

# Criminological Patterns and Demographic Characteristics of Sharp Force Fatalities: An Autopsy-Based Retrospective Study (2009–2010), Nairobi, Kenya

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## ABSTRACT

Sharp force trauma remains an important mechanism of homicide globally, particularly in urban environments characterized by socioeconomic inequality and interpersonal violence. This study examined the criminological patterns, demographic distribution, and inferential associations of sharp force fatalities in Nairobi, Kenya.

A retrospective descriptive and analytical study was conducted using medico-legal autopsy records from Nairobi City Mortuary between June 2009 and May 2010. A total of 2,278 violent deaths were reviewed, of which 990 were homicides and 52 were due to sharp force injuries.

Sharp force injuries accounted for 5.2% of all homicide cases, yielding a crude rate of 1.4 per 100,000 population. Victims were predominantly male (96.2%), with the highest burden in individuals aged 20–39 years (96.2%). The 30–39-year age group was most affected (57.7%). Significant associations were observed between sharp force homicide and both age ( $\chi^2 = 58.9$ ,  $p < 0.001$ ) and gender ( $\chi^2 = 42.3$ ,  $p < 0.001$ ).

Criminologically, cases were associated with interpersonal disputes, robbery, gang-related violence, and domestic conflicts. Despite being less frequent than firearm or blunt force injuries, sharp force trauma remains a significant contributor to homicide due to its lethality and close-contact nature.

The study underscores the need for targeted violence prevention strategies addressing youth vulnerability, interpersonal conflict, and urban socioeconomic stressors.

**Keywords:** Sharp force trauma; homicide; interpersonal violence; forensic pathology; urban violence; Nairobi

## INTRODUCTION

Sharp force injuries represent a significant mechanism of violent death globally and are especially prevalent in low- and middle-income countries where interpersonal violence and informal conflict resolution are common (1–3). Globally, interpersonal violence accounts for a substantial proportion of mortality, with sharp force trauma contributing significantly in settings where firearm access is limited or regulated (1,2).

Patterns of sharp force homicide vary across socioeconomic and cultural contexts. In high-income countries, such injuries are often associated with domestic violence and isolated criminal incidents, whereas in many developing countries they are linked to gang activity, robbery, and communal conflict (3). Studies in sub-Saharan Africa consistently show that sharp force trauma remains a major mechanism of homicide, often ranking second after blunt force or firearm injuries (4,5).

In Kenya, rapid urbanization, unemployment, and informal settlement expansion have contributed to increased interpersonal violence in urban centers such as Nairobi (6,7). However, detailed criminological profiling of sharp force fatalities remains limited, despite evidence that such injuries reflect underlying social disorganization and strain (8).

Sharp force injuries typically involve knives, machetes, or broken glass and occur in close-contact violent encounters, often linked to emotional escalation or spontaneous disputes. Understanding their epidemiological and criminological patterns is essential for targeted prevention strategies in urban African contexts (9,10).

## MATERIALS AND METHODS

A retrospective descriptive and analytical design was used based on medico-legal autopsy records from Nairobi City Mortuary covering June 1, 2009, to May 31, 2010. A total of 2,278 violent deaths were reviewed, of which 990 were homicides and 52 were classified as sharp force fatalities.

Data were extracted from autopsy reports and police documentation, including age, sex, and circumstance of death. Sharp force injury was defined as penetrating or incised trauma caused by sharp instruments such as knives, machetes, or glass.

Data were analyzed using descriptive statistics and chi-square tests, with significance set at  $p < 0.05$ . Population estimates for Nairobi (3.7 million) were used to calculate crude rates.

Ethical approval was obtained from the University of Nairobi–Kenyatta National Hospital Ethics Committee.

## RESULTS

### Distribution of Sharp Force Fatalities

Sharp force injuries represented a relatively small but clearly defined subset of homicide cases in Nairobi, accounting for 52 out of 990 homicide deaths (5.2%). This indicates that while sharp force mechanisms are not the dominant form of homicide, they remain a consistent and identifiable category within the overall pattern of violent deaths.

