Original Article

Association of Medical Morbidities with Injury Patterns among Geriatric Patients Attending a Primary Health Care Facility in Urban Area of Delhi

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Abstract

Background: Injuries are defined as physical harm resulting from the acute transfer of energy—including mechanical, thermal, electrical, chemical, or radiation energy—or from the sudden deprivation of essential elements such as oxygen or heat. Over time, this definition has been broadened to include psychological harm, developmental impairment, and social deprivation. Injuries among older adults represent a major public health concern due to age-related physiological changes and the presence of chronic medical conditions, which may influence both the occurrence and nature of injuries. The objective is to assess the association between the nature of injuries and underlying medical illnesses among elderly individuals. **Material and Methods:** Following approval from the Institutional Ethics Committee, a community-based cross-sectional study was conducted among elderly patients attending the Urban Health Centre (UHC), Gokalpuri, New Delhi, for the first time over one year. A total of 150 participants were selected from the outpatient department register and interviewed using a pre-tested, semi-structured questionnaire. Data were analyzed using the Statistical Package for the Social Sciences (SPSS), version 25. **Results:** A significantly higher proportion of participants presenting with bruises and sprains had a pre-existing medical illness (55.55% and 50%, respectively) compared to those with concussions or fractures, among whom no medical disease was reported. This association between the nature of injury and the presence of medical illness was statistically significant ($p < 0.0001$). No significant association was observed between the type of injury and visual or hearing impairment. **Conclusion:** Bruises and sprains were more frequently observed among elderly individuals with underlying medical illnesses, whereas concussions and fractures were not associated with the presence of medical conditions. The association between medical illness and injury type was statistically significant, highlighting the importance of identifying medical risk factors in injury prevention strategies for the geriatric population.

Keywords: Geriatric population; Injuries; Medical comorbidities; Injury patterns; Primary health care.

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Introduction

Injury is defined as 'a body lesion at the organic level, resulting from an acute exposure of energy (mechanical, thermal, chemical, or radiant) in an amount that exceeds the threshold of physiological tolerance. ' In some cases (e.g., drowning, strangulation, freezing), the injury results from an insufficiency of a vital element.[1,2]

Accident Versus Injury Event

The term "accident" is increasingly avoided because it implies randomness and inevitability. In contrast, the term "injury events" emphasizes that such occurrences have identifiable causes, can be systematically examined, and are therefore potentially preventable.[3]

Road traffic injuries account for a substantial global health burden, causing an estimated 1.2 million deaths annually, while nearly 50 million individuals sustain non-fatal injuries each year. According to the World Health Organization (WHO), low- and middle-income countries experience significantly higher road traffic mortality rates—approximately 21.5 and 19.5 per 100,000 population, respectively—than high-income countries, where the rate is about 10.5 per 100,000. Vulnerable road users, including pedestrians, cyclists, and two-wheeler riders, contribute to nearly half of all fatal road traffic injuries. Furthermore, the WHO projects that road traffic injuries will rank as the fifth leading cause of death globally by 2030.[4] Injuries, except road traffic injuries, are often overlooked. According to the World Health Organisation, unintentional injuries contribute to about 3.9 million deaths and over 138 million disability adjusted life years in 2004, more in low and middle-income countries.[5]

Types of injuries

Injuries are broadly categorized as unintentional and intentional.[6]

Unintentional injuries include- (1) Road traffic accidents, (2) Poisoning, (3) Falls, (4) Fires and burns, (5) Drowning, (6) Animal bites (dogs, snakes), (7) Others.

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Intentional injuries include- (1) Violence, (2) Suicide, (3) Self-harm, (4) War, (5) Gang fight.

Global burden of injuries

As per the Global Burden of Disease 2013, total 973 million people sustained injuries that warranted some healthcare and 4.8 million people died from injuries that warranted some healthcare and 4.8 million people died from injuries.11 According to a study done on the frequency of fatally injured body regions among the population above 75 years of age by the Institute of Traffic Accident Research and Data Analysis (ITARDA) in Japan from 2009 to 2013, it was found that the fatalities of hip injuries and head injuries were significantly higher for cyclists above 75 years of age.[7]

According to a study done at the database of PubMed, the Centre for Reviews, and the Cochrane database of systematic reviews till June 2009, found that the cost of treatment of injuries, as reported by prevalence-based studies among the elderly, accounts for 0.85% to 1.5% of total health expenditures. Mean costs per fall victim, mean cost per fall, and mean cost per fall-related hospitalization range from 2,044 to 25,995; 1059 to 10,913; 5,654 to 42,840 USD PPP, respectively. The purpose of this study was to determine the economic burden of falls in old age. The results were assessed for inclusion, classified, and synthesized, and the cost per inhabitant, the share of fall-related costs, and the gross domestic product were calculated as above. Another finding was that direct costs occurred mainly in older age groups and among females, in addition to health care facilities. Another major purpose of this study was to initiate fall prevention programs that will substantially reduce costs. During the first three decades of the 21st century, the combination of rising life expectancy and falling birth rates will result in substantial demographic changes in the United Kingdom. A large increase in the elderly population is likely to have significant effects on the number of patients who sustain a hip fracture.[8]

Objective: To study the association between the nature of injuries and underlying medical illness.

