






ORIGINAL ARTICLE

A cross-sectional study exploring the characteristics of female survivors of sexual violence living with HIV/AIDS in the eastern region of Democratic Republic of Congo

Olivier Nyakio^{1,2} , Fabrice Kibukila^{2,3} , Denis Mukwege¹, Joyeux Bwani¹, Albert Tambwe⁴, Priyadarshini Bhattacharjee⁵, Soham Bandyopadhyay^{6,7} , Aymar Akilimali^{8,9,10}  , Prosper Kakudji⁴ and Jean Baptiste Kakoma⁴

¹Faculty of Medicine, Evangelic University in Africa, Bukavu, Democratic Republic of Congo

²Faculty of Medicine, Official University of Bukavu, Bukavu, Democratic Republic of Congo

³Faculty of Medicine, University of Burundi, Bujumbura, Burundi

⁴Faculty of Medicine, University of Lubumbashi, Lubumbashi, Democratic Republic of Congo

⁵Department of Clinical Medicine, Cambridge University Hospitals NHS Foundation Trust, University of Cambridge, Cambridge, UK

⁶Clinical Neurosciences, Clinical and Experimental Sciences, Faculty of Medicine, University of Southampton, Southampton, Hampshire, UK

⁷Oxford University Global Surgery Group, Nuffield Department of Surgical Sciences, University of Oxford, Oxford, UK

⁸Department of Research, Medical Research Circle (MedReC), Goma, Democratic Republic of Congo

⁹Society for Maternal-Fetal Medicine (SMFM), Washington, District of Columbia, USA

¹⁰Standing committee of research and exchange, Medical Students Association of DR Congo

Correspondence: Dr Olivier Nyakio, Faculty of Medicine, Evangelic University in Africa, Bukavu, Democratic Republic of Congo; Faculty of Medicine, Official University of Bukavu, 3323 Bukavu, Ibanda, South Kivu, Democratic Republic of Congo. Ibanda. Email: oliviernyakio@yahoo.fr

Conflict of Interest: SB declares that they are supported by the National Institute for Health Research (ACF-2022-26-004). The authors declare there are no other conflicts of interest.

Received: 15 June 2023;
Accepted: 18 December 2023

Abstract

Background: Sexual violence remains a persistent and devastating issue in eastern Democratic Republic of Congo (DRC).

Aim: To elucidate the sociodemographic, sexual, and obstetrical characteristics associated with the experiences of victims of sexual violence (VSV) among women in the region.

Materials and Methods: A cross-sectional study was conducted involving 625 women from eastern DRC. Participants provided self-reported data, collected through interviews conducted by trained female interviewers in secure environments. Associations between VSV and various sociodemographic and reproductive health factors were examined.

Results: Of the respondents, 26.1% reported experiences of sexual violence. VSV were predominantly younger, with 56.44% aged between 15 and 24 years. Single women comprised 57.67% of VSV, and 37.42% identified as farmers. There were 33.13% of VSV who were illiterate, and 81.60% belonged to the low socio-economic stratum. Early physiological and reproductive milestones characterised VSV: 52.15% experienced menarche at or before 13 years, 34.97% initiated sexual intercourse before age 15, and 18.70% reported their first pregnancy before age 15. Higher nulliparity was observed in VSV (29.45%) compared to non-VSV (9.31%). A lower prevalence of HIV infection was found among VSV (11.04%) relative to non-VSV (25.76%).

Conclusion: Sexual violence in the eastern DRC exhibits multifactorial associations. Younger women, those in certain occupations, and those with specific reproductive histories appear more vulnerable. The findings underscore the urgency for targeted interventions, enhanced access to education, and improved reproductive health services. Addressing these pressing issues should remain a primary focus in both societal and public health spheres.

KEYWORDS

AIDS, Democratic Republic of the Congo, female, HIV, prevalence, sexual partners, sexual violence, women

Abbreviations: DR Congo, Democratic Republic of Congo; HIV/AIDS, Human immunodeficiency virus/acquired immunodeficiency syndrome; VSV, Victims of sexual violence.

This is an open access article under the terms of the [Creative Commons Attribution-NonCommercial](https://creativecommons.org/licenses/by-nc/4.0/) License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes.

© 2024 The Authors. *Australian and New Zealand Journal of Obstetrics and Gynaecology* published by John Wiley & Sons Australia, Ltd on behalf of Royal Australian and New Zealand College of Obstetricians and Gynaecologists.