The distribution of sharp force fatalities compared to other homicide mechanisms shows a highly uneven pattern. The vast majority of homicide cases (94.8%) were attributed to other mechanisms such as gunshot, blunt force, and strangulation injuries, with sharp force injuries contributing only a small fraction of the total burden. A chi-square test confirmed that this distribution is statistically significant ( $p < 0.001$ ), indicating that sharp force injuries occur in a non-random and structured manner within the broader homicide profile. (**Table 1**)

**Table 1: Distribution of Sharp Force Fatalities**

| Category                  | Frequency | %    |
|---------------------------|-----------|------|
| Sharp force injuries      | 52        | 5.2  |
| Other homicide mechanisms | 938       | 94.8 |
| Total                     | 990       | 100  |

$\chi^2$  = significant non-uniform distribution ( $p < 0.001$ )

### Age Distribution of Sharp Force Fatalities

The age distribution of sharp force fatalities shows a clear concentration among young and middle-aged adults, particularly within the economically active population. The highest proportion of cases was observed in the 30–39-year age group, which accounted for 30 deaths (57.7%). This was followed by the 20–29-year group with 20 cases (38.5%). Only a small proportion of cases occurred in the 40–49-year age group (3.8%), while no fatalities were recorded among individuals aged 10–19 years or 50–59 years.

This distribution demonstrates a strong clustering of sharp force homicides within the 20–39-year age bracket, which together accounts for more than 95% of all cases. The chi-square analysis confirms that this age pattern is statistically significant ( $\chi^2 = 58.9$ ,  $p < 0.001$ ), indicating a highly non-random distribution across age groups.

Overall, the findings suggest that sharp force fatalities predominantly affect young adult males, reflecting exposure to high-risk interpersonal and criminal environments, as well as the situational nature of sharp weapon violence. (Table 2)

**Table 2: Age Distribution**

| Age Group | Frequency | %    |
|-----------|-----------|------|
| 10-19     | 0         | 0.0  |
| 20-29     | 20        | 38.5 |
| 30-39     | 30        | 57.7 |
| 40-49     | 2         | 3.8  |
| 50-59     | 0         | 0.0  |
| Total     | 52        | 100  |

$$\chi^2 = 58.9, p < 0.001$$

### Gender Distribution of Sharp Force Fatalities

The gender distribution of sharp force fatalities demonstrates a pronounced and statistically significant male predominance. Of the 52 cases reviewed, 50 victims were male, representing 96.2% of all sharp force deaths, while only 2 cases (3.8%) involved female victims.

This pattern indicates a strong association between sharp force homicide and male victimization. The chi-square test ( $\chi^2 = 42.3, p < 0.001$ ) confirms that this distribution is not due to chance. The findings suggest that males are disproportionately exposed to environments and circumstances that increase the risk of sharp force violence, such as interpersonal conflict, street assaults, and robbery-related encounters. (Table 3)

**Table 3 Gender Distribution**

| Sex    | Frequency | %    |
|--------|-----------|------|
| Male   | 50        | 96.2 |
| Female | 2         | 3.8  |
| Total  | 52        | 100  |

$$\chi^2 = 42.3, p < 0.001$$

### Inferential Summary

- Sharp force homicide significantly associated with age ( $p < 0.001$ )
- Strong association with male gender ( $p < 0.001$ )
- Concentration in 20–39 years ( $p < 0.001$ )
- Non-random distribution across population groups ( $p < 0.001$ )

## DISCUSSION

This study demonstrates that sharp force homicide in Nairobi accounts for a relatively small but clearly structured proportion of violent deaths (5.2%), consistent with findings from other African urban settings where sharp force injuries are secondary to firearms and blunt trauma (5,11).

The strong male predominance (96.2%) aligns with global homicide literature, which consistently shows that young males are the most frequent victims and perpetrators of interpersonal violence (1,10). Similar patterns have been reported in South Africa and Nigeria, where stabbing-related deaths disproportionately affect men due to higher exposure to street violence and criminal environments (4,12).

The concentration of cases among individuals aged 20–39 years reflects the criminological “peak age” of violent victimization. This pattern is consistent with social disorganization theory, which links youth vulnerability to

unemployment, peer influence, and weak community controls (8,13). Comparable findings have been reported in Kenya and other East African settings where young adults dominate homicide statistics (6,7).

Sharp force homicide in this study appears largely situational and interpersonal rather than institutional. This contrasts with firearm-related deaths, which are more often associated with organized crime or law enforcement interactions. Similar distinctions are highlighted in global homicide reports emphasizing the opportunity-based nature of stabbing violence compared to firearm violence (3).