Materials and Methods

Inclusion criteria:

All newly registered injury patients aged 60 years and above attending the general outpatient department of the Urban Health Centre (UHC), Gokalpuri, during the study period who had resided in Gokalpuri for at least 6 months were included.

Exclusion criteria:

- Seriously ill patients needing hospitalization.
- Patients admitted to a higher centre, who could not be contacted at home on three attempts

Study area: The study was carried out in the General Outpatient Department of the Urban Health Centre (UHC), Gokalpuri, East Delhi, which functions as a primary health care facility and an urban field practice area under the Department of Community Medicine, Maulana Azad Medical College, New Delhi.

Study design: It is a Descriptive Cross-Sectional Study. The study was registered with the Clinical Trials Registry of India (Registration Number: CTRI /2021/10/037345).

Study Population: Geriatric patients aged 60 years and above, attending the general OPD, were considered in this study.

Study Period: The study was conducted over one year, from 2020 to 2021.

Sampling method: All eligible subjects attending the study area during the study period were enrolled after providing written informed consent. However, the total number of eligible subjects enrolled was 150.

Sampling Technique: The investigator visited the outpatient department twice a week and obtained the addresses of all geriatric patients presenting with injuries since the previous visit from the OPD register. These patients were subsequently contacted at their residences for data collection. Before enrolment, the study objectives and procedures were explained, and participant information sheets were provided. Written informed consent was obtained from all willing participants. If a participant was unavailable during the initial home visit, follow-up visits were conducted on subsequent scheduled days. A maximum of three contact attempts were made, after which individuals who remained unreachable were excluded from the study.

Study instrument: Data collection was carried out using a pre-tested, semi-structured interview schedule adapted from the World Health Organization (WHO) injury surveillance data collection pro forma, with appropriate modifications to address the local context and the study's objectives. The questionnaire was originally prepared in English, translated into the local language (Hindi), and subsequently backtranslated into English to ensure linguistic accuracy and validity. The interview schedule included sections on participant identification, sociodemographic characteristics, injury-related details, and behavioural factors.

Relevant medical records, including outpatient prescriptions from the Urban Health Centre and prescription or discharge summaries from referral hospitals in referred cases, were reviewed, where available, to corroborate information obtained during interviews.

Ethical Approval: The study was reviewed and approved by the Institutional Ethics Committee, Maulana Azad Medical College and associated Lok Nayak Hospital, New Delhi (Approval No.: F.1/IEC/MAMC/(70/05/2019)/No 429). The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki. Written informed consent was obtained from all participants before enrolment. Confidentiality and anonymity of the participants were strictly maintained throughout the study.

Statistical Analysis

Data was collected, compiled, processed, and analysed by MS Excel and SPSS software version 25.0.

The proportion of new cases of injuries among all new patients attending the health centre was expressed in terms of percentages. The percentage distribution of various factors under study among the study population was expressed in terms of percentages. Association of various factors with the mechanism and type of injury was tested using the chi-square test, / Fischer test, or the Z test, as applicable.

All tests were two-tailed and p-value.

RESULTS

Table 1: Distribution of study participants according to age

Age group (years)	Number	Percentage
60-69	68	45.33
70-79	55	36.66
80-90	27	18
Mean age ±SD	65.76±6.86 years	
Minimum age	60 years	
Maximum age	90 years	

A total of 150 participants were included in the study. The mean age was 65.76±6.86 years with a range of 30 years. The percentage of the participants in the age group of 60-69 years was 45.33%, while 36.66% and 18% in the age group of 70-79 years and 80-90 years respectively.