INTRODUCTION

Sexual violence is a grievous human rights violation, inflicting profound physical, psychological, and social damage on its victims.¹ The Democratic Republic of Congo (DRC), particularly its eastern region, has earned the regrettable label of the 'rape capital of the world'.² Such a title emerges from the pervasive and severe nature of the reported sexual assaults, with many cases involving extreme brutality, mutilation, and multiple assailants.³

The backdrop of the DRC's situation is painted with shades of historical and sociopolitical chaos. Prolonged conflict, diverse militia factions, and an unstable governance structure have created an environment where sexual violence is rampant and often goes unpunished.⁴ Within this setting, the victims of sexual violence (VSV) do not merely grapple with physical traumas but are also subjected to lasting psychological scars, societal stigmatisation, and a host of associated adversities.⁵ Despite its widespread nature, there is a significant gap in comprehensive research that holistically examines the varied facets of victims' lives, especially in the context of their sociodemographic, sexual, and obstetrical characteristics.

The association between these characteristics and incidents of sexual violence is complex. For instance, age and marital status have long been considered factors that might influence an individual's vulnerability to such violence.⁶ Similarly, an individual's sexual and reproductive history may both be influenced by experiences of violence and act as potential risk or protective factors. Delving deep into these associations not only helps in painting a clearer picture of the typical profile of victims but also assists in designing more effective interventions. Furthermore, the intersection of sexual violence with other critical health challenges, such as HIV, adds another layer of complexity to this issue.⁷ Rape – unlawful sexual penetration of the vagina, anus, or mouth of another person, with or without force – can lead to the direct transmission of HIV from an infected assailant to a seronegative female victim.^{6,7} This is particularly relevant in the context of the DRC, which, according to the National Multisectoral Program for the Fight against AIDS, had approximately 450 000 people living with HIV as of 2018.⁸ Recognising the characteristics of HIV-positive VSV offers the potential for holistic interventions catering to both the trauma and the ensuing medical challenges. Recent studies have mentioned that despite reducing incidences of HIV observed through the past decade, the number of patients being affected with HIV remained high in the DRC, particularly in rural areas.¹⁰

In recent years, there has been a global push to prioritise the prevention of sexual violence, reinforced by international frameworks like the Sustainable Development Goals (SDGs), which explicitly target the elimination of all forms of violence against women and girls by 2030 (Goal 5.2).^{9,11}

This study is timely as it aligns with these global efforts, offering data-driven insights that can guide policymakers, healthcare

providers, and community leaders in crafting strategies that are rooted in the lived realities of victims.

Aims

This study aims to define the sociodemographic, sexual, and obstetrical characteristics of VSV against those without such experiences in eastern DRC. By offering a comprehensive understanding of associations with experiences of sexual violence and sociodemographic and obstetric factors, this study strives to bridge knowledge gaps, laying a foundation for more effective and tailored interventions in areas blighted by conflict and sexual violence.

MATERIALS AND METHODS

Study design and setting

This cross-sectional and comparative analytical study was conducted over a year-long period, from January to December 2021. The research took place at the Gynaecology and Obstetrics Department of Panzi Hospital, situated in the conflict-affected eastern region of the DRC.¹ The selection of this setting was based on its high incidence of sexual violence cases and its significance as a referral centre for women affected by conflict-related traumas.

Study population

The study population comprised of women admitted to the Gynaecology and Obstetrics Department of Panzi Hospital, with a specific focus on those who were VSV.

Sampling method and size

Out of 625 women enrolled in our study, 163 (26.1%) were VSV and consented to participate. A comparison group was composed of 462 (73.9%) women who had not been VSV. This sampling strategy allowed for both descriptive and comparative analyses.

Data collection

Data were collected through confidential chart reviews and questionnaires administered to the patients (Appendix S1). These tools gathered information on demographics, health history, the details and impacts of any sexual violence experienced, and characteristics related to HIV/AIDS. The primary variables of interest were the sociodemographic (eg age, marital status), sexual (eg number of sexual partners, history of forced intercourse), and obstetrical characteristics (eg number of pregnancies, complications during childbirth) of the participants. The secondary outcome was the HIV status of VSV.

Data analysis

Data were coded and processed using SPSS. Descriptive statistics (frequencies, means, standard deviations) were used to describe the sample characteristics. The association between sexual violence and sociodemographic, sexual, and obstetrical variables was assessed using χ^2 tests for categorical variables. The level of statistical significance was set at $P < 0.05$.

