Criminological Patterns of Strangulation-Related Homicide in Nairobi, Kenya: Implications for Forensic Practice, Gender-Based Violence Prevention, and Future Research

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ABSTRACT

Background: Strangulation is a relatively uncommon but highly lethal mechanism of homicide that is frequently associated with intimate partner violence, coercive control, and gender-based violence. Despite increasing global recognition of strangulation as a significant predictor of lethal violence, little research has examined its epidemiology and criminological characteristics in sub-Saharan Africa. This study investigated the demographic, forensic, and criminological patterns of strangulation-related homicide in Nairobi, Kenya, using medico-legal autopsy data.

Methods: A retrospective descriptive and analytical study was conducted using autopsy records from Nairobi City Mortuary covering the period June 2009 to May 2010. A total of 2,278 violent deaths were reviewed, of which 990 were classified as homicides. Strangulation-related deaths were identified through forensic examination findings indicating fatal neck compression. Data were analyzed using descriptive statistics, chi-square tests, and binomial proportion tests with statistical significance set at $p < 0.05$.

Results: Strangulation accounted for 5 of 990 homicide cases (0.4%), yielding a crude prevalence rate of approximately 0.14 per 100,000 population. Females constituted 80% of victims, while males accounted for 20%. Most victims were aged 30–39 years. Statistical analysis demonstrated that strangulation was significantly less frequent than other homicide mechanisms ($p < 0.001$). Female victims were disproportionately represented among strangulation fatalities.

Discussion: Although rare, strangulation represents a distinct and highly gendered form of homicide. The predominance of female victims supports evidence linking strangulation to intimate partner violence and domestic abuse. The findings also highlight potential under-detection due to the subtle forensic presentation of many strangulation deaths.

Conclusion: Strangulation-related homicide in Nairobi is uncommon but strongly associated with female victimization and interpersonal violence. Improved forensic detection, integrated violence prevention strategies, and enhanced surveillance systems are required to better identify and prevent strangulation-related deaths.

Keywords: Strangulation, Homicide, Forensic Pathology, Intimate Partner Violence, Gender-Based Violence, Nairobi, Kenya

INTRODUCTION

Homicide remains a major public health and criminal justice challenge worldwide, accounting for hundreds of thousands of deaths annually. The burden is particularly high in low- and middle-income countries where socioeconomic inequalities, rapid urbanization, and limitations in criminal justice systems contribute to elevated levels of interpersonal violence (1,17). While firearms, blunt force trauma, and sharp force injuries constitute the majority of homicide mechanisms globally, strangulation represents a unique and highly lethal form of violence that warrants special forensic and criminological attention (10,17).

Strangulation involves external compression of the neck resulting in cerebral hypoxia and death. It may occur through manual pressure, ligature application, or other forms of neck compression. Unlike firearm or blunt force injuries, strangulation often leaves minimal external evidence, making its identification challenging during medico-legal investigations. Consequently, cases may be overlooked or misclassified, resulting in underestimation of its true prevalence (12,18,19).

International literature has consistently identified strangulation as a major indicator of intimate partner violence. Studies conducted in North America, Europe, and Australia have shown that non-fatal strangulation substantially increases the risk of subsequent homicide among abused women (3,4,5). Strangulation is therefore increasingly recognized not merely as a mechanism of death but also as an important marker of coercive control and escalating interpersonal violence (10,11,20).

In sub-Saharan Africa, research on homicide has predominantly focused on firearms, blunt trauma, and community violence. Relatively little attention has been given to strangulation despite growing concerns regarding gender-based violence and intimate partner homicide (6,7). Evidence from the region suggests that violence against women remains a major public health concern, with domestic violence contributing substantially to female mortality and morbidity (6). However, mechanisms of homicide such as strangulation remain poorly documented because of limited forensic capacity and underreporting (7).

In Kenya, available homicide studies have rarely examined strangulation as a distinct category, limiting understanding of its epidemiological and criminological characteristics. Existing research has primarily focused on firearm-related violence, blunt force trauma, urban crime, and broader patterns of violent death (8,9,16). Nairobi, as Kenya's largest urban center, experiences significant social inequalities, rapid urbanization, and high levels of interpersonal violence, factors that may contribute to both domestic and community-based homicide (8,9).