Table 2: Proportional distribution of the injury cases in elderly population according to age

Proportion of elderly new cases among total new cases			
Age group (years)	**Male (%)**	**Female (%)**	**Total**
60-69	30.18	13.20	22.84
70-79	25.77	13.40	12.58
80-89	19.56	6.52	3.97
Total	27.15	12.25	39.40
Proportion of elderly injury cases among total new cases			
60-69	14.46	5.03	10.26
70-79	9.27	4.12	4.30
80-90	4.34	2.17	0.09
Total	11.25	4.30	5.56
Proportion of elderly injury cases among elderly new cases			
60-69	33.33	11.59	26.05
70-79	23.68	10.52	10.92
80-90	12.66	8.33	2.52
Total	28.57	10.92	39.49

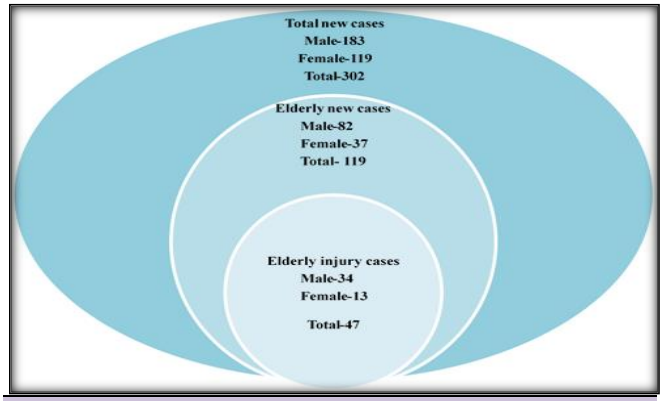

Figure 1: Proportional distribution of injury cases among total cases

The distribution of newly registered elderly patients showed that individuals aged 60–69 years accounted for the largest proportion of new cases, with a higher representation among males than among females. The proportion of elderly new cases declined progressively with advancing age, with the lowest contribution observed in the 80–89 year age group. Overall, males contributed a greater share of elderly new registrations than females.

A similar age-related trend was observed when elderly injury cases were examined among all new cases. The highest proportion of injury cases was reported in the 60–69 year age group, followed by those aged 70–79 years, while the oldest age group contributed the least. Across all age groups, injury-related visits were consistently more common among males than females.

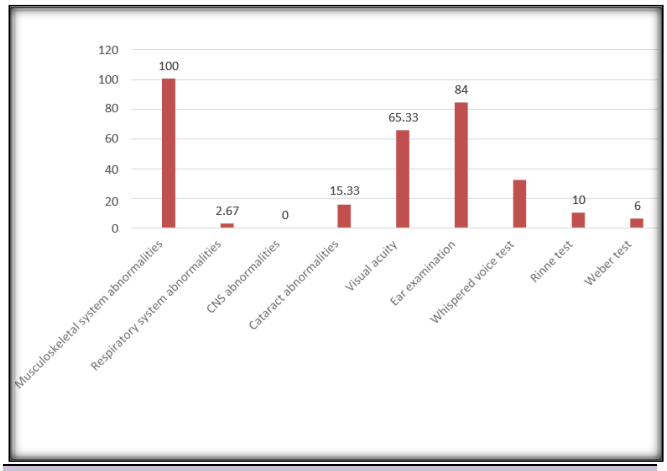

Figure 2: Systemic Examination of study participants

When injury cases were analyzed specifically among elderly new registrations, injuries were most frequent in the young-old age group (60–69 years). The proportion of injury cases declined steadily with increasing age, indicating that comparatively fewer injuries were reported among the older elderly. Males accounted for a higher proportion of injury cases across all age categories compared to females. Overall, the findings indicate a male

predominance and a decreasing trend in injury occurrence with advancing age among the elderly population attending the health facility.

Table 3: Distribution of participants according to socio-demographic characteristics

Interview and examination findings	Number	Percentage
Medical history		
No	87	58.00
Yes	63	42.00
Systemic examination	Number	Percentage
Musculoskeletal system abnormalities		
Yes	150	100.00
Respiratory system abnormalities		
No	146	97.33
Yes	4	2.67
CNS abnormalities		
No	150	100.00
Cataract abnormalities		
No	127	84.67
Yes	23	15.33
Visual acuity		
Decreased	98	65.33
Normal	52	34.67
Ear examination		
Patent	24	16.00
Wax present	126	84.00
Whispered voice test		
Normal	102	68.00
Abnormal	48	32.00
Tuning fork test (Rinne test)		
Normal	135	90.00
Abnormal	15	10.00
Tuning fork test (Weber test)		
Normal	141	94.00
Abnormal	9	6.00

42% of participants had a history of a disease condition. A comprehensive systemic examination of the musculoskeletal system was performed on all participants. But the respiratory and CNS examinations were not performed in most participants. Ophthalmological examination showed cataract in 23 participants (15.33%), and 98 participants (65.33%) had decreased visual acuity. Ear examination revealed wax in the external auditory canal in most participants (126, 84%). Sixty-three participants (42%) in the study had a medical history present. The whispered-voice test was normal in 68% of participants, and in the majority, both the Weber (94%) and the Rinne (90%) tests were normal.

