



HAL
open science

Individual and contextual determinants of early access to post-rape care: A retrospective cohort study of 4048 women in the Democratic Republic of Congo from 2014 to 2019

Mugisho-Munkwa Guerschom, Ali Bitenga Alexandre, Andro Armelle

► To cite this version:

Mugisho-Munkwa Guerschom, Ali Bitenga Alexandre, Andro Armelle. Individual and contextual determinants of early access to post-rape care: A retrospective cohort study of 4048 women in the Democratic Republic of Congo from 2014 to 2019. *Journal of Epidemiology and Population Health*, 2024, 72 (4), pp.202534. 10.1016/j.jep.2024.202534 . hal-04654854

HAL Id: hal-04654854

<https://hal.science/hal-04654854>

Submitted on 20 Jul 2024

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



ELSEVIER

Contents lists available at ScienceDirect

Journal of Epidemiology and Population Health

journal homepage: <https://www.journals.elsevier.com/jepih>

Original article

Individual and contextual determinants of early access to post-rape care: A retrospective cohort study of 4048 women in the Democratic Republic of Congo from 2014 to 2019

Mugisho-Munkwa Guerschom^{a,b,*}, Ali Bitenga Alexandre^c, Andro Armelle^a^a Demography Institute, Paris 1 Panthéon-Sorbonne University (CRIDUP), Ecole des Hautes Etudes en Démographie, France^b Université Evangélique en Afrique-DRC, Bukavu, Democratic Republic of the Congo (DRC)^c ICART Research Center, Panzi Hospital and Foundation - DRC, Bukavu, Democratic Republic of the Congo (DRC)

ARTICLE INFO

Article History:

Available online xxx

Keywords:

Sexual violence

Rape

Access to health care

Conflict zones

Democratic Republic of Congo

ABSTRACT

Background: Armed conflict in the eastern Democratic Republic of Congo (DRC) has significantly increased the incidence of sexual violence against women. Victims who manage to access health care within 72 h of experiencing rape can receive critical preventive care to mitigate the consequences of such violence. Despite this, a disproportionately small number of victims are able to obtain medical care within this crucial time frame. This study aimed to identify both individual and contextual factors that influence the likelihood of accessing post-rape care within 72 h in the eastern DRC.

Methods: This retrospective cohort study utilized patient records from Panzi Hospital along with contextual data provided by the South Kivu Provincial Ministry of Health. It encompassed rape victims residing in South Kivu province who sought post-rape care between 2014 and 2019. To identify individual and contextual factors influencing timely access to care (within 72 h), multilevel logistic regression analysis was employed.

Results: The study included a total of 4,048 women, with 30 % being under 18 years old and 40 % married. Around 13 % accessed care within 72 h of rape. Multivariate analysis revealed that timely access to care (within 72 h) was negatively influenced by factors such as the isolation of the victim's health zone of residence (aOR = 0.29 [0.14–0.63], $p = 0.002$), the distance between the home health zone and the hospital (aOR = 0.75 [0.54–0.99], $p = 0.041$), instances of rape occurring in 2015 or earlier (aOR = 0.44 [0.34–0.57], $p < 0.001$), and referrals to the hospital from other health facilities or organizations (aOR = 0.78 [0.61–1.00], $p = 0.049$). Conversely, being single was positively associated with access to care within this critical period (aOR = 1.29 [1.03–1.61], $p = 0.024$). Furthermore, statistical trends indicate that the presence of Panzi partner NGOs in the victim's health zone might facilitate access to care (aOR = 1.33 [0.99–1.80], $p = 0.057$), highlighting an area of interest, while being internally displaced at the time of rape was associated with a trend towards reduced access to care (aOR = 0.78 [0.59–1.02], $p = 0.068$), underscoring the need for further research and targeted interventions.

Conclusion: To enhance access to post-rape care, our study highlights the need for strengthened collaboration with all partnering organizations and focused efforts on raising awareness, particularly among married women and their husbands. Enhancing security measures, constructing or upgrading roads to better connect major cities with currently inaccessible or isolated areas, bolstering the efforts of both local and international NGOs, and offering comprehensive reproductive health services to internally displaced women and those residing in the victims' health zones, are crucial steps toward ensuring access to post-rape care within the critical 72-hour window.

© 2024 The Author(s). Published by Elsevier Masson SAS. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

1. Introduction

Sexual violence (SV) is a major public health problem. Access to treatment and care after rape is another. Access to preventive health care after sexual assault remains low, and most victims suffer adverse consequences. In both war and peacetime, these consequences are

DOI of original article: <http://dx.doi.org/10.1016/j.jepih.2024.202745>.

* Corresponding author.

E-mail address: mguerschom@gmail.com (M.-M. Guerschom).

