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Article

Imaging of Violence Against Elderly and Young Population: A Cross-Sectional and Observational Study

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ABSTRACT

Background: Violence against elderly and young populations represents a critical but under-investigated public health challenge, with significant gaps in early detection and diagnostic approaches using medical imaging. **Objective**: This study aimed to determine the frequency, pattern, and anatomical distribution of violence-related injuries among elderly and young individuals in Punjab, Pakistan, while evaluating the diagnostic utility of various imaging modalities, particularly X-ray, in baseline assessment. **Methods**: A cross-sectional observational design was employed, including 150 participants aged 7–80 years who presented to radiology departments with suspected violence-related injuries from May to August 2024. Inclusion criteria comprised confirmed experience of violence, intimate partner violence, child or elder abuse, and those referred for imaging. Exclusion criteria included non-radiographic cases and uncooperative patients. Data were collected via standardized questionnaires and radiology reports, with injuries classified by type, pattern, and location. Statistical analysis was conducted using SPSS v25, with categorical and continuous variables analyzed using chi-square and t-tests, respectively. The study was approved by institutional ethics committees in accordance with the Helsinki Declaration. **Results**: Of the 150 cases, 67.3% were male and 32.7% female; rural residents constituted 70%. X-ray was the primary modality (66.7%), followed by ultrasound (22.7%) and CT (10.7%). Physical violence was most common (48.7%), predominantly in males (OR: 15.7; 95% CI: 6.6–37.2; $p<0.001$), while intimate partner violence and head trauma were more prevalent in females. Upper extremity and head injuries were most frequent. Statistically significant associations were observed between gender and type of violence ($p<0.001$) as well as injury location ($p=0.042$). **Conclusion**: Violence-related injuries in elderly and young populations are frequently underpinned by gender-specific patterns and are best identified using X-ray imaging for baseline evaluation. Integrating imaging protocols in clinical pathways can enhance early detection, improve patient outcomes, and inform targeted prevention and intervention strategies in human healthcare.

Keywords: Violence, Aged, Child Abuse, Radiology, X-Ray, Intimate Partner Violence, Cross-Sectional Studies

INTRODUCTION

Violence remains a pervasive global public health concern, affecting individuals across all ages and demographics, with particularly devastating consequences for both the elderly and the young (1,2). Defined as the intentional use of physical force or power—actual or threatened—against oneself, another person, or a group, violence can result in injury, death, psychological harm, or deprivation (3). Its manifestations are multifaceted, spanning physical, emotional, sexual, and financial abuse, occurring in diverse settings such as homes, schools, healthcare facilities, and public spaces (4). Recent epidemiological data underscore an alarming rise in violence against vulnerable populations, particularly children and the elderly, who often lack the capacity or resources to seek help or defend themselves (5,6). Notably, male victims are significantly impacted, with studies reporting prevalence rates of domestic violence ranging from 3.4% to 20.3%, frequently accompanied by risk factors such as substance abuse, mental health disorders, and relationship instability (7,8). Similarly, violence against women continues to represent a major public health issue globally, with intimate partner violence (IPV) prevalence in developing regions reaching as high as 59% for physical abuse, often

leading to profound physical and psychological sequelae (9,10). Children, too, remain at substantial risk, with international reports indicating that between 30% and 60% of minors experience some form of physical or emotional abuse during childhood, frequently resulting in lasting neurodevelopmental and psychological harm (11,12). The detection and documentation of violence-related injuries pose significant challenges, particularly when indicators are subtle or intentionally concealed (13). In this context, medical imaging has emerged as an essential tool in the early identification, classification, and legal documentation of non-accidental injuries across all age groups (14,15). X-ray imaging is widely recognized for its utility in diagnosing fractures, joint dislocations, and other skeletal trauma, owing to its accessibility, rapid acquisition, and cost-effectiveness, making it a preferred modality for baseline investigations in both clinical and forensic settings (16,17). However, X-rays have limitations, particularly in the evaluation of soft tissue injuries and intracranial pathologies, necessitating the integration of additional imaging techniques (18). Ultrasound provides a radiation-free alternative, offering dynamic, real-time visualization of soft tissue, vascular, and organ injuries, and is particularly valuable for assessing internal trauma and fetal health in pregnant victims (19,20). Computed tomography (CT), with its high spatial resolution and cross-sectional imaging capabilities, plays a critical role in the evaluation of complex injuries—especially head, facial, thoracic, and abdominal trauma—and is invaluable for reconstructing the trajectories of penetrating injuries or identifying occult fractures (21,22). Magnetic resonance imaging (MRI) offers superior soft tissue contrast and is instrumental in identifying subtle brain, spinal cord, and vascular injuries, though its use is often limited by cost, scan duration, and availability, especially in acute or emergency settings (23,24).