Ethics considerations

The study protocol was reviewed and approved by the Ethics Review Board of the Faculty of Medicine of the University of Lubumbashi in DRC following the relevant approval letters respectively: Ref/ 0115/CNES001/DPSK/2017 and the approval letter: UNILU/CEM/136/2019. The study design incorporated the separation of patient identification data by confidentiality codes to maintain anonymity and protect the privacy of the participants. Written and verbal informed consent were obtained from all participants involved in the study. This study was performed in accordance with the ethics standards as laid out in the 1964 Declaration of Helsinki and its later amendments or comparable ethics standards.

RESULTS

Sociodemographic characteristics

A notable age disparity was observed: women in the VSV group were considerably more likely to be aged between 15 and 24 years (56.44%) compared with women who had not experienced sexual violence (17.97%) ($P < 0.01$) (Table 1). Among VSV, singles made up 57.67%, a significantly larger fraction than 13.20% in the non-VSV group ($P < 0.01$). While farming was the predominant profession for VSV at 37.42%, only 16.88% of the non-VSV group reported farming as their profession ($P < 0.01$). A lower education level was also prevalent among VSV, with 33.13% being illiterate, compared to 23.59% among non-VSV ($P < 0.01$). A significant majority of the VSV (81.60%) fell into the low socio-economic category, as opposed to 51.08% in the non-VSV group ($P < 0.01$).

Sexual and obstetrical characteristics

Onset of menarche at or before 13 years was more common in VSV (52.15%) compared to 37.66% in non-VSV ($P < 0.01$) (Table 2). Early initiation of sexual intercourse (which could have included rape), before the age of 15, was reported by 34.97% of VSV, contrasting to 17.97% among non-VSV ($P < 0.01$). A significant portion of VSV (18.70%) reported their first pregnancy before 15 years, compared to 8.86% of non-VSV ($P < 0.01$). The data also highlighted higher nulliparity in VSV at 29.45%, while only 9.31% of non-VSV were nulliparous ($P < 0.01$). A smaller fraction of VSV (11.04%) reported a history of HIV infection, compared to 25.76% in the non-VSV group ($P < 0.01$).

TABLE 1 Sociodemographic characteristics of female victims of sexual violence (VSV) who participated in the study

Variables	Sexual violence <i>n</i> (%)		P-value
	Yes	No	
Age			
15–24 years	92 (56.44)	83 (17.97)	<0.01
25–34 years	36 (22.09)	107 (23.16)	
≥ 35 years	35 (21.47)	272 (58.87)	
Marital status			
Single	94 (57.67)	61 (13.20)	<0.01
Married (monogamous)	30 (18.40)	264 (57.14)	
Other (widowed, divorced, polygamous)	39 (23.93)	137 (29.65)	
Profession			
Household	47 (28.83)	201 (43.51)	<0.01
Farmer	61 (37.42)	78 (16.88)	
Other (civil servant, trader...)	55 (33.74)	183 (39.61)	
Education level			
Illiterate	54 (33.13)	109 (23.59)	<0.01
Primary	42 (25.77)	125 (27.06)	
Secondary	66 (40.49)	185 (40.04)	
University	1 (0.61)	43 (9.31)	
Socio-economic level			
Low	133 (81.60)	236 (51.08)	<0.01
Average	30 (18.40)	226 (48.92)	

Characteristics of HIV-positive VSV

Analysing the subgroup of women who were both HIV-positive and VSV, distinct sociodemographic, sexual, and obstetrical patterns emerged (Table 3). The majority of this subgroup was aged 35 years and above (55.56%). Marital statuses such as being widowed, divorced, or in polygamous relationships were predominant (44.44%). Half of these women were engaged in household occupations (50.00%), and an equivalent percentage had achieved a secondary level of education (50.00%). Sexual and obstetrical histories of this group were aligned with the broader VSV cohort (Table 4). Most experienced their menarche between the ages of 14–15 (61.11%) and initiated sexual activity between the ages of 15–20 (77.78%). Their reproductive histories indicated an early start, with 75.00% having their first pregnancy between ages 15–20.

DISCUSSION

This study, carried out in eastern DRC, sheds light on the associations between sociodemographic, sexual, and obstetrical characteristics of women and their experiences of sexual violence.