Table 4: Association between nature of injury and medical condition

Medical history Status	Nature of injury				
	Bruise	Concussion	Fracture	Sprain	P Value
No	20 (44.45)	7 (100)	22 (100)	38 (50)	<0.0001
Yes	25 (55.55)	0	0	38 (50)	
Vision					
Normal	16	6	21	9	0.134
Decreased	23	5	38	32	
Hearing					
Normal	41	5	33	23	0.413
Abnormal	13	2	21	12	

It was seen that a very high proportion of patients with bruise and sprain had a medical history present (55.55% and 50%) compared to the concussion and fracture, where no patient was seen to have a medical history. The trend was statistically significant (P<0.0001). No significant association was found between the nature of injury and vision/hearing

Discussion

The present study explored the association between injury type and underlying medical morbidities among geriatric patients attending a primary health care facility in an urban resettlement colony of Delhi. Injuries in older adults result from complex interactions among age-related physiological changes, chronic medical conditions, sensory impairments, and environmental exposures. Understanding these associations is essential for developing effective injury prevention strategies at the primary care level.

In the current study, the majority of injuries occurred among

individuals aged 60–69 years, with a progressive decline in injury rates with advancing age. Similar age-related patterns have been reported in previous Indian and international studies, in which the "young-old" group demonstrates greater mobility, social engagement, and exposure to environmental hazards than the "old-old," who may have restricted mobility and reduced outdoor activity.[9,10] The predominance of males among injury cases in the present study is consistent with findings from earlier studies, which attribute this trend to higher levels of outdoor activity, occupational exposure, and risk-taking behaviour among elderly men.[9,11]

A key finding of this study was a statistically significant association between medical comorbidities and injury type. Bruises and sprains were significantly more common among elderly participants with pre-existing medical illnesses, whereas concussions and fractures were observed predominantly among those without documented medical conditions. Chronic diseases such as hypertension, diabetes mellitus, osteoarthritis, and cardiovascular disorders can impair balance, muscle strength, and reaction time, thereby increasing susceptibility to minor soft tissue injuries following trivial trauma.[12,13] These findings highlight the role of medical comorbidities as important contributors to injury patterns rather than merely injury occurrence.

The absence of medical illness among participants presenting with fractures and concussions in the present study may be explained by the mechanism and severity of injury. Fractures and concussions often result from high-energy trauma such as falls from height or road traffic incidents, which can affect individuals irrespective of their underlying health status. Similar observations have been reported in other studies where severe injuries were more closely related to environmental and situational factors rather than chronic morbidity alone.[14,15] This underscores the multifactorial nature of injury causation among the elderly.

Visual impairment was common in the study population, with nearly two-thirds of participants demonstrating reduced visual acuity. However, no statistically significant association was observed between visual impairment and the nature of injury. While poor vision has been widely recognized as a risk factor for falls and injuries among older adults,[16] the lack of association in the present study may be attributed to the limited sample size or the predominance of minor injuries. Additionally, compensatory behaviours such as cautious ambulation and environmental familiarity among visually impaired elderly individuals may reduce the severity of injuries sustained.

Similarly, hearing impairment did not show a significant association with injury type in this study. Although impaired hearing can affect spatial awareness and response to environmental cues, its direct relationship with specific injury patterns remains inconsistent across studies.[17] The findings suggest that while sensory impairments are prevalent among the elderly, their influence on the nature of injury may be modified by behavioural adaptation and social support.

The results of this study have important public health implications. The strong association between medical comorbidities and minor injuries such as bruises and sprains emphasizes the need for routine screening and optimal management of chronic diseases in geriatric populations. Primary health care settings serve as a crucial point for early identification of high-risk individuals and implementation of targeted interventions, including balance training, medication review, physiotherapy, and health education.[18]

Conclusion

This study demonstrates a significant association between underlying medical morbidities and the nature of injuries among geriatric patients attending a primary health care facility in an urban area of Delhi. Minor soft tissue injuries, such as bruises and sprains, were more frequently observed among elderly individuals with pre-existing medical conditions. In contrast, fractures and concussions were predominantly seen in those without documented medical illnesses. No significant association was observed between sensory impairments, including vision and hearing, and the nature of injuries.

The findings emphasize the importance of comprehensive geriatric assessment, particularly identification and optimal management of chronic medical conditions, as an integral component of injury prevention strategies. Strengthening primary health care services to include routine screening for medical comorbidities, functional limitations, and fall risk assessment can help reduce injury-related morbidity among older adults. Further longitudinal studies are recommended to elucidate causal pathways better and guide targeted preventive interventions for the geriatric population.

Data availability statement: The data used to support the conclusions of this study can be obtained from the corresponding author upon reasonable request. Public sharing of the data is restricted due to ethical considerations and the presence of confidential participant information.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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