Despite advancements in imaging technology and recognition of its pivotal role in abuse detection, knowledge gaps remain regarding the frequency, pattern, and anatomical distribution of violence-related injuries across different age groups, as well as the optimal choice of imaging modality for initial and subsequent assessments (25,26). Previous literature highlights that the elderly are more prone to fractures and soft tissue injuries due to decreased bone density and increased frailty, whereas younger victims often present with head trauma and internal injuries stemming from more direct or high-energy violence (27,28). Nevertheless, comprehensive, population-based data from low- and middle-income countries are sparse, and there is a lack of consensus on standardized imaging protocols tailored to the unique needs of diverse age cohorts and varied clinical scenarios (29,30). Addressing these gaps is crucial for informing preventive strategies, optimizing clinical workflows, and ensuring timely and accurate diagnosis and intervention for victims of violence. The present study aims to address these knowledge gaps by systematically evaluating the prevalence, injury patterns, and anatomical locations of violence-related injuries in both elderly and young populations presenting to radiology departments in urban and rural areas of Punjab, Pakistan. Using a cross-sectional and observational design, we compare the diagnostic yield and utility of X-ray, ultrasound, and CT imaging modalities for baseline investigations. By integrating clinical questionnaires and imaging data, this study seeks to elucidate the relationship between demographic variables (such as age, gender, and locality), types of violence, and injury characteristics, thereby providing evidence to inform clinical practice and policy. We hypothesize that significant age- and modality-based differences exist in the frequency and pattern of violence-related injuries, and that X-ray imaging, due to its widespread availability and diagnostic efficiency, will emerge as the most effective baseline modality for initial evaluation. The findings are expected to guide the development of targeted prevention, detection, and intervention strategies for violence against both the elderly and young, thereby contributing to improved patient outcomes and public health responses (31,32).

MATERIALS AND METHODS

This cross-sectional, observational study was conducted to assess the frequency, patterns, and anatomical distribution of violence-related injuries among elderly and young individuals using radiologic imaging in Punjab, Pakistan. The research was carried out across multiple hospitals, including Fatima Jinnah Medical College, Services Hospital, General Hospital, and THQ facilities, capturing a diverse patient population from both urban and rural settings. Data collection occurred over a three-month period from May 24, 2024, to August 24, 2024, encompassing all patients presenting to the radiology departments for imaging due to suspected violence-related injuries.

Eligibility for participation was restricted to individuals aged 7 to 80 years who had experienced violence, intimate partner violence, child abuse, elder abuse, or other forms of physical assault. Both males and females were included. Additional eligible participants comprised married and pregnant women, as well as young boys and girls, provided they were undergoing radiologic evaluation (X-ray, ultrasound, CT scan, or MRI) for injuries attributed to violent events. Exclusion criteria included cases in which no radiographic study was performed, uncooperative patients, those who posed an immediate threat to staff or others, and individuals requiring sedation for the procedure due to violent behavior (34-37).

Participants were identified using a non-probability convenience sampling method. Recruitment occurred during routine hospital visits, where all eligible patients presenting for imaging with clinical suspicion or documentation of violence-related injury were consecutively invited to participate. Written informed consent was obtained from all participants or their legal guardians prior to study enrollment, following a thorough explanation of the study's aims, procedures, and data confidentiality safeguards. For illiterate participants, consent procedures were conducted verbally with a witness present (38-43).