<https://doi.org/10.1016/j.jepih.2024.202534>

2950-4333/© 2024 The Author(s). Published by Elsevier Masson SAS. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

highly traumatic in both the short and long term, affecting both the victim and society as a whole [1,2]. In conflict zones, unwanted births, sexually transmitted infections (STIs) or HIV, fistula and sterility are the most frequently cited physiological consequences [3–6]. A meta-analysis of 20 studies on the consequences of rape, including 12 on the DRC (Democratic Republic of Congo), shows that up to 46.3 % of women raped in conflict zones became pregnant as a result of rape. Between 2.1 % and 28.7 % of victims have traumatic genital lesions or tears. Between 9 and 40.7 % of rapes result in rectal and vaginal fistula. STIs and sexual dysfunction were the most common problems, with prevalence rates ranging from 4.6 % to 83.6 % and 20.1 % to 56.7 %, respectively [7–9].

Rape is also associated with poor psychosocial health¹ among women. The most commonly reported psychosocial problems are fear and anxiety, posttraumatic stress disorder, depression, poor self-esteem, social adjustment issues, and sexual dysfunctions [10]. These physiological and psychosocial consequences vary according to the circumstances and nature of the rape. According to a series of studies conducted in eastern DRC, women who had been sexually assaulted by four or five attackers were two to three times more likely to develop gynecological problems than women who had been raped by a single attacker. Victims who had given birth as a result of rape were 2.5 times more likely to suffer severe trauma than those who had not [7,9]. Victims of conflict-related sexual violence were more likely to develop severe symptoms of post-traumatic stress disorder and psychological distress than victims of non-conflict-related sexual violence [12].

Despite the link between rape and health problems, few victims have access to post-rape treatment and prevention. A study conducted by UNFPA in the DRC shows that less than 25 % of victims reach a health facility within 72 h of being raped [13]. In addition, statistics from Panzi Hospital² show that approximately 13 % of victims receive medical consultation within 72 h of rape. However, medical care after rape varies depending on the time between the rape and the medical consultation, i.e. whether the victim access medical care before or after 72 h. Victims who access post-rape medical care before 72 h receive special care. This includes prevention of sexually transmitted diseases, pregnancy, HIV, hepatitis B, and tetanus [15]. Thus, the health consequences of rape can be avoided or reduced if victims seek care before 72 h.

In reviewing the literature on this topic, we identified a number of studies that analyzed the factors associated with delayed post-rape medical consultations in countries not affected by conflict. For example, Leye *et al.* [16] found that delayed access to medical care among rape victims in Senegal was associated with being over 18, being married, and being pregnant. Hanson *et al.* [4] found that in the United States, teenage victims were more likely to seek early post-rape care. Little attention has been paid to access to post-rape care in conflict zones. In addition, the identified studies did not analyze contextual factors related to the provision of care in the victim's place of residence.

This study aimed to identify both individual and contextual factors that influence the likelihood of accessing post-rape care within 72 h in the eastern DRC.

¹ Each victim of rape treated at Panzi Hospital receives psychosocial counseling from a team of psychologists during their hospitalization. Treatments include individual counseling, group counseling, narrative exposure therapy, music therapy, mental field therapy, relaxation, psychoeducation, active listening, resiliency building, picnic, neurofeedback, etc. After discharge from the hospital, a team of psychologists and psychosocial assistants makes follow-up home visits to victims who need them to monitor the evolution of their physical and psychological health [9].

² A hospital located in the city of Bukavu, South Kivu province, in the east of the Democratic Republic of Congo. This hospital was founded in 1990 by Dr. Denis Mukwege, winner of the 2018 Nobel Peace Prize. The hospital attracts a large number of victims not only because of the quality of the holistic care provided free of charge, but also because of its global reputation. By 2015, more than 48,482 victims of SV have been treated there [14].

2. Patients and methods

2.1. Study design, data sources and population

This retrospective cohort study was conducted in eastern DRC, involving female victims of sexual violence (SV) who received treatment for rape at Panzi Hospital in Eastern DRC from 2014 to 2019 and resided in South Kivu. Individual data were sourced from the Panzi Hospital database, while contextual data were obtained from the South Kivu Provincial Ministry of Health and the Panzi Hospital administration.

2.2. Inclusion and exclusion criteria

The database documented many forms of sexual violence, with rape being by far the most common (99 %). Only victims who had been raped, who lived in the province of South Kivu at the time of the rape, and who had never received post-rape medical care elsewhere were included. Rape victims who received post-rape care at other facilities before being transferred to Panzi for further treatment were not included in the sample analyzed (49 records). Similarly, rape victims from other provinces or countries (132 records) were not included in the study because contextual information on their health zones of residence was not available.

