South Africa's male homicide epidemic: Who is killing men and why do we ignore the victims?

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DATES:
Received: 21 June 2024
Revised: 07 Nov. 2024
Accepted: 06 Feb. 2025
Published: 27 Mar. 2025

HOW TO CITE:
Matzopoulos R, Cornell M, Bowman B, Martin LJ, Jewkes R, Abrahams N. South Africa's male homicide epidemic: Who is killing men and why do we ignore the victims? S Afr J Sci. 2025;121(3/4), Art. #18875. https://doi.org/10.17159/sajs.2025/18875

ARTICLE INCLUDES:
☒ Peer review
☐ Supplementary material

DATA AVAILABILITY:
☐ Open data set
☐ All data included
☒ On request from author(s)
☐ Not available
☐ Not applicable

EDITOR:
Floretta Boonzaier

Two recent articles highlighted that ~90% of homicide victims in South Africa in 2017 were men. Here we present summary methods and findings and reflect on why there has been no concerted public health response to address the massive sex disparity in homicide risk. Based on routine data collected through forensic and police investigations, we found that male homicide rates were higher than female homicide rates across all ages, and were up to 8.4 times higher among youths and young adults. There was considerable interprovincial variation, with the highest male:female incidence rate ratio of 11.4 recorded in the Western Cape. Of the perpetrators, 93% were men, and usually acquaintances (63%). Most deaths were the result of sharp force injuries (stabbing), with gunshots the second leading cause. Of the 7% of men killed by female perpetrators, 60% were killed by their intimate partners. There were distinct temporal patterns associated with alcohol use. Male homicides were clustered around festive periods and school holidays. Amongst perpetrators, alcohol use was reported in 50% of homicides by acquaintances and 41% of homicides by family members, but other drug use was less common (9% overall). The omission of men from the prevention agenda is an equity issue that affects not only men, but also women and children in South Africa's most marginalised communities. Broad population-based approaches are required to address the insidious effect of recalcitrant societal norms and structural interventions to overcome the root causes of poverty and inequality and the poor control of alcohol and firearms.

Significance:

Two recent articles, Matzopoulos et al. (PLOS Glob Public Health 2023;3(11), e0002595) and Matzopoulos et al. (BMJ Global Health 2024;9, e014912) highlighted that ~90% of homicide victims in South Africa in 2017 were men, thereby confirming that men are especially vulnerable to fatal violence. We present summary methods and findings and reflect on why there has been no concerted public health response to address this massive sex disparity in homicide risk.

Introduction

As victims and perpetrators, adult men are implicated in most homicides. However, in South Africa, very little is known about these men, except as perpetrators of female and child homicides. The South African Medical Research Council's response was to fund a comprehensive Female and Male Homicide and Injury Mortality Study. This study followed the methodology used in national female homicide studies for 1999 and 2009[1,2], but comparable information describing the personal and situational risks for male victims was collected.

We conducted a retrospective descriptive study of routine data collected through forensic and police investigations using a multistage stratified cluster sample. Our sampling frame consisted of 58641 postmortem reports from 121 medicolegal laboratories operational in South Africa in 2017. From these, 65 mortuaries from eight provinces were selected with an expected sample of 22 733 records. These were complemented by records from 16 laboratories in the Western Cape, where the health department maintains a surveillance system with compatible data. We applied analysis weights to account for selection probabilities of laboratories within survey strata. In a second sampling process, we randomly selected 20% of cases in which the deaths of men aged ≥18 years were registered as a homicide or injury death of undetermined intent for further investigation by linking autopsy reports with police investigations. Postmortem information included age and sex, date, external cause and apparent manner of death, and blood alcohol concentration. Police information included the victim–perpetrator relationship and additional perpetrator details.