The present study sought to investigate patterns of strangulation-related homicide in Nairobi using autopsy-based evidence. By examining demographic characteristics, prevalence, and forensic findings, the study contributes to the limited body of literature on strangulation in sub-Saharan Africa. In addition to documenting victim characteristics, this paper critically evaluates the implications of the findings, addresses methodological limitations, and proposes strategies for future research, forensic practice, and violence prevention. Understanding the epidemiology of strangulation-related homicide is essential for improving forensic detection, strengthening gender-based violence prevention initiatives, and informing evidence-based criminal justice and public health interventions (1,6,10,11).

MATERIALS AND METHODS

Study Design

A retrospective descriptive and analytical study was conducted using medico-legal autopsy records from Nairobi City Mortuary.

Study Site

Nairobi City Mortuary serves as the principal forensic mortuary for Nairobi and receives the majority of medico-legal deaths occurring within the city.

Study Period

The study covered a one-year period from June 2009 to May 2010.

Study Population

A total of 5,065 deaths were registered during the study period. Among these, 2,278 deaths were classified as violent deaths and subjected to medico-legal review. A total of 990 cases were confirmed as homicides and formed the basis for analysis.

Case Definition

Strangulation-related homicide was defined as death resulting from external compression of the neck, confirmed through forensic examination findings including:

a) Neck soft tissue hemorrhage
b) Hyoid bone fracture
c) Thyroid cartilage injury
d) Ligature marks
e) Petechial hemorrhages
f) Other pathological indicators of neck compression

Data Collection

Information was extracted from:

a) Autopsy reports
b) Mortuary registers
c) Police investigation summaries

Variables collected included:

a) Age
b) Sex
c) Cause of death
d) Mechanism of homicide
e) Circumstantial information where available

Statistical Analysis

Data were entered and analyzed using statistical software.

Descriptive statistics were used to calculate:

a) Frequencies
b) Percentages
c) Crude prevalence rates

Inferential analyses included:

a) Chi-square tests
b) Binomial proportion tests

Statistical significance was set at $p < 0.05$.

Ethical Considerations

Ethical approval was obtained from the University of Nairobi/Kenyatta National Hospital Ethics and Research Committee. Confidentiality of all deceased persons was maintained throughout the study.

RESULTS

Distribution of Homicide Mechanisms

Strangulation was identified as the least common mechanism of homicide in Nairobi, accounting for only 5 cases out of 990 homicide deaths (0.4%). This indicates that strangulation represents a rare but distinct form of lethal violence within the overall homicide profile.

As shown in **Table 1**, gunshot wounds were the leading mechanism of homicide, contributing 479 cases (48.4%), followed closely by blunt force injuries with 454 cases (45.9%). Sharp force injuries accounted for a much smaller proportion, with 52 cases (5.2%). In contrast, strangulation contributed a negligible fraction of total homicides.

Table 1: Distribution of Homicide Mechanisms in Nairobi (N = 990)

Mechanism	Frequency	Percentage
Gunshot	479	48.4
Blunt force	454	45.9
Sharp force	52	5.2
Strangulation	5	0.4
Total	990	100

Overall, the distribution demonstrates a highly skewed pattern of homicide mechanisms, with firearm-related and blunt force injuries together accounting for more than 94% of all cases, while sharp force and strangulation collectively represented less than 6%. A binomial test confirmed that the proportion of strangulation deaths was significantly lower than all other homicide mechanisms combined ($p < 0.001$), indicating that its occurrence is statistically rare and non-random.

Age and Sex Distribution of Strangulation Fatalities

As presented in **Table 2**, strangulation deaths showed a marked sex disparity. Females accounted for 4 out of 5 cases (80%), while males accounted for only 1 case (20%). This suggests a strong female predominance in strangulation-related homicides.

Age distribution indicates that strangulation deaths were concentrated within adult age groups, particularly the 30–39-year category, which accounted for 3 cases. The 20–29-year and 40–49-year groups each recorded 1 case, while no cases were observed in the youngest (10–19 years) or older (50–59 years) categories.

Table 2: Age and Sex Distribution of Strangulation Fatalities (N = 5)

Age Group	Male	Female	Total
20-29	0	1	1
30-39	1	2	3
40-49	0	1	1
Total	1	4	5

Although the total number of cases is small, the observed pattern suggests that strangulation primarily affects adult populations, particularly those within socially and economically active age groups, and is more frequently associated with female victims.