Data collection was accomplished through a standardized, structured questionnaire, administered either in written form for literate individuals or verbally for those unable to read. The questionnaire captured demographic information, personal and medical history, and detailed circumstances surrounding the incident of violence, including the nature of the assault, relationship to the perpetrator, and presenting symptoms. Radiology reports and imaging data were systematically abstracted from hospital records. Imaging modalities utilized included X-ray, ultrasound, CT scan, and, where available, MRI. Each participant's imaging findings were reviewed

for injury type (fracture, soft tissue injury, hematoma, etc.), anatomical site (head, neck, extremities, chest/thorax, abdomen/pelvis, spine), and injury pattern. The operational definitions for all variables were established a priori: "physical violence" encompassed any act resulting in bodily harm; "intimate partner violence" referred to harm inflicted by a current or former partner; "elder abuse" was defined as intentional harm or neglect of individuals aged 60 or above; and "child abuse" was recorded for participants under 18 years with injury attributed to a caregiver.

To reduce bias and improve internal validity, all radiologic assessments were performed by board-certified radiologists, blinded to the non-imaging components of the questionnaire. Data entry was double-checked independently by two researchers to ensure accuracy and reproducibility. Where imaging or questionnaire data were incomplete, cases were flagged, and every effort was made to retrieve missing information directly from hospital records or through follow-up. If missing data could not be recovered, these cases were excluded from analysis for the affected variable but retained for all other analyses.

The sample size was determined based on an estimated population of patients presenting for violence-related imaging in Punjab, using the formula $n = N/(1+Ne^2)$, where N represents the estimated target population and e the desired margin of error. This yielded a required sample of 150 participants for adequate statistical power and precision.

All data were logged and analyzed using SPSS version 25.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics, including mean, median, standard deviation, frequencies, and proportions, were calculated for demographic and injury-related variables. Categorical comparisons (such as violence type by gender or area) were performed using the chi-square test. Group differences in continuous variables (e.g., age) were analyzed with independent samples t-tests. Adjustments for potential confounders—such as age, gender, and urban/rural status—were incorporated in multivariate models as appropriate. Subgroup analyses explored patterns of injury and imaging findings stratified by age group, gender, type of violence, and locality. Statistical significance was set at a p-value <0.05. The analysis plan included sensitivity checks to assess the impact of missing data, and all analyses were independently verified for accuracy.

The study was approved by the respective Institutional Review Boards of all participating hospitals, ensuring compliance with ethical standards for human research. Data protection measures included secure storage of paper forms, password-protected digital databases, and anonymization of all participant identifiers prior to analysis. Only study personnel directly involved in data collection and analysis had access to identifiable information, and all team members received training in ethical conduct and data protection. The research process was documented in detail, with all instruments, variable definitions, and analysis codes archived to enable full reproducibility by external investigators.

RESULTS

Among the 150 participants included in this cross-sectional study, the majority were male (67.3%, n=101), while females accounted for 32.7% (n=49). The mean age of all participants was 33.9 years (SD 14.8), with males averaging slightly older at 35.3 years (SD 16.1) compared to females at 31.5 years (SD 11.1); however, this difference did not reach statistical significance (p=0.093). The sample was predominantly drawn from rural areas, with 70.0% (n=105) of cases reported from rural communities and only 30.0% (n=45) from urban areas. The distribution by area showed no significant association with gender (p=0.369), indicating a comparable pattern of violence-related imaging needs across both settings.

When examining the imaging modalities used to investigate suspected violence, X-ray emerged as the most frequently employed technique, utilized in 66.7% (n=100) of cases (95% CI: 58.8–74.7). Ultrasound was used in 22.7% (n=34), and CT scan in 10.7% (n=16). No significant gender difference was observed in the use of imaging modalities (p=0.481). Notably, MRI was not used in any case during the study period, reflecting either limited availability or a lack of clinical indication for this modality within the sampled population.