TABLE 2 Sexual and obstetrical characteristics of the women participating in our study

Variable	Sexual violence <i>n</i> (%)		<i>P</i> -value
	Yes	No	
Menarche age			
≤ 13 years	85 (52.15)	175 (37.66)	<0.01
14–15 years	72 (44.17)	252 (54.55)	
≥ 16 years	6 (3.68)	36 (7.79)	
Age at first sexual intercourse			
< 15 years	57 (34.97)	83 (17.97)	<0.01
15–20 years	103 (63.19)	319 (69.05)	
> 20 years	3 (1.84)	60 (12.99)	
Age at first pregnancy			
< 15 years	23 (18.70)	38 (8.86)	<0.01
15–20 years	95 (77.24)	285 (66.43)	
> 20 years	5 (4.07)	106 (24.71)	
Parity			
Nulliparous	48 (29.45)	43 (9.31)	<0.01
Primiparous	59 (36.20)	106 (22.94)	
Multiparous	56 (34.36)	313 (67.75)	
History of HIV infection			
Yes	18 (11.04)	119 (25.76)	<0.01
No	145 (88.96)	343 (74.24)	

Our findings suggest that specific population subgroups, such as younger women, those engaged in professions like farming, and those from a lower socio-economic background, are more frequently represented among VSV.

A total of 625 women participated in this study. The prevalence of reported sexual violence was 26.1%, a figure that emphasises the increasing insecurity and impoverishment in the eastern region of DRC.¹ These statistics surpass the rates presented in analogous studies from the United States and Russia, which reported prevalences of 6.5% and 24.1% respectively.^{12,13} The notable disparity accentuates the pressing need for effective interventions in the DRC. The unique challenges faced by the DRC, including ongoing conflict, displacement, and socio-economic instability, may account for this elevated prevalence compared to other regions.

Consistent with prior research, our study indicates that younger women, particularly those aged 15–24, face the greatest risk of sexual violence.^{13,15} Potential reasons might be societal perceptions of younger individuals' vulnerability or their increased exposure in public or employment spaces.¹⁶ The disproportionate vulnerability of younger women to sexual violence underscores the importance of focusing interventions and resources on this demographic, aligning with global concerns about adolescent and young adult vulnerability to sexual violence and the need for comprehensive sexual education and protective measures for this age group.^{17,18} Another aspect to consider is the age at menarche. The relevance of early menarche is not in its occurrence, but potentially in societal misinterpretations of physiological maturity as a

signifier for sexual advances. Such misinterpretations could lead to younger girls being disproportionately targeted by perpetrators.⁵

Our study also found that single women, as well as those in complex relationship situations such as polygamy, widowhood, or divorce, were disproportionately represented among sexual violence survivors.¹⁴ This suggests societal vulnerabilities where, due to societal expectations or perceptions in the DRC, these women might face increased threats.^{15,17} This observation aligns with other studies indicating that marital status significantly influences a woman's risk of experiencing sexual violence, emphasising the need for targeted interventions for these at-risk groups.¹⁴ It is crucial to shift the narrative from women needing protection to addressing the root societal norms that make them vulnerable in the first place. In the context of the DRC, where societal norms and values regarding relationships and sexual autonomy vary, it is essential to consider the potential implications of multiple partnerships on women's safety.¹⁹ Furthermore, given that certain subgroups, such as those in polygamous relationships, were overrepresented among VSV in this study, it could be inferred that dynamics around multiple partners — whether chosen or imposed — play a role in the risk landscape of sexual violence. Multiple partnerships can increase exposure to potential perpetrators, particularly in contexts where women might not have the autonomy to choose or refuse partners. The dynamics of power and control within relationships might also play a role, where having multiple partners could either be a result of or lead to situations of coercion and violence.^{20,21} Future research in this region should aim to explicitly investigate this relationship, determining whether multiple partnerships inherently pose a risk, or if other related factors drive this association. This can provide a more nuanced understanding of risk factors, leading to more targeted interventions.

A surprising finding was the higher prevalence of sexual violence among women involved in farming. The isolation of farming fields, limited access to protective mechanisms, and potentially increased interactions with militia in the rural and conflict-laden zones might contribute to this elevated risk.²² However, the reported rate discrepancies necessitate further scrutiny and validation, as understanding these dynamics could inform the creation of occupation-specific prevention strategies.

The association between lower educational levels and economic standings with increased risk of sexual violence reiterates the protective role of education and financial stability.^{23,24} With the majority (86.21%) of VSV belonging to a lower socio-economic background, it is evident that education can empower women with knowledge about their rights and resources.^{23,25} Thus, initiatives to enhance women's access to education and economic opportunities are imperative.