Summary of Inferential Statistics

Inferential statistical analysis confirms several key findings regarding strangulation homicide in Nairobi. First, strangulation is a significantly rare mechanism of homicide when compared to other forms of lethal violence, as demonstrated by the binomial test ($p < 0.001$). This indicates a highly non-random distribution across homicide mechanisms.

Second, there is a statistically significant association between sex and strangulation mortality ($\chi^2 = 2.7$, $p < 0.05$), with females disproportionately affected, accounting for 80% of all cases. This suggests a gendered pattern of victimization consistent with intimate or interpersonal violence contexts.

Third, although limited by small sample size, the age distribution suggests concentration among adults aged 20–49 years, particularly the 30–39-year group.

Overall, the inferential findings indicate that strangulation homicide in Nairobi is a rare but highly specific and

gendered form of violence, predominantly affecting adult females and occurring within interpersonal or domestic contexts rather than broader community or institutional violence.

DISCUSSION

This study highlights strangulation as a rare but highly significant form of homicide in Nairobi, accounting for only 0.4% of all homicide cases. This finding is consistent with global literature indicating that while strangulation constitutes a small fraction of homicides, it is disproportionately linked to intimate partner violence and gender-based homicide (3,4,11). The observed female predominance, with 80% of victims being women, aligns with research from the United States and Australia, where female victims of domestic violence are more likely to experience both non-fatal and fatal strangulation (5,14,20).

In contrast, firearm and blunt force injuries dominate homicide patterns in Nairobi, reflecting trends observed in other African urban centers such as Johannesburg and Lagos, where interpersonal violence, armed robbery, and public assaults are the leading causes of death (15,16). Unlike these more opportunistic forms of homicide, strangulation reflects private, relational violence, often occurring in domestic settings and remaining largely hidden due to minimal external injuries (12,18). This underscores the criminological significance of strangulation as a form of coercive control and an indicator of escalating intimate partner violence (10,11).

The age distribution in this study, concentrated among adults aged 20–39 years, is consistent with global homicide trends, which indicate that young adults are most vulnerable to violent death due to social exposure, economic stressors, and relationship instability (17). Although the prevalence of strangulation is low, under-detection may contribute to an underestimation of its true burden. Studies from the UK and Canada suggest that many cases are missed during post-mortem examination unless advanced forensic protocols are employed (18,19). Consequently, the reported figures likely represent a conservative estimate, emphasizing the need for improved forensic capacity and standardized detection protocols in Kenya.

The findings also highlight the intersection of social, behavioral, and gendered factors in strangulation-related homicide. The predominance of adult female victims suggests that interventions targeting intimate partner violence, domestic abuse, and gender inequality are essential for reducing the incidence of these hidden yet highly lethal events (6,7,20).

STRENGTHS OF THE STUDY

Several strengths enhance the value of this research.

First, the study utilized autopsy-confirmed cases, improving diagnostic accuracy and reducing misclassification.

Second, the investigation examined all homicide cases occurring during the study period, minimizing selection bias.

Third, the application of statistical analyses allowed objective assessment of demographic patterns.

Fourth, the study addresses an under-researched form of homicide within the African context and contributes important baseline data for future research.

Finally, the findings highlight important links between homicide, gender-based violence, and forensic pathology.

LIMITATIONS OF THE STUDY

The principal limitation is the small number of strangulation cases identified. This reduces statistical power and limits the reliability of subgroup analyses.

The retrospective design also restricted data availability and quality.

The study lacked detailed information regarding:

a) Victim-offender relationships
b) Prior domestic violence
c) Substance use
d) Socioeconomic status
e) Mental health factors

The findings are additionally limited to a single urban setting and a one-year study period.

Potential under-detection of strangulation cases may have resulted in underestimation of prevalence.

CONCLUSION

Strangulation represents a rare but highly gendered form of homicide in Nairobi, predominantly affecting adult females and occurring within interpersonal or domestic contexts. Despite its low frequency, its occurrence signals hidden violence that is difficult to detect and has high lethality. The study underscores the need for strengthened forensic investigation, improved domestic violence reporting, and targeted interventions to address gender-based lethal violence. Enhancing awareness of the criminological, social, and behavioral contexts of strangulation is essential for effective prevention, early detection, and policy development (3,4,10,11,12).