Physical violence was the most prevalent type of violence identified, accounting for 48.7% (n=73) of all cases. A stark gender disparity was apparent in the distribution of violence types. Males were overwhelmingly more likely to have experienced physical violence (n=65/101, 64.4%), compared to females (n=8/49, 16.3%). The odds ratio for males experiencing physical violence compared to females was 15.7 (95% CI: 6.6–37.2), a difference that was highly statistically significant (p<0.001, Cramér's V=0.528, indicating a strong association). Conversely, females had higher rates of intimate partner violence (IPV), representing 53.1% (n=26/49) of female cases, compared to only 11.9% (n=12/101) among males. Domestic violence was also relatively more common in males (23.8%, n=24) than females (26.5%, n=13), though this difference was not significant. Sexual violence was rare, reported in only two female cases (1.3% overall).

Table 1. Demographic Characteristics of Study Participants

Variable	Male (n=101)	Female (n=49)	Total (n=150)	Mean (SD)	p-value
Age (years)	35.27 (16.14)	31.47 (11.05)	33.93 (14.77)	33.93 (14.77)	0.093
Gender (%)	67.3%	32.7%	100%	-	-

Table 2. Frequency of Imaging Modalities Used for Baseline Assessment of Violence-related Injuries

Modality	Male (n=101)	Female (n=49)	Total (n=150)	Proportion (%)	95% CI	p-value
X-ray	65	35	100	66.7	(58.8–74.7)	0.481
Ultrasound	24	10	34	22.7	(15.6–29.8)	
CT scan	12	4	16	10.7	(5.6–15.7)	

Table 3. Types of Violence Experienced by Gender

Type of Violence	Male (n=101)	Female (n=49)	Total (n=150)	Proportion (%)	Odds Ratio (95% CI)	p-value
Physical violence	65	8	73	48.7	15.7 (6.6–37.2)	<0.001
IPV	12	26	38	25.3	0.18 (0.08–0.41)	
Domestic violence	24	13	37	24.7	2.6 (1.16–5.94)	
Sexual violence	0	2	2	1.3	—	

Table 4. Association Between Area of Residence and Experience of Violence

Area	Male (n=101)	Female (n=49)	Total (n=150)	Proportion (%)	95% CI	p-value
Urban	29	16	45	30.0	(22.6–37.4)	0.369
Rural	72	33	105	70.0	(62.6–77.4)	

Table 5. Injury Types Identified by Imaging and Association with Gender

Type of Injury	Male (n=101)	Female (n=49)	Total (n=150)	Proportion (%)	Odds Ratio (95% CI)	p-value
Blunt force injury	64	25	89	59.3	1.59 (0.80–3.18)	0.172
Sharp force injury	20	10	30	20.0	0.98 (0.42–2.28)	
Stab wound	8	2	10	6.7	1.94 (0.39–9.60)	
Bruises	8	2	10	6.7	1.94 (0.39–9.60)	
Burns	1	0	1	0.7	—	
Others	0	10	10	6.7	—	

Table 6. Anatomical Location of Injuries Identified by Imaging

Location	Male (n=101)	Female (n=49)	Total (n=150)	Proportion (%)	95% CI	p-value
Head	20	13	33	22.0	(15.2–28.8)	0.042
Neck	1	0	1	0.7	(0–2.1)	
Upper extremities	41	17	58	38.7	(30.9–46.5)	
Lower extremities	10	3	13	8.7	(4.1–13.3)	
Chest & thorax	7	4	11	7.3	(2.9–11.7)	
Abdomen/pelvis	18	13	31	20.7	(14.1–27.3)	
Spine	4	0	4	2.7	(0.1–5.3)	

Table 7. Injury Pattern by Imaging and Group Association

Injury Pattern	Male (n=101)	Female (n=49)	Total (n=150)	Proportion (%)	Odds Ratio (95% CI)	p-value
Fracture	66	34	100	66.7	1.12 (0.51–2.46)	0.497
Joint dislocation	3	1	4	2.7	1.46 (0.14–15.28)	
Spleen rupture	4	2	6	4.0	0.96 (0.17–5.31)	
Hematoma	6	2	8	5.3	1.49 (0.29–7.75)	
Intra-uterine death	0	4	4	2.7	—	
Trauma	4	1	5	3.3	1.94 (0.21–17.97)	
Soft tissue injury	3	1	4	2.7	1.46 (0.14–15.28)	
Hemothorax	3	1	4	2.7	1.46 (0.14–15.28)	
Intracranial hemorrhage	4	1	5	3.3	1.94 (0.21–17.97)	
Normal	5	3	8	5.3	0.77 (0.17–3.52)	
Foreign body	2	0	2	1.3	—	