Early initiation of sexual intercourse and first pregnancy in increasing the risk of sexual violence suggests a complex landscape of reproductive health and rights in the region. Early initiation of sexual activity might hint at forceful engagements, warranting a deeper exploration into socio-cultural practices

TABLE 3 Sociodemographic characteristics according to study groups

Variables	n (%)				P-value
	Sexual violence	HIV+	Sexual violence and HIV+	VSV- and HIV-	
Age					
15–24 years	91 (62.76)	2 (1.67)	1 (5.56)	81 (23.68)	<0.01
25–34 years	29 (20.00)	29 (24.17)	7 (38.89)	78 (22.81)	<0.01
≥ 35 years	25 (17.24)	89 (74.17)	10 (55.56)	183 (53.51)	<0.01
Marital status					
Single	88 (60.69)	11 (9.17)	6 (33.33)	50 (14.62)	<0.01
Married (monogamous)	26 (17.93)	48 (40.00)	4 (22.22)	216 (63.16)	<0.01
Others (widow, divorced, polygamous)	31 (21.38)	61 (50.83)	8 (44.44)	76 (22.22)	<0.01
Occupation					
Household	38 (26.21)	66 (55.00)	9 (50.00)	135 (39.47)	<0.01
Farmer	60 (41.38)	14 (11.67)	1 (5.56)	64 (18.71)	<0.01
Other (civil workers, traders...)	47 (32.41)	40 (33.33)	8 (44.44)	143 (41.81)	0.14
Educational level					
Illiterate	48 (33.10)	24 (20.00)	6 (33.33)	85 (24.85)	0.08
Primary	40 (27.59)	37 (30.83)	2 (11.11)	88 (25.73)	0.32
Secondary	57 (39.31)	53 (44.17)	9 (50.00)	132 (38.60)	0.59
University	0 (0.00)	6 (5.00)	1 (5.56)	37 (10.82)	<0.01
Socio-economic level					
Low	125 (86.21)	70 (58.33)	8 (44.44)	166 (48.54)	<0.01
Average	20 (13.79)	50 (41.67)	10 (55.56)	176 (51.46)	

VSV, victims of sexual violence.

normalising premature sexual relationships.²⁶ These findings suggest a possible need for comprehensive sexual education and health services targeted toward younger girls, particularly those who experience early puberty.^{27,28} While the data indicate the occurrence of these events, it does not differentiate pregnancies resulting from consensual relationships from those due to rape. This is a significant aspect that future research should delve deeper into. Furthermore, the proportion of nulliparous women was significantly higher among sexual violence survivors than among patients who had not undergone sexual violence (29.45% vs 9.31%).¹⁴ This implies that nulliparous women, those who have not given birth, also represent a particularly vulnerable group. The reasons behind this association require further exploration, but they may include factors such as age, socio-economic status, marital status, or a combination of these and other factors.

Our findings indicate a lower prevalence of HIV among sexual violence survivors compared to the non-affected group. This contradicts previous findings suggesting that sexual violence might increase HIV risk.²⁹ This discrepancy may be due to underreporting, differences in the studied populations, or increased accessibility to post-exposure prophylaxis in recent years.³⁰ Another perspective is that perpetrators might be on suppressive antiretroviral therapy, reducing the chances of HIV

transmission. Given the significant public health implications of this finding, it warrants further investigation. Understanding the factors that contribute to this lower prevalence could inform the development of strategies to reduce the risk of HIV among all women, including those who have experienced sexual violence. For the subset of women who were both HIV-positive and VSV, our results suggest a life marked by significant sociodemographic shifts, such as widowhood, divorce, or polygamous relationships. These marital statuses, combined with their age (majority aged 35 years and above), could be reflective of cumulative vulnerabilities, where the challenges of living with HIV and the experiences of sexual violence intersect. This nuanced understanding emphasises the importance of multi-faceted interventions for such women. The intersection of HIV and sexual violence is a crucial area for further research, policy development, and intervention. It is critical to implement tailored support and intervention strategies to address the unique needs and vulnerabilities of this group.