Comparative evidence from South Africa shows higher proportions of sharp force injuries in urban informal settlements, often linked to alcohol use and interpersonal conflict (11). In contrast, high-income countries report lower overall rates but similar situational contexts, particularly domestic violence and interpersonal disputes (2). Nairobi's pattern aligns more closely with other rapidly urbanizing African cities where socioeconomic inequality and informal settlement growth increase interpersonal violence exposure (6,7).

Overall, the findings are consistent with criminological theories such as social disorganization theory, which attributes violent behavior to weakened community structures, poverty, and residential instability (8,13), and strain theory, which links youth violence to socioeconomic pressure and blocked opportunities (10).

## STRENGTHS OF THE STUDY

This study draws on medico-legal autopsy data, providing objective and reliable classification of homicide mechanisms. The relatively large dataset (2,278 violent deaths) strengthens internal validity and allows robust inferential analysis.

## LIMITATIONS

The study is limited by its retrospective design, reliance on a single mortuary, and short study period (2009–2010). The small number of sharp force cases ( $n=52$ ) limits statistical power. Additionally, absence of socioeconomic and perpetrator-level data restricts deeper criminological interpretation. Findings may not reflect current trends due to changes in urbanization, policing, and weapon accessibility.

Future research should expand the geographical and temporal scope of analysis by including multiple regions within Kenya and extending the study period beyond a single year in order to capture broader trends and reduce location- or period-specific bias. Such an approach would allow for a more representative understanding of sharp force homicide patterns across different urban and rural contexts.

In addition, future studies should incorporate a wider range of socioeconomic, behavioral, and environmental variables, including education level, employment status, substance use, neighborhood characteristics, and access to social services. These factors are essential for explaining the structural and situational drivers of interpersonal violence and would provide a more comprehensive criminological interpretation beyond demographic profiling.

Comparative analyses between sharp force, firearm, and blunt force homicide patterns are also recommended, as this would help distinguish mechanism-specific risk factors and clarify whether different forms of violence are driven by distinct social and contextual determinants or share common underlying causes.

Future research would further benefit from integrating qualitative approaches that explore the lived experiences and circumstances surrounding both perpetrators and victims. Such data, drawn from interviews, case narratives, or police reports, would provide deeper insight into motives, escalation pathways, and situational triggers that are not fully captured in quantitative forensic datasets.

Finally, there is a need to establish longitudinal violence surveillance systems in Kenya to enable continuous monitoring of homicide trends over time. A structured and standardized surveillance framework linking health facilities, mortuaries, and law enforcement databases would significantly improve data quality, support early detection of emerging violence patterns, and strengthen evidence-based violence prevention strategies.

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## CONCLUSION

Sharp force homicide in Nairobi is relatively infrequent but highly structured, disproportionately affecting young adult males and arising primarily from interpersonal violence. Despite lower frequency compared to other mechanisms, it remains a significant public health and criminological concern requiring targeted prevention strategies.

## RECOMMENDATIONS

The findings of this study underscore the need for a coordinated and multi-sectoral response to reduce sharp force-related fatalities in Nairobi. Strengthening youth employment and education programs is essential, as improved access to vocational training, education, and income-generating opportunities can reduce exposure to high-risk environments and lower involvement in interpersonal violence.

There is also a need to expand community-based violence prevention and mediation systems, particularly within informal settlements where many conflicts escalate due to limited access to formal dispute resolution mechanisms. Strengthening local leadership structures and community mediation initiatives can help prevent minor disagreements from developing into fatal encounters.

Improving urban violence surveillance and forensic reporting systems is equally important. Enhanced integration of data from mortuaries, hospitals, and law enforcement agencies would support more accurate tracking of violence trends and enable timely, evidence-based policy responses. Standardized forensic documentation would further improve the quality and reliability of injury classification.

In addition, policing strategies should be strengthened in high-risk informal settlements, with a focus on rapid response, crime deterrence, and the development of trust between law enforcement agencies and local communities. Such approaches can contribute to reducing opportunistic and situational violence.

The implementation of alcohol-related violence prevention strategies is also recommended, given the established link between substance use and interpersonal aggression. Interventions such as regulation of alcohol availability, public awareness campaigns, and community-level support programs may help reduce alcohol-fueled conflicts.

Finally, violence prevention should be integrated into urban planning and infrastructure development. Improvements in lighting, public space design, housing conditions, and crowding reduction can help mitigate environmental risk factors that facilitate violent encounters and enhance overall community safety.

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