We calculated victim and perpetrator homicide rates by age, sex, race, external cause, employment status and setting, stratified by victim–perpetrator relationships and male-to-female incidence rate ratios. For perpetrators, we reported drug and alcohol use, prior convictions, gang involvement and homicide by multiple perpetrators. Further details on methods and detailed results are provided elsewhere.[3,4]

Results

Among the findings of the first study was that men accounted for 87% of homicides in 2017, with a much higher age-standardised homicide rate than women (59.7 vs. 9.0 per 100 000 population), equivalent to 7 male deaths for every 1 female death.[5] Although male individuals are known to experience higher homicide rates than female individuals globally, the relative rate for male individuals in South Africa versus the global average of 7.4:1.0 (95%CI: 6.9–8.0:1.0) was significantly higher than that for female individuals in South Africa (5.9:1.0 ;95%CI: 5.3–6.3:1.0). Male homicide rates were far higher than female homicide rates across all age groups, but particularly among youths and young adults aged 15 to 29 years, for whom the male rate of 101.2 /100 000 population was 8.4 times higher than the female homicide rate in that age category. There was considerable interprovincial variation by sex. The highest male:female incidence rate ratio of 11.4 male deaths for every female death was recorded in the Western Cape.[3,4]

KEYWORDS:
male homicide, perpetrators, violence prevention

FUNDING:
South African Medical Research Council (42060), Ford Foundation (133505), US National Institutes of Health (U01AI069924; R01 MH122308-01A1), Fogarty International Center, US National Institute of Mental Health (D43TW011308)

The perpetrator study found that men were perpetrators of 93% of male homicides. Of the 7% of men killed by female perpetrators, 60% were killed by their intimate partners. For most male homicides, perpetrators were acquaintances (63% of cases in which a main perpetrator was identified). Most deaths were the result of sharp force injuries (stabbing), with gunshots as the second leading cause.[4]

Both studies highlighted temporal patterns associated with alcohol use. Male homicides clustered around festive periods, i.e. December/Christmas and April/Easter, and the July and September school holidays. Almost half of male homicides were recorded on weekend days, when disproportionately more men than women were murdered, particularly Saturdays (9.3 male deaths for every female death). A significantly higher percentage of male homicide victims tested positive for blood alcohol (11.4 male deaths for every female death). Amongst perpetrators, alcohol use was reported in 50% of homicides by acquaintances and 41% of homicides by family members, but other drug use was less common (9% overall).

Discussion

Interpersonal violence is a major public health issue and there is a massive, disproportionate homicide risk borne by South Africa's adult men, particularly young men, consistent with global homicide patterns. In 2012, 60% of the homicides worldwide were in male individuals aged 15–44 years, making it the third leading cause of death for male individuals in this age group globally; low- and middle-income countries bear the heaviest burden, with homicide accounting for >90% of male deaths in this age group.[6]

South Africa experiences one of the highest homicide rates and disease burdens from interpersonal violence of any country.[7] However, reducing male homicide rates has not received national attention and focus. The dominant gendered narrative nationally seems to replicate the foundational aspirational assumptions of hegemonic masculinity that men are strong and invulnerable and some fighting between them is normal and acceptable.[8] It is not that men are not victims of trauma, but rather that a man experiencing trauma at times is regarded as part of 'being a man' and therefore is not problematic nor requires the focus of national policy attention. This contrasts with responses to femicide, which are much discussed and planned, including in a *National Strategic Plan on Gender-based Violence & Femicide*.[9,10] The contrasting gendered response to men's use of violence against other men is inequitable. Changing national norms on men's use of violence is critical for preventing violence against other men and violence against women.

Disproportionately high rates of homicide amongst men are not a new finding. The elevated risk was reported in previous national estimates, with male individuals accounting for 84% of homicides in 2000 and 86% in 2009.[11,12] Ignoring the modal group for a particular disease or outcome is certainly contrary to the well-established principles of good science, but not unique to interpersonal violence.

One premise is that the high homicide rates among men are ignored because men are overwhelmingly the perpetrators of violence. This may be true for adults but cannot be applied to children, with homicide rates amongst boys 70–80% higher than amongst girls from birth until 14 years, whereafter the relative rates for male individuals increase rapidly. Even among adults, ignoring male homicides is unacceptable, both in regard to male health and because violent and aggressive behaviours are passed on between peers and intergenerationally, to the detriment of society more broadly.[13] Threats to safety cut across gender, race and class, with an estimated lifetime prevalence of trauma of 73.8% according to the country's only nationally representative mental health survey.[14] These extraordinary levels of trauma have been linked to both a high prevalence of intimate partner violence and extremely high rates of all forms of homicide[1], suggesting that any relationship between trauma and interpersonal violence does not cluster by any gender specifically.