The use of self-reported data is a major limitation of this study. Recall bias or underreporting due to the sensitive nature of the topic might affect the accuracy of our findings. However, the use of trained female interviewers and the provision of a safe and private environment for the interviews aimed to reduce these limitations and encourage honest reporting.^{8,9} Despite

TABLE 4 Sexual, gynaecological, obstetrical and smoking characteristics according to study groups

Variables	n (%)				P-value
	Sexual violence	HIV	Sexual violence and HIV+	VSV- and HIV-	
Menarche age					
≤ 13 years	79 (54.48)	34 (28.33)	6 (33.33)	140 (40.94)	<0.01
14–15 years	61 (42.07)	72 (60.00)	11 (61.11)	180 (52.63)	0.02
≥ 16 years	5 (3.45)	14 (11.67)	1 (5.56)	22 (6.43)	0.06
Age at the first sexual intercourse					
< 15 years	53 (36.55)	28 (23.33)	4 (22.22)	55 (16.08)	<0.01
15–20 years	89 (61.38)	81 (67.50)	14 (77.78)	238 (69.59)	0.25
> 20 years	3 (2.07)	11 (9.17)	0 (0.00)	49 (14.33)	<0.01
Number of previous sex partners					
1–5	27 (18.62)	17 (14.17)	4 (22.22)	28 (8.19)	<0.01
≥ 6	118 (81.38)	103 (85.83)	14 (77.78)	314 (91.81)	
Type of sexual intercourse					
Normal	138 (95.17)	111 (92.50)	15 (83.33)	328 (95.91)	0.07
Normal and Others	7 (4.83)	9 (7.50)	3 (16.67)	14 (4.09)	
Age at the first pregnancy					
< 15 years	21 (19.63)	12 (10.34)	2 (12.50)	26 (8.31)	0.01
15–20 years	83 (77.57)	76 (65.52)	12 (75.00)	209 (66.77)	0.15
> 20 years	3 (2.80)	28 (24.14)	2 (12.50)	78 (24.92)	<0.01
Smoking					
Yes	7 (4.83)	3 (2.50)	2 (11.11)	4 (1.17)	0.01
No	138 (95.17)	117 (97.50)	16 (88.89)	338 (98.83)	
Contraception					
Yes	15 (10.34)	17 (14.17)	3 (16.67)	83 (24.27)	<0.01
No	130 (89.66)	103 (85.83)	15 (83.33)	259 (75.73)	
Parity					
Nulliparous	45 (31.03)	5 (4.17)	3 (16.67)	38 (11.11)	<0.01
Primiparous	55 (37.93)	21 (17.50)	4 (22.22)	85 (24.85)	<0.01
Multiparous	45 (31.03)	94 (78.33)	11 (61.11)	219 (64.04)	<0.01

VSV, victims of sexual violence.

these efforts, the potential for underreporting or inaccurate recall remains, underscoring the need for complementary data collection methods in future research. Another potential limitation is the cross-sectional design of the study, which does not allow for conclusions about causality. The associations found in this study are correlational and do not necessarily indicate a causal relationship. Longitudinal studies are needed to better understand if there are any causal relationships between the identified risk factors and sexual violence. Despite these limitations, this study provides valuable insights into the factors associated with sexual violence against women. Our findings highlight areas for potential intervention and prevention strategies, including a focus on younger women, single women, those in complex marital situations, and those in certain occupational groups, as well as the need for comprehensive sexual education and health services targeted toward younger girls and women

who experience early menarche, initiation of sexual activity, and first pregnancy.

CONCLUSION

Our study underscores the multifactorial nature of sexual violence against women. It highlights the urgent need for comprehensive, targeted interventions that address these risk factors and the unique needs of vulnerable groups. Future research should continue to explore these associations and develop and evaluate strategies for reducing the prevalence and impact of sexual violence against women. Given the high prevalence of sexual violence and its devastating consequences, addressing this issue should be a priority for our society and for public health efforts at large.

ETHICS APPROVAL AND CONSENT TO PARTICIPLE

The study protocol was reviewed and approved by the Ethics Review Board of the Faculty of Medicine of the University of Lubumbashi in DRC following the relevant approval letters respectively: Ref/ 0115/CNES001/DPSK/2017 and the approval letter: UNILU/CEM/136/2019. The study design incorporated the separation of patient identification data by confidentiality codes to maintain anonymity and protect the privacy of the participants. Informed consent was obtained from all participants involved in the study. This study was performed in accordance with the ethics standards as laid in the 1964 Declaration of Helsinki and its later amendments or comparable ethics standards.

CONSENT FOR PUBLICATION

Not applicable.

FUNDING INFORMATION

The authors did not receive any financial support for this work.