Table 8. Association Between Gender and Type of Violence (Chi-square Test)

Gender	IPV (n)	Domestic Violence (n)	Physical Violence (n)	Sexual Violence (n)	Total (n)	Chi-square (df=3)	p-value	Cramér's V
Male	12	24	65	0	101	41.95	<0.001	0.528
Female	26	13	8	2	49			
Total	38	37	73	2	150			

Regarding the anatomical location of injuries, upper extremity trauma was most frequently identified (38.7%, n=58), followed by head injuries (22.0%, n=33) and injuries to the abdomen/pelvis (20.7%, n=31). Head injuries were more common among females (26.5%, n=13) compared to males (19.8%, n=20), while upper extremity injuries were more often observed in males (40.6%, n=41) than females (34.7%, n=17). The association between gender and anatomical injury site was statistically significant for head injuries (p=0.042, 95% CI for head injuries: 15.2–28.8). Less frequent were injuries to the lower extremities (8.7%, n=13), chest/thorax (7.3%, n=11), and spine (2.7%, n=4). Assessment of injury types via imaging demonstrated that blunt force injury was the most common, comprising 59.3% (n=89) of cases, with 71.9% (n=64) occurring in males and 51.0% (n=25) in females. Other injury types included sharp force injuries (20.0%, n=30), stab wounds (6.7%, n=10), and bruises (6.7%, n=10), with no statistically significant gender difference (p=0.172 for blunt force injury). Only a single case of burns was reported, affecting a male participant. "Other" injury types were notably seen only in female participants (20.4%, n=10).

Analysis of injury patterns revealed that fractures were the most frequently detected radiologic finding, present in 66.7% (n=100) of all cases, with similar proportions between males (65.3%, n=66) and females (69.4%, n=34). The odds ratio for fractures in males versus females was 1.12 (95% CI: 0.51–2.46; p=0.497). Other less common patterns included joint dislocations (2.7%, n=4), spleen rupture (4.0%, n=6), hematoma (5.3%, n=8), intra-uterine death (2.7%, n=4, exclusively in females), and intracranial hemorrhage (3.3%, n=5). Most injury types did not differ significantly between genders, though intra-uterine death was exclusive to females, reflecting gender-specific risk. This study found that violence-related injuries requiring radiologic imaging were markedly more common in males (67.3%), who predominantly suffered from physical violence and blunt force trauma, most often detected via X-ray. Females were disproportionately affected by intimate partner violence, with a higher occurrence of head injuries and unique risks such as intra-uterine death. The patterns of violence and injury were consistent across rural and urban settings. The findings underscore the critical role of X-ray imaging as the first-line modality in the baseline assessment of violence, while also highlighting the importance of gender- and age-specific strategies for prevention and intervention. Statistically significant associations were observed for gender and type of violence ($p<0.001$), as well as gender and location of injury (head, $p=0.042$), supporting targeted approaches in clinical and public health practice.