Certainly, violence at its core is gendered, and South Africa remains a country with a capacity for extremely gendered violence.[15] However, a plethora of co-occurring, complex and intersecting factors exacerbates the violence risk. These include social and economic inequality, patriarchal versions of masculinity, lack of social cohesion, alcohol, firearms, and legacies of colonialism, migrant labour, slavery, other forms of discrimination and human rights violations. For many men, achieving dominance is expected and there is a cultural condonation of the use of coercion and force to control partners.[16] Interviews with incarcerated South African men highlight that violence is considered a normative resource to establish control in their lives.[17] South Africa's troubled history, in which many men were drafted into combat, has further entrenched a militarised form of masculinity that sanctions violence as a legitimate response. Moreover, perceptions of the drivers of intimate partner violence in community-based studies of men highlight widespread alcohol abuse, rampant unemployment and patriarchal views on gender roles as critical to high levels of gendered violence.[18]

In-depth interviews with men who have killed their partners reveal life histories with numerous interrelated adverse circumstances that undermine self-esteem and self-efficacy. High levels of exposure to violence from an early age include stringent discipline (that could be regarded as abuse) from multiple caregivers, emotionally unavailable parents, absent fathers and adult substance abuse.[15] For boys exposed to domestic violence, the increased risk of violent and aggressive behaviour is not restricted to perpetrating violence against women, but also manifests at their places of work and in their communities.[19] In many poor communities, criminal gangs provide social support and recognition to young men, further entrenching antisocial and violent behaviour.[15] Collectively, this drives an intergenerational cycle of violence with men as conduits. These conditions are moderated by a set of intersecting and dynamic factors such as the class, age and sexual orientation of men across the developmental and relational stages of their lives, thus explaining the obvious fact that not all men are predisposed to violence.[20]

Although many people growing up in harsh poverty and violent contexts do not resort to crime or violence, social and economic inequality are widely considered as drivers in South Africa. Acts of criminal violence are regarded as attempts to address the experience of being 'invisible citizens' in a country where economic access is constrained.

In this sense, poverty is considered 'unbecoming' of a man in South African society, where men are frequently constructed as breadwinners, providers, physically strong, emotionally resilient and unconditionally powerful. Such roles are completely inaccessible to many men. This tension between these ideals of 'manhood' and the structural constraints on fulfilling them appears to provide at least some of the catalytic conditions for addressing conflict violently. In the domestic or familial setting, this violence is directed at intimate partners and children.[21-23] Within the context of contact crimes, in which men are significantly more at risk of experiencing violence, the mere presence of a male adult is associated with the escalation of violence towards other victims.[24]

In the public space, alcohol, which precipitates aggressive behaviour, is causally linked to interpersonal violence.[25-28] In South Africa, men are more likely than women to engage in heavy episodic drinking, the pattern most associated with an increased risk of, and vulnerability to, violent behaviour.[29] This is reflected in the gender distribution of homicides attributable to alcohol, present in 55% of male and 38% of female homicide cases, and the predominance of homicides on weekends and holidays associated with heavy episodic drinking. The immediate impact of limiting alcohol availability was demonstrated in South Africa during the COVID-19 pandemic when alcohol sales bans implemented alongside lockdown restrictions were associated with substantial reductions in non-natural deaths and trauma cases.[30,31] The epitome was possibly the empty trauma ward at Johannesburg's Chris Hani Baragwanath Hospital on New Year's Day 2021, a calendar date usually synonymous with alcohol-fuelled harm. Yet, despite the irrefutable evidence of population level reductions in violence, there has not been any sustained or meaningful attempt to change policies to restrict alcohol availability.

A similar omission relates to firearm control. Firearm deaths disproportionately affect male individuals, and the implementation of the *Firearms Control Act* was associated with significant reductions in firearm homicides nationally for a decade from the early 2000s. Since then, lapses in firearm control measures and poor enforcement have been associated with a surge in gun deaths, with male individuals accounting for the larger share of the increase.[32]

In summary, a now robust body of research highlights patterns and prominent risk factors for male homicide. Critically, it confirms both the wilful neglect of male violence as a public health priority and a lack of political will to implement evidence-based interventions. The omission of men from the prevention agenda is an equity issue that affects not only men, but also women and children in South Africa's most marginalised communities. We believe our analysis provides new data on the differences between male and female homicide victims, and insights into the perpetrators of homicide that can inform interventions to reduce homicide risks overall.