2.3. Measures

The outcome variable was access to care within 72 h following the rape, represented as a dichotomous variable: 1 for victims who accessed care within this timeframe, and 0 for those who did not.

Twenty-three (23) independent variables were selected, which are listed in Table 1. Most of the variables were selected based on their availability in the datasets and their theoretical relationship with access to health care after rape, as reported in previous studies [4,11]. Other variables were included in the model after interviewing various people involved in rape care in South Kivu. Some variables were measured at the individual level, others at the level of the health zone where the victim resides at the time of the rape.

Individual level (level 1) factors. Nineteen (19) individual level variables were selected: age (<18 years, ≥18 years), marital status (married, single, separated/widow), highest educational attainment (no diploma, completed primary school, completed secondary school), tribe (Bashi, Barega, other), religion (no religion, Protestant, Catholic, other), rape cohort (coded 2015 or before and After 2015, to account for the change in the predominant type of rape before and after 2015³), head of household (no/yes), engaged in income-generating activity (no/yes), place of residence (urban, rural), disability (yes if the victim has a physical or mental disability as assessed by a doctor or psychologist, and no otherwise), vulnerable (yes if the victim is in any of the following situations: victim living alone or on the street, minor abandoned by family, married woman abandoned by husband, and no otherwise), displaced (no/yes), having been referred to the hospital (no/yes), previous rape (no/yes), relationship with perpetrator (no/yes), armed perpetrator (no/yes), number of perpetrators (no/yes), kidnapped (no/yes), tortured (no/yes).

Contextual level (level 2) factors. The victim's health zone of residence was the identifier for the contextual variables. Four contextual variables were selected: the number of active NGOs working with Panzi Hospital in the victim's health zone of residence, the number of health facilities in the victim's health zone of residence, the distance

³ In fact, before 2015, about 84% of rapes reported in Panzi were attributed to armed groups, a trend that has reversed in recent periods, with most rapes now being committed by civilians [17]. According to Moufflet [18], a significant proportion of women raped in urban areas of Kivu are raped by street children, neighbors, friends, classmates, passers-by.

Table 1
 Characteristics of victims, perpetrators, and health zones in relation to access to health care within 72 h after a rape.

Variables	Values	Before 72 h Frequency (%)	>72 h Frequency (%)	Whole sample Frequency (%)	Pearson Chi-square (p-value ^e)
Qualitative variables					
Age	<18 years old	314 (25.9)	897 (74.1)	1211 (100)	258.9 ^c (<0.001) ***
	≥18 years old	209 (7.4)	2628 (92.6)	2837 (100)	
Marital status	Married	229 (12.5)	1661 (87.5)	1838 (100)	2.0 (0.360)
	Single	218 (13.8)	1129 (86.2)	1575 (100)	
	Separated/Widow	76 (12.0)	735 (88.0)	635 (100)	
Highest diploma	No diploma	146 (8.1)	1378 (91.9)	1807 (100)	71.4 (<0.001) ***
	Completed primary school	211 (15.7)	854 (84.3)	1340 (100)	
	Completed secondary school	166 (18.4)	529 (81.6)	901 (100)	
Tribe	Bashi	380 (13.9)	2357 (86.1)	2727 (100)	7.1(0.029) **
	Barega	33 (10.4)	285 (89.6)	318 (100)	
	Other	110 (11.1)	883 (88.9)	993 (100)	
Religion	No religion	26 (19.7)	106 (80.3)	132 (100)	6.7 (0.081) ^o
	Protestant	279 (12.4)	1965 (87.6)	2244 (100)	
	Catholic	183 (13.4)	1183 (86.6)	1366 (100)	
	Other	35 (11.4)	271 (88.6)	306 (100)	
Head of home	No	456 (15.1)	2553 (84.8)	3009 (100)	52.0 (<0.001) ***
	Yes	67 (6.5)	825 (93.6)	1039 (100)	
Engaging in an income-generating activity	No	364 (22.4)	1261 (77.6)	1625 (100)	216(<0.001) ***
	Yes	159 (6.6)	2264 (93.4)	2423 (100)	
Place of residence	No	318 (23.9)	1010 (76.1)	1328 (100)	213(<0.001) ***
	Yes	205 (7.5)	2515 (92.5)	2720 (100)	
Living in an isolated health zone	No	512 (14.7)	2972 (85.3)	3484 (100)	70.1(<0.001) ***
	Yes	11 (2.0)	553 (98.0)	564 (100)	
Vulnerable	No	218 (8.8)	2265 (91.2)	2483 (100)	97.8(<0.001) ***
	Yes	305 (19.5)	1660 (80.5)	1565 (100)	
Disability	No	501 (12.8)	3418 (87.2)	3919 (100)	2.0 (0.155)
	Yes	22 (17.1)	107 (82.9)	129 (100)	
Displaced	No	436 (13.1)	2898 (86.9)	3334 (100)	0.4 (0.519)
	Yes	87 (12.2)	627 (87.8)	714 (100)	
Referred to the hospital	No	157 (23.6)	508 (76.4)	665 (100)	80.8(<0.001) ***
	Yes	366 (10.8)	3017 (89.2)	3383 (100)	
Rape cohort	≤ 2015	89 (6.2)	1357 (93.8)	1446 (100)	91.5(<0.001) ***
	After 2015	434 (16.7)	2168 (83.3)	2602 (100)	
Previous rape	No	116 (14.0)	710 (84.0)	826 (100)	1.16(0.281)
	Yes	407 (12.6)	2815 (87.4)	3222 (100)	
Relationship with perpetrator	No	278 (9.6)	2615 (93.4)	2893 (100)	98.7 (<0.001) ***
	Yes	245 (21.2)	910 (78.8)	1155 (100)	
Armed perpetrator	No	355 (15.4)	1945 (84.6)	2300 (100)	29.9 (<0.001) ***
	Yes	168 (9.6)	1580 (90.4)	1748 (100)	
Number of perpetrators	One	391 (19.3)	1633 (80.7)	2024 (100)	147.2(<0.001) ***
	Two or more	132 (6.5)	1892 (93.5)	2024 (100)	
Kidnapped	No	493 (12.8)	3368 (68.2)	3861 (100)	1.69(0.192)
	Yes	30 (16)	157 (67.4)	187 (100)	
Tortured	No	458 (12.7)	2131 (68.7)	3593 (100)	0.85(0.357)
	Yes	65 (14.3)	390 (64.0)	455 (100)	
Whole sample (%)	523 (12.9)	3525 (87.1)	4048 (100)		
Quantitative variables					
Variables	Values	Mean (sd) ^d	Mean (sd)	Mean (sd)	Statistic (p-value)
Distance between home health zone and hospital	Quantitative	37.3 (69.4)	91.4 (105.1)	84.4(102.8)	15.3(<0.001) ^a ***
Number of hospital NGO partners in victim's health zone of residence	Quantitative	37.3 (11.9)	30.7 (13.1)	31.6(13.1)	-12(<0.002) ^b ***
Number of health facilities in the health zone	Quantitative	33.4 (9.2)	30.1 (7.38)	30.6 (5.7)	-7.7(<0.001) ^d ***