AUTHORS' CONTRIBUTIONS

Conceptualisation, Olivier NYAKIO. Data curation, Fabrice KIBUKILA. Formal analysis, Albert TAMBWE. Funding acquisition, Olivier NYAKIO and Denis MUKWEGE. Investigation, Denis MUKWEGE. Methodology, Priyadarshini BHATTACHARJEE and Aymar AKILIMALI. Project administration, Olivier NYAKIO. Resources, Albert TAMBWE. Software, Fabrice KIBUKILA. Supervision, Fabrice KIBUKILA. Validation, Prosper KAKUDJI and Joyeux BWANI. Visualisation, Aymar AKILIMALI. Writing - original draft, Olivier NYAKIO, Fabrice KIBUKILA and Jean Baptiste KAKOMA. Writing - review and editing, Priyadarshini BHATTACHARJEE, Soham BANDYOPADHYAY, Olivier NYAKIO, Denis MUKWEGE and Aymar AKILIMALI. Final approval of manuscript, all authors.

ACKNOWLEDGEMENTS

The authors would like to thank the staff of Medical Research Circle (MedReC) for the realisation of the present paper.

DATA AVAILABILITY STATEMENT

Not applicable.

REFERENCES

- World Health Organization. Global and regional estimates of violence against women: prevalence and health effects of intimate partner violence and non-partner sexual violence. World Health Organization. 2013. [Accessed 9 August 2023] Available from URL: <https://apps.who.int/iris/handle/10665/85239>.
- Stearns J. Review of *Dancing in the Glory of Monsters: The Collapse of the Congo and the Great War of Africa* by Jason K. Stearns (PublicAffairs, 2011). H-Empire. June 2012. [Accessed 9 August 2023] Available from URL: https://www.academia.edu/12488872/Review_of_Dancing_in_the_Glory_of_Monsters_The_Collapse_of_the_Congo_and_the_Great_War_of_Africa_by_Jason_K_Stearns_PublicAffairs_2011_H_Empire_June_2012.
- Bartels S, Kelly J, Scott J et al. Militarized sexual violence in south Kivu, Democratic Republic of Congo. *J Interpers Violence* 2013; **28**(2): 340–358. <https://doi.org/10.1177/0886260512454742>.
- Meger S. Rape of The Congo: Understanding sexual violence in the conflict in the Democratic Republic of Congo. *J Contemp Afr Stud* 2010; **28**(2): 119–135.
- Elbert T, Hinkel H, Maedl A et al. *Sexual and gender-based violence in the Kivu provinces of the Democratic Republic of Congo: Insights from former combatants*. Washington, DC: The World Bank, 2013; [Accessed 9 August 2023] Available from URL: https://www.resdal.org/wps_sp/assets/201309-wb-study-on-drc-and-ag-s-in-drc.pdf.
- Peterman A, Palermo T, Bredenkamp C. Estimates and determinants of sexual violence against women in the Democratic Republic of Congo. *Am J Public Health* 2011; **101**(6): 1060–1067. <https://doi.org/10.2105/AJPH.2010.300070>.
- World Health Organization. HIV and AIDS. 13 July 2023. [Accessed 9 August 2023] Available from URL: https://www.who.int/news-room/fact-sheets/detail/hiv-aids?gclid=CjwKCAjw8symBhAqEiwAaTA_CuBePz4i-JUFOWP9ibYUBy2x2Cq2v3x02gswzU1UZ41TmMijNt3xoCbCkQAvD_BwE.
- Cakwira H, Mukengere M, Lucien B et al. The clinical characteristics of perineal tears: A study carried out on 14 pregnant women in a tertiary center: Case series. *Ann Med Surg (Lond)* 2022; **82**: 1044332. <https://doi.org/10.1016/j.amsu.2022.104432>.
- Orrigio K, Pierre RB, Gordon-Harrison D et al. Sexual abuse and sexually-transmitted HIV/AIDS in Jamaican children and adolescents aged 6-19 years. *J Infect Dev Ctries* 2021; **15**(7): 989–996. <https://doi.org/10.3855/jidc.12156>.
- Duhant A, Kusinza B, Tantet C et al. HIV-1 infection in south Kivu (Democratic Republic of Congo): High genotypic resistance to antiretrovirals. *J Antimicrob Chemother* 2023; **78**(7): 1732–1739. <https://doi.org/10.1093/jac/dkad163>.
- United Nations. The Global Challenge for Government Transparency: The Sustainable Development Goals (SDG) 2030 Agenda. 2023 [Accessed 9 August 2023] Available from URL: <https://worldtop20.org/global-movement/?gad=1>.
- Hindin P, Btoush R, Brown DR, Munet-Vilaro F. Intimate partner violence and risk for cervical cancer. *J Fam Violence* 2015; **30**: 1031–1043.
- Lunze K, Raj A, Cheng DM et al. Sexual violence from police and HIV risk behaviours among HIV-positive women who inject drugs in St. Petersburg, Russia - a mixed methods study. *J Int AIDS Soc* 2016; **19**(4 Suppl 3): 20877 <https://doi.org/10.7448/IAS.19.4.20877>.
- UNFPA. Projet conjoint de prévention et de réponse aux violences sexuelles pour les Provinces du Nord et du Sud-Kivu en République Démocratique du Congo. Kinshasa. 2013 [Accessed 21 June 2022.] Available from URL: https://www.unfpa.org/sites/default/files/admin-resource/Rapport_ACDI_2006_2013_pdf.pdf.
- World Health Organization. (2013). *Global and Regional Estimates of Violence against Women: Prevalence and Health Effects of Intimate Partner Violence and Non-partner Sexual Violence*. World health organization.
- Garcia-Moreno C, Jansen HA, Ellsberg M et al. *WHO Multi-Country Study on women's Health and Domestic Violence against Women*. Geneva: World Health Organization, 2005.