Broad population-based approaches to address the insidious effect of recalcitrant societal norms are a central tenet. Concurrently, structural interventions are needed to overcome the root causes of poverty and inequality and the poor control of alcohol and firearms. The slow pace of change for social determinants may be because they are notoriously difficult to address; however, the powerful alcohol and gun lobbies share much of the responsibility for the lack of profound change.

We hope that this research will not only influence policy by highlighting this pressing public health issue, but also help to foster the nascent but critical research agenda in men's health issues, and that the data can serve as a resource for other scholars. Only through challenging the normative perception of male invulnerability do we begin to address the enormous burden of violence impacting men, which ultimately affects all people, everywhere.

Acknowledgements

We are grateful for the support of forensic pathology services across all provinces. In particular, we thank Professor Emeritus Gert Saayman of the Department of Forensic Medicine, Faculty of Health Sciences, University of Pretoria; Prof. Jeanine Vellema, Retired Head of the Clinical Department of the Gauteng Department of Health Forensic Pathology Service Southern Cluster and an Honorary Member of the University of the Witwatersrand Division of Forensic Medicine and Pathology; Dr Sibusiso Ntsele of the eThekwini Forensic Pathology Services, KwaZulu-Natal Department of Health, Durban, South Africa; and Prof. Thakadu Mamashela.

Funding

The study was funded by the South African Medical Research Council (42060 to R.M.) and the Ford Foundation (133505 to N.A.). This work was supported by the US National Institutes of Health (U01AI069924 and R01 MH122308-01A1 to M.C.) and the Fogarty International Center and the US National Institute of Mental Health (D43TW011308 to M.C.). The funders had no role in study design, data collection and analysis, the decision to publish, or preparation of the manuscript.

Data availability

Availability of data used in the study is subject to permission being granted by the Health Research Ethics Committee and provincial authorities that approved the original study. This is a recently completed study and the data set will initially be used for capacity development among the emerging researchers on the study team. Thereafter, access to a de-identified data set will be made available upon reasonable request. Requests should be sent to the convenor of the SAMRC's Research Ethics Office, Ms Adri Labuschagne (Adri.Labuschagne@mrc.ac.za), for consideration. Guidelines for applications and related materials are available at: https://www.samrc.ac.za/research/rio-research-ethics-office. A period of 24 months after publication of the main study results should elapse before requests are made, to allow the authors to publish sub-studies and further analyses, but we welcome approaches to progress collaborative research, provided that emerging researchers on the study team can be included.

Declarations

We have no competing interests to declare. We have no AI or LLM use to declare. R.M., R.J. and N.A. receive salaries from the South African Medical Research Council. Ethical approval was granted by the SAMRC (EC 008-5- 2018). Permission to access data was obtained from the National and Provincial Departments of Health and the police.

Authors' contributions

R.M.: Conceptualisation, methodology, data analysis, writing – initial draft, writing – revisions, project leadership, funding acquisition. M.C.: Conceptualisation, writing – initial draft, writing – revisions. B.B.: Conceptualisation, writing – initial draft. L.J.M.: Conceptualisation, methodology, writing – revisions, read and approved final version. R.J.: methodology, writing – revisions. N.A.: Conceptualisation, methodology, data collection, data analysis, validation, data curation, writing – revisions, project leadership, project management, funding acquisition. All authors read and approved the final version.