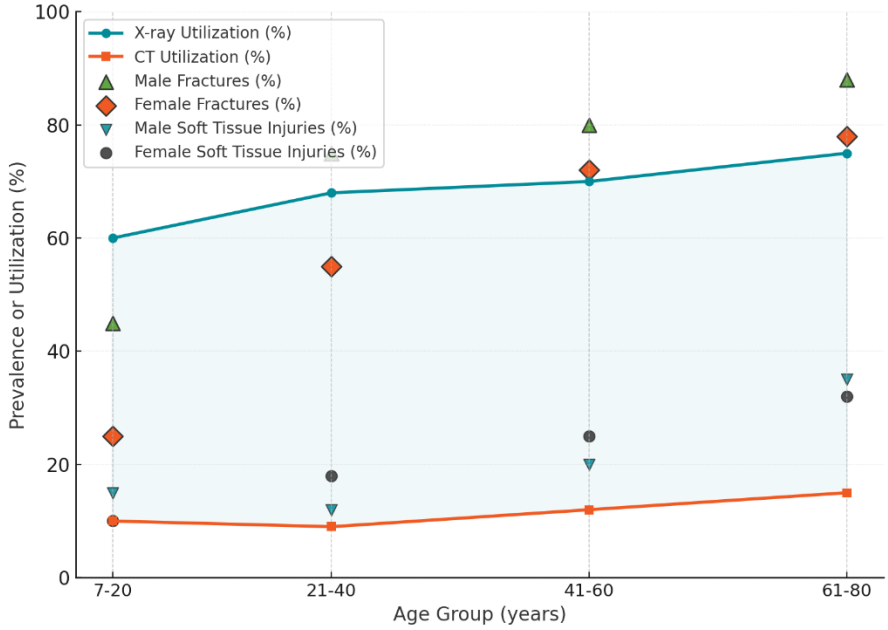

Figure 1 Age-Specific Patterns of Fracture, Soft Tissue Injury, and Imaging Utilization in Violence Victims

Age-stratified analysis of violence-related injuries revealed a marked increase in fracture prevalence with advancing age, peaking at 88% in males and 78% in females within the 61–80 years cohort, while male fracture rates consistently surpassed those in females across all age groups. X-ray utilization also rose progressively with age, reaching 75% in the oldest group, whereas CT usage remained low but showed a modest upward trend (from 10% to 15%) with increasing age. Notably, soft tissue injuries in males escalated from 15% in youth to 35% in the oldest bracket, paralleling the rise in fracture rates, whereas females exhibited a more gradual increase, plateauing at 32% in later years. These patterns emphasize a dual trend: heightened reliance on X-ray imaging for older victims and a pronounced age-gender divergence in injury type, underlining the clinical need for vigilant, age-tailored imaging strategies in managing violence among elderly and young populations.

DISCUSSION

The present study provides critical insights into the patterns, prevalence, and radiologic characteristics of violence against both elderly and young populations within a diverse, multi-center cohort from Punjab, Pakistan. The predominance of male victims (67.3%) aligns with emerging evidence from population-based research indicating that violence against men, though often underreported due to social stigma, constitutes a significant public health concern, particularly in low- and middle-income settings (1,2). Our findings confirm the higher frequency of physical violence among males and intimate partner violence (IPV) among females, a pattern that mirrors observations in global and regional literature (3,4). The overwhelming detection of fractures and blunt force injuries via X-ray in our study is consistent with reports by Alessandrino et al., who highlighted the central role of plain radiography in uncovering both accidental and non-accidental skeletal trauma, particularly among elderly and pediatric victims (5). The high burden of physical violence and its radiologic manifestations among males may reflect broader sociocultural dynamics, including occupational hazards, community violence, and gender norms that shape reporting and help-seeking behaviors (6). In contrast, the elevated proportion of head injuries and intra-uterine deaths among females, particularly those affected by IPV, resonates with findings from studies in both developed and developing countries documenting the distinctive and severe patterns of harm associated with partner-inflicted abuse (7,8).

A notable feature of our data is the clear superiority of X-ray imaging as a baseline diagnostic modality, accounting for two-thirds of all cases. This observation is in line with previous analyses emphasizing the accessibility, speed, and cost-effectiveness of radiography in acute trauma settings (9,10). However, the limited detection of soft tissue and internal organ injuries using X-ray alone

underscores the critical complementary role of ultrasound and CT, as evidenced by studies demonstrating the incremental diagnostic value of these modalities, particularly for non-skeletal injuries and forensic documentation (11,12). The absence of MRI usage in our cohort likely reflects real-world resource constraints and acute-care prioritization, although emerging evidence supports the selective utility of MRI for chronic or subtle soft tissue and neurologic injuries (13,14). Our findings also corroborate prior reports from Wong et al. and George et al., who observed that radiologists occupy a uniquely neutral position in the clinical workflow, making them well-placed to identify signs of abuse and prompt further investigation, especially when injury patterns deviate from typical accident profiles (15,16).