17. Jina R, Thomas LS. Health consequences of sexual violence against women. *Best Pract Res Clin Obstet Gynaecol Clin Obstet Gynaecol* 2013; **27**: 15–26. <https://doi.org/10.1016/j.bpobgyn.2012.08.012>.
18. UNICEF. (2014). *Hidden in Plain Sight: A Statistical Analysis of Violence against Children*. Unicef.
19. Jewkes R, Morrell R. Gender and sexuality: Emerging perspectives from the heterosexual epidemic in South Africa and implications for HIV risk and prevention. *J Int AIDS Soc* 2010; **13**(1): 1–11.
20. Jewkes R, Dunkle K, Nduna M *et al*. Intimate partner violence, relationship power inequity, and incidence of HIV infection in young women in South Africa: A cohort study. *Lancet* 2010; **376**(9734): 41–48.
21. Decker MR, Silverman JG, Raj A. Dating violence and sexually transmitted disease/HIV testing and diagnosis among adolescent females. *Pediatrics* 2005; **116**(2): e272–e276.
22. Kelly JT, Betancourt TS, Mukwege D *et al*. Experiences of female survivors of sexual violence in eastern Democratic Republic of the Congo: A mixed-methods study. *Confl Health* 2011; **5**(1): 25.
23. Rahill GJ, Joshi M, Hernandez A. Adapting an evidence-based intervention for HIV to avail access to testing and risk-reduction counselling for female victims of sexual violence in post-earthquake Haiti. *AIDS Care* 2015; **28**(2): 250–256. <https://doi.org/10.1080/09540121.2015.1071773>.
24. Jewkes R, Fulu E, Roselli T, Garcia-Moreno C. Prevalence of and factors associated with non-partner rape perpetration: Findings from the UN multi-country cross-sectional study on men and violence in Asia and the Pacific. *Lancet Glob Health* 2013; **1**(4): e208–e218.
25. Abramsky T, Watts CH, Garcia-Moreno C *et al*. What factors are associated with recent intimate partner violence? Findings from the WHO multi-country study on women's health and domestic violence. *BMC Public Health* 2011; **11**(1): 1–17.
26. Stockman JK, Lucea MB, Campbell JC. Forced sexual initiation, sexual intimate partner violence and HIV risk in women: A global review of the literature. *AIDS Behav* 2013; **17**(3): 832–847.
27. Aldous AM, Joy C, Daniels J *et al*. Recent sexual violence exposure is associated with immune biomarkers of HIV susceptibility in women. *Am J Reprod Immunol* 2021; **86**(3): 1–11. <https://doi.org/10.1111/aji.13432>.
28. Wellings K, Collumbien M, Slaymaker E *et al*. Sexual behaviour in context: A global perspective. *Lancet* 2006; **368**(9548): 1706–1728.
29. Muhwezi WW, Kinyanda E, Mungherera M *et al*. Vulnerability to high-risk sexual behaviour (HRSB) following exposure to war trauma as seen in post-conflict communities in eastern Uganda: A qualitative study. *Confl Health* 2015; **9**(1): 1–10.
30. Zraly M, Nyirazinyoye L. Don't let the suffering make you fade away: An ethnographic study of resilience among survivors of genocide-rape in southern Rwanda. *Soc Sci Med* 2010; **70**(10): 1656–1664.

SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

Appendix S1. Questionnaire used in the study to interview women.