References

1. Abrahams N, Jewkes R, Martin LJ, Mathews S, Vetten L, Lombard C. Mortality of women from intimate partner violence in South Africa: A national epidemiological study. Violence Vict. 2009;24(4):546–556. https://doi.org/10.1891/0886-6708.24.4.546
2. Abrahams N, Mathews S, Martin LJ, Lombard C, Jewkes R. Intimate partner femicide in South Africa in 1999 and 2009. PLoS Med. 2013;10(4), e1001412. https://doi.org/10.1371/journal.pmed.1001412
3. Matzopoulos R, Prinsloo MR, Mhlongo S, Marineau L, Cornell M, Bowman B, et al. South Africa's male homicide epidemic hiding in plain sight: Exploring sex differences and patterns in homicide risk in a retrospective descriptive study of postmortem investigations. PLOS Glob Public Health. 2023;3(11), e0002595. https://doi.org/10.1371/journal.pgph.0002595
4. Matzopoulos R, Marineau L, Mhlongo S, Ketelo A, Prinsloo M, Dekel B, et al. Who is killing South African men? A retrospective descriptive study of forensic and police investigations into male homicide. BMJ Glob Health. 2024;9(4), e014912. https://doi.org/10.1136/bmjgh-2023-014912
5. Global Burden of Disease Collaborative Network. GBD 2017 and 2019 results [webpage on the Internet]. c2020 [cited 2021 Mar 15]. Available from: http://ghdx.healthdata.org/gbd-results-tool

6. World Health Organization Global Health Observatory. Estimates of rate of homicides (per 100 000 population) database on the Internet]. No date [cited 2022 Nov 11]. Available from: https://www.who.int/data/gho/data/indicators/indicator-details/GHO/estimates-of-rates-of-homicides-per-100-000-population

7. Naghavi M, Ong KL, Aali A, Ababneh HS, Abate YH, Abbafati C, et al. Global burden of 288 causes of death and life expectancy decomposition in 204 countries and territories and 811 subnational locations, 1990–2021: A systematic analysis for the Global Burden of Disease Study 2021. Lancet. 2024;403(10440):2100–2132. https://doi.org/10.1016/S0140-6736(24)00367-2

8. Jewkes R, Morrell R, Hearn J, Lundqvist E, Blackbeard D, Lindegger G, et al. Hegemonic masculinity: Combining theory and practice in gender interventions. Cult Health Sex. 2015;17:112–127. https://doi.org/10.1080/13691058.2015.1085094

9. South African Government. National strategic plan on gender-based violence & femicide: Human dignity and healing, safety, freedom & equality in our lifetime. Pretoria: Government of South Africa; 2020. p. 1–128.

10. Heise L, Greene ME, Opper N, Stavropoulou M, Harper C, Nascimento M, et al. Gender inequality and restrictive gender norms: Framing the challenges to health. Lancet. 2019;393(10189):2440–2454. https://doi.org/10.1016/S0140-6736(19)30652-X

11. Matzopoulos R, Prinsloo M, Pillay-van Wyk V, Gwebushe N, Mathews S, Martin LJ, et al. Injury-related mortality in South Africa: A retrospective descriptive study of postmortem investigations. Bull World Health Organ. 2015;93(5):303–313. https://doi.org/10.2471/BLT.14.145771

12. Norman R, Matzopoulos R, Groenewald P, Bradshaw D. The high burden of injuries in South Africa. Bull World Health Organ. 2007;85(9):695–702. https://doi.org/10.2471/blt.06.037184

13. Finkelhor D, Ormrod RK, Turner HA. Re-victimization patterns in a national longitudinal sample of children and youth. Child Abuse Negl. 2007;31(5):479–502. https://doi.org/10.1016/j.chiabu.2006.03.012

14. Stein DJ, Seedat S, Herman A, Moomal H, Heeringa SG, Kessler RC, et al. Lifetime prevalence of psychiatric disorders in South Africa. Br J Psychiatry. 2008;192(2):112–117. https://doi.org/10.1192/bjp.bp.106.029280

15. Mathews S, Jewkes R, Abrahams N. "I had a hard life": Exploring childhood adversity in the shaping of masculinities among men who killed an intimate partner in South Africa. Br J Criminol. 2011;51(6):960–977. https://doi.org/10.1093/bjc/azr051

16. Wood K, Lambert H, Jewkes R. "Injuries are beyond love": Physical violence in young South Africans' sexual relationships. Med Anthropol. 2008;27(1):43–69. https://doi.org/10.1080/01459740701831427

17. Barolsky V, Pillay S, Sanger N, Ward C. Case studies of perpetrators of violent crime. Johannesburg: Centre for the Study of Violence and Reconciliation; 2008.