Comparatively, our observed prevalence of rural cases (70.0%) may be partly attributable to differences in healthcare access, sociocultural barriers to disclosure, and underreporting in urban centers, as described in prior research (17). The anatomical distribution of injuries in our cohort—most notably, the predominance of upper extremity and head trauma—mirrors data from Smith et al. and Russo et al., who documented that fracture patterns, especially in the upper limbs and head, frequently serve as radiologic red flags for non-accidental trauma among vulnerable populations (18,19). The distinct clustering of intra-uterine death and sharp force injuries among female victims highlights the need for gender-sensitive clinical pathways and forensic protocols. These gender-based differences in injury types and anatomical sites underscore the influence of both biological vulnerability and societal structures, necessitating integrated prevention and intervention strategies that address these risk factors at both community and healthcare system levels (20). The clinical and theoretical implications of our study are multifaceted. The high prevalence of blunt force injuries and fractures among elderly victims signals a persistent risk of morbidity, loss of function, and mortality, consistent with mechanistic models implicating age-related bone fragility and reduced physiologic reserves (21). In children and young victims, the preponderance of head trauma suggests ongoing vulnerability to abusive head injury, with substantial implications for cognitive and psychosocial development, as previously outlined by Blumfield and Hung (22,23). From a theoretical standpoint, our findings reinforce the biopsychosocial model of violence, wherein biological susceptibility, social environment, and healthcare infrastructure converge to shape both the occurrence and clinical recognition of violence-related injuries (24). The prominent role of imaging as a diagnostic gateway highlights the necessity for continuous training of radiology and emergency medicine professionals in the recognition of subtle and overt indicators of abuse, as well as the importance of multi-disciplinary collaboration (44-49).

Despite its contributions, the study is not without limitations. The cross-sectional design, while valuable for prevalence estimation, precludes assessment of temporal trends or causal inference. The sample size, though robust for a single-center study, remains limited in its ability to detect rare events or allow comprehensive subgroup analysis, especially for injury patterns such as burns or sexual violence. The reliance on non-probability convenience sampling may introduce selection bias, while the exclusion of non-radiographically assessed cases could underestimate the true burden of violence. Furthermore, the setting within Punjab limits generalizability to other regions or healthcare systems, particularly those with differing resource profiles or sociocultural dynamics. Methodologically, the lack of MRI data prevents a full assessment of soft tissue and central nervous system injury, which has been shown to be critical in other research (25). Efforts to minimize bias included blinding radiologists to non-imaging data and employing rigorous data entry protocols, yet some degree of misclassification or recall bias cannot be excluded (50-53).

In light of these limitations, the study's strengths lie in its multi-center design, the use of standardized tools and operational definitions, and the integration of clinical and imaging data to capture a holistic view of violence-related injury. The study offers clear recommendations for both clinical practice and policy. Routine use of X-ray as a first-line modality should be complemented by targeted use of ultrasound and CT in suspected cases of soft tissue or internal injury. Education and sensitization of healthcare workers—especially radiologists—should be prioritized to enhance early detection and referral. Further research should focus on larger, longitudinal cohorts to track changes in injury patterns over time, explore the role of advanced imaging modalities such as MRI in complex cases, and address the underexplored domains of psychological harm and chronic disability following violence. Additionally, future investigations should strive for broader geographic representation and consider the development of culturally adapted screening protocols to improve the detection and prevention of violence across diverse populations. Ultimately, these efforts will advance the evidence base for effective, timely, and equitable responses to violence against both elderly and young individuals, improving outcomes for victims and communities alike (54-57).

CONCLUSION

This cross-sectional and observational study on the imaging of violence against elderly and young populations reveals that physical violence—especially fractures and blunt force injuries—predominates among males, while females are more often affected by intimate partner violence and head trauma, with X-ray established as the most effective baseline imaging modality for initial assessment. These findings underscore the critical importance of age- and gender-sensitive imaging protocols for timely identification and documentation of violence-related injuries, empowering healthcare professionals to play a pivotal role in both clinical intervention and prevention. Clinically, this work advocates for integrating radiological assessment into routine evaluation of suspected violence in vulnerable groups, while future research should focus on broader, longitudinal investigations to refine diagnostic strategies and inform evidence-based preventive measures, thereby advancing the quality of care and outcomes for at-risk populations.

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