^a Welch test.

^b Student t-test.

^c Pearson Chi-square

^d Standard deviation

^e *** p-value<1%, ** p-value<5%, * p-value<7.5%, ° p-value<1%

by road between the victim's health zone of residence and Panzi Hospital, and the isolation of the victim's health zone of residence. The number of NGOs and health facilities variables can in principle vary over time, but due to a lack of data, they were fixed at their 2018 value. However, given low social investment or entrepreneurship, they were assumed to vary little over time, limiting potential bias. They were also not calculated per 1000 inhabitants due to a lack of credible population data by health zone. The distance variable was

measured using Google Maps. The variable isolation of health zone was coded 1 if there was no viable road⁴ connecting the victim's health zone of residence to the city of Bukavu, where Panzi Hospital is located, and 0 otherwise. The number of NGOs and the number of

⁴ Women living in remote health areas reach Panzi Hospital for treatment either by walking in areas where there are no roads, or by NGO vehicles where there are roads, or by NGO airlift [19].

health facilities were taken from the Panzi Hospital administration and from the Ministry of Health of the Province of South Kivu, respectively.

2.4. Statistical analysis

In the bivariate analysis, we examined the relationship between access to care within 72 h following the rape and both categorical and quantitative variables. Categorical variables were analyzed using the chi-squared test, while quantitative variables were evaluated with the Student's *t*-test, assuming normality and homogeneity of variances, or with the Welch's test when these assumptions were not met. A two-level multilevel logistic model with random intercept was used in the multivariate analysis. All independent variables used in the bivariate analysis were included in the multivariate analysis, as some variables that were not statistically significant in the univariate analysis were found to be statistically significant in the multivariate analysis [20]. Independent variables were included in the model based on their level of measurement (individual or contextual) using a four-step approach (Table 2). First, an empty multilevel model (null model) was estimated, i.e. a model with no explanatory variables, showing the proportion of variability in access to post-rape care before 72 h that is explained by health zones (the intraclass correlation, ICC). The greater this variability, the more relevant multilevel modeling is [21]. The results (Table 2) showed that health zones explained a very large (intraclass correlation = 25 %) and significant ($p < 0.001$)⁵ proportion of the total variability in access to care, indicating the relevance of multilevel modeling. Second, only individual level variables were included