حصہ ڈالا۔ تشدد کی اقسام اور ہر مالیاتی میٹرک کے درمیان اہم شماریاتی انجمنیں دیکھی گئیں۔

نتیجہ: کام کی جگہ پر تشدد صحت کی دیکھ بھال کے نظام پر ایک قابل پیمائش اور اہم مالی بوجھ ڈالتا ہے۔ ہدف شدہ پالیسیاں اور حفاظتی مداخلتیں تشدد کو کم کرنے اور اعلی خطرے والے محکموں میں صحت کی دیکھ بھال کی موثر، محفوظ اور پائیدار فراہمی کو یقینی بنانے کے لیے ضروری ہیں۔

مطلوبہ الفاظ: کام کی جگہ پر تشدد، صحت کی دیکھ بھال کے اخراجات، غیر حاضری، کاروبار، دیکھ بھال کا معیار، پاکستان

Abstract in 中国人 (Chinese)

抽象的

背景： 針對醫療保健提供者的工作場所暴力擾亂了醫療服務的提供，並給衛生系統帶來了嚴重的財務壓力。這項研究量化了暴力造成的經濟成本，重點在於巴基斯坦卡拉奇的缺勤、員工流動率和照護品質下降。

方法： 對卡拉奇兒科和婦科的 414 名醫療保健提供者進行了一項橫斷面研究。使用平均薪資資料、重置成本和收入影響指標來估算因缺勤、人員流動和品質損失而產生的財務成本。使用 SPSS 21 版進行統計分析。

結果： 工作場所暴力每年造成的經濟負擔估計為 2,490 萬巴基斯坦盧比。缺勤造成 166 萬巴基斯坦盧比，員工流失造成 720 萬巴基斯坦盧比，護理品質損失 1,180 萬巴基斯坦盧比。在暴力類型和每個財務指標之間觀察到顯著的統計關聯。

結論： 工作場所暴力給醫療保健系統帶來了可衡量且嚴重的財務負擔。有針對性的政策和安全乾預措施對於減少暴力並確保在高風險部門提供高效、安全和永續的醫療服務至關重要。

關鍵字： 工作場所暴力、醫療費用、缺勤、人員流動、照護品質、巴基斯坦

Abstract in française (French)

Résumé

Contexte: La violence au travail à l'encontre des soignants perturbe la prestation des soins et pèse lourdement sur les systèmes de santé. Cette étude quantifie les coûts économiques de la violence, en se concentrant sur l'absentéisme, la rotation du personnel et la baisse de la qualité des soins à Karachi, au Pakistan.

Méthodes: Une étude transversale a été menée auprès de 414 soignants des services de pédiatrie et de gynécologie de Karachi. Les coûts financiers liés à l'absentéisme, à la rotation du personnel et aux pertes de qualité ont été estimés à l'aide de données sur le salaire moyen, les coûts de remplacement et les indicateurs d'impact sur les revenus. Les analyses statistiques ont été réalisées avec SPSS version 21.

Résultats: Le fardeau financier annuel de la violence au travail a été estimé à 24,9 millions de roupies pakistanaises. L'absentéisme a contribué à hauteur de 1,66 million de roupies pakistanaises, la rotation du personnel à hauteur de 7,2 millions de roupies pakistanaises et les pertes de qualité des soins à hauteur de 11,8 millions de roupies pakistanaises. Des associations statistiques significatives ont été observées entre les types de violence et chaque indicateur financier.

Conclusions: La violence au travail représente un fardeau financier mesurable et critique pour les systèmes de santé. Des politiques ciblées et des interventions en matière de sécurité sont essentielles pour atténuer la violence et garantir une prestation de soins efficace, sûre et durable dans les services à haut risque.

Mots-clés: violence au travail, coûts des soins de santé, absentéisme, rotation du personnel, qualité des soins, Pakistan

Abstract in русский (Russian)

Аннотация

Предыстория: Насилие на рабочем месте в отношении поставщиков медицинских услуг нарушает предоставление медицинской помощи и создает серьезную финансовую нагрузку на системы здравоохранения. В этом исследовании количественно оцениваются экономические издержки насилия, уделяя особое внимание невыходам на работу, текучести кадров и снижению качества медицинской помощи в Карачи, Пакистан.

Методы: Было проведено поперечное исследование среди 414 поставщиков медицинских услуг в педиатрических и гинекологических отделениях Карачи. Финансовые издержки из-за невыходов на работу, текучести кадров и потерь качества были оценены с использованием данных о средней заработной плате, затрат на замену и показателей влияния на доход. Статистический анализ был выполнен с использованием версии SPSS 21.

Результаты: Годовое финансовое бремя насилия на рабочем месте было оценено в 24,9 млн пакистанских рупий. Невыходы на работу обошлись в 1,66 млн пакистанских рупий, текучесть кадров — в 7,2 млн пакистанских рупий, а потери качества медицинской помощи — в 11,8 млн пакистанских рупий. Были обнаружены значительные статистические связи между типами насилия и каждым финансовым показателем.

Выводы: Насилие на рабочем месте налагает измеримое и критическое финансовое бремя на системы здравоохранения. Целевые политики и меры безопасности имеют важное значение для смягчения насилия и обеспечения эффективного, безопасного и устойчивого предоставления медицинских услуг в отделениях с высоким риском.

Ключевые слова: Насилие на рабочем месте, расходы на здравоохранение, прогулы, текучесть кадров, качество ухода, Пакистан

Abstract in español (Spanish)

Resumen

Antecedentes: La violencia laboral contra profesionales sanitarios interrumpe la prestación de servicios de salud y supone una grave carga financiera para los sistemas de salud. Este estudio cuantifica los costes económicos de la violencia, centrándose en el ausentismo, la rotación de personal y la reducción de la calidad de la atención en Karachi, Pakistán.

Métodos: Se realizó un estudio transversal con 414 profesionales sanitarios de departamentos de pediatría y ginecología de Karachi. Los costes financieros derivados del ausentismo, la rotación y la pérdida de calidad se estimaron utilizando datos sobre salarios promedio, costes de reemplazo y métricas de impacto en los ingresos. Los análisis estadísticos se realizaron con el programa SPSS versión 21.

Resultados: La carga financiera anual de la violencia laboral se estimó en 24,9 millones de rupias pakistaníes. El ausentismo contribuyó con 1,66 millones de rupias pakistaníes, la rotación de personal con 7,2 millones de rupias pakistaníes y la pérdida de calidad de la atención con 11,8 millones de rupias pakistaníes. Se observaron asociaciones estadísticas significativas entre los tipos de violencia y cada métrica financiera.

Conclusiones: La violencia laboral supone una carga financiera medible y crítica para los sistemas de salud. Las políticas específicas y las intervenciones de seguridad son esenciales para mitigar la violencia y garantizar una atención sanitaria eficiente, segura y sostenible en departamentos de alto riesgo.

Palabras clave: Violencia laboral, costes sanitarios, absentismo, rotación del personal, calidad de la atención, Pakistán

What is already known in study's context

- Quantified financial costs of workplace violence in Pakistani healthcare settings.
- Highlighted absenteeism as the largest cost component.
- Demonstrated turnover rates significantly linked to violence.
- Identified gaps in legal enforcement as a driver of violence.

What this study adds to the existing literature

- Workplace violence disrupts healthcare delivery.
- Violence contributes to staff burnout and turnover.
- Maternal and child health departments are high-risk zones.
- Enforcement of protective laws remains inadequate.

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