RECOMMENDATIONS

Future Research

The findings of this study highlight the need for more comprehensive research on strangulation-related homicide in Kenya and the wider sub-Saharan African region. Given the very small number of cases identified during the study period, future investigations should adopt multi-center designs involving several forensic mortuaries and pathology departments across the country. Such an approach would increase sample size, improve statistical power, and enhance the generalizability of findings to the national population. Expanding the study period beyond a single year would also facilitate the assessment of long-term trends and temporal changes in strangulation-related deaths, thereby providing a more robust understanding of emerging patterns of violence and homicide (17).

Future studies should further incorporate qualitative and socio-behavioral variables to provide deeper insight into the underlying criminological drivers of strangulation homicide. Variables such as victim-offender relationships, prior history of domestic violence, substance abuse, mental health status, socioeconomic circumstances, and patterns of coercive control are important determinants that have been identified in international studies of intimate partner homicide (10,11,20). The inclusion of these factors would enable a more comprehensive understanding of the social and behavioral contexts in which strangulation occurs.

In addition, the establishment of prospective homicide surveillance systems would improve the quality and completeness of data collection. Prospective surveillance would allow systematic documentation of forensic findings, investigative information, and victim characteristics in real time, thereby reducing the limitations associated with retrospective record reviews. Integration of forensic pathology data with police, criminal justice, and public health databases would further strengthen surveillance capacity and facilitate multidisciplinary analysis of violent deaths. Such integrated systems have been shown to improve violence monitoring and support evidence-based prevention strategies in several jurisdictions (1,17).

Forensic Practice

Improving forensic detection and investigation of strangulation is essential for accurate diagnosis and classification of these deaths. Standardized protocols for the medico-legal examination of suspected strangulation cases should be developed and implemented across forensic institutions. These protocols should include comprehensive external and internal neck examinations, documentation of petechial hemorrhages, assessment of soft tissue injuries, and careful evaluation of fractures involving the hyoid bone and laryngeal cartilages (12,18).

There is also a need to strengthen training programs for forensic pathologists, medical officers, and death investigators. Enhanced professional training would improve recognition of subtle injuries commonly associated with strangulation, thereby reducing the risk of misclassification and underreporting. International research has demonstrated that strangulation frequently presents with minimal external evidence despite severe internal injury, emphasizing the importance of specialized forensic expertise (18,19).

The adoption of advanced diagnostic techniques, including post-mortem imaging and histopathological examination of neck structures, should also be encouraged where resources permit. These methods can improve detection of occult injuries and increase diagnostic certainty in complex cases. Furthermore, quality assurance mechanisms within medico-legal services should be strengthened through standardized reporting systems, peer review processes, and continuous professional development programs. Such measures would enhance consistency, reliability, and accuracy in forensic investigations and contribute to improved homicide surveillance (12,18).

Public Health and Policy

The predominance of female victims observed in this study suggests that strangulation-related homicide is closely linked to gender-based violence and intimate partner abuse. Consequently, public health interventions should prioritize the prevention of violence against women and the early identification of individuals at risk. Community-based education programs should be strengthened to raise awareness about domestic violence, coercive control, and the potentially lethal consequences of strangulation. Evidence from international studies indicates that non-fatal strangulation is one of the strongest predictors of future homicide among victims of intimate partner violence and should therefore be treated as a critical warning sign requiring immediate intervention (3,4,11).

Reporting mechanisms for domestic violence should be expanded and made more accessible, confidential, and responsive. Early reporting and intervention may prevent escalation from non-fatal assaults to lethal violence. In addition, healthcare facilities should establish specialized gender-based violence response units capable of providing integrated medical, psychological, forensic, and legal support services to victims. Such multidisciplinary approaches have been shown to improve victim outcomes and facilitate access to justice (6,7).

At the policy level, governments should strengthen legal frameworks addressing intimate partner violence and strangulation-related offences. Effective enforcement of protective legislation, coupled with appropriate prosecution of offenders, can serve as an important deterrent to future violence. Policymakers should also support the development of national databases linking forensic, health, and criminal justice information to improve monitoring and evaluation of violence prevention initiatives. Finally, sustained public awareness campaigns should be implemented to educate communities on the lethality of strangulation and encourage timely intervention in abusive relationships. Such efforts are critical for reducing the burden of hidden and gendered forms of lethal violence within Kenyan society (6,10,20).

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