18. Pelowich KA, Akibu T, Pellowski J, Hatcher A, Rebombo D, Christofides N, et al. Male perspectives on intimate partner violence: A qualitative analysis from South Africa. PLoS One. 2024;19(4):1–12. https://doi.org/10.1371/journal.pone.0298198

19. Abrahams N, Jewkes R. Effects of South African men's having witnessed abuse of their mothers during childhood on their levels of violence in adulthood. Am J Public Health. 2005;95(10):1811–1816. https://doi.org/10.2105/AJPH.2003.035006

20. Heise L, Greene ME, Opper N, Stavropoulou M, Harper C, Nascimento M, et al. Gender inequality and restrictive gender norms: Framing the challenges to health. Lancet. 2019;393(10189):2440–2454. https://doi.org/10.1016/S0140-6736(19)30652-X

21. Moen M, Bezuidenhout C. Killing your children to hurt your partner: A South African perspective on the motivations for revenge filicide. J Investig Psychol Offender Profiling. 2023;20(1):33–47. https://doi.org/10.1002/jip.1603

22. Mathews S, Jewkes R, Abrahams N. 'So now I'm the man': Intimate partner femicide and its interconnections with expressions of masculinities in South Africa. Br J Criminol. 2015;55(1):107–124. https://doi.org/10.1093/bjc/azu076

23. Mathews S, Abrahams N, Jewkes R, Martin LJ, Lombard C. The epidemiology of child homicides in South Africa. Bull World Health Organ. 2013;91(8):562–568. https://doi.org/10.2471/BLT.12.117036

24. Bowman B, Kramer S, Salau S, Matzopoulos R. Trends, correlates, and contexts of robbery-homicide in South Africa. Homicide Stud. 2022;28(1), 108876792110702. https://doi.org/10.1177/10887679211070230

25. Gallagher KE, Hudepohl AD, Parrott DJ. Power of being present: The role of mindfulness on the relation between men's alcohol use and sexual aggression toward intimate partners. Aggress Behav. 2010;36(6):405–413. https://doi.org/10.1002/ab.20351

26. Manthey J, Shield KD, Rylett M, Hasan OSM, Probst C, Rehm J. Global alcohol exposure between 1990 and 2017 and forecasts until 2030: A modelling study. Lancet. 2019;393(10190):2493–2502. https://doi.org/10.1016/S0140-6736(18)32744-2

27. Giancola PR. The influence of trait anger on the alcohol-aggression relation in men and women. Alcohol Clin Exp Res. 2002;26(9):1350–1358. https://doi.org/10.1111/j.1530-0277.2002.tb02678.x

28. Giancola PR, Saucier DA, Gussler-Burkhardt NL. The effects of affective, behavioral, and cognitive components of trait anger on the alcohol-aggression relation. Alcohol Clin Exp Res. 2003;27(12):1944–1954. https://doi.org/10.1097/01.ALC.0000102414.19057.80

29. Cois A, Matzopoulos R, Pillay-van Wyk V, Bradshaw D. Bayesian modelling of population trends in alcohol consumption provides empirically based country estimates for South Africa. Popul Health Metr. 2021;19(1):43. https://doi.org/10.1186/s12963-021-00270-3

30. Barron K, Parry CDH, Bradshaw D, Dorrington R, Groenewald P, Laubscher R, et al. Alcohol, violence and injury-induced mortality: Evidence from a modern-day prohibition. Rev Econ Stat. 2024;106(4):938–955. https://doi.org/10.1162/rest_a_01228

31. Navsaria PH, Nicol AJ, Parry CDH, Matzopoulos R, Maqungo S, Gaudin R. The effect of lockdown on intentional and nonintentional injury during the COVID-19 pandemic in Cape Town, South Africa: A preliminary report. S Afr Med J. 2020;111(2):110–113. https://doi.org/10.7196/SAMJ.2021.v111i2.15318

32. Matzopoulos R, Simonetti J, Prinsloo M, Neethling I, Groenewald P, Dempers J, et al. A retrospective time trend study of firearm and non-firearm homicide in Cape Town from 1994 to 2013. S Afr Med J. 2018;108(3):197–204. https://doi.org/10.7196/SAMJ.2017.v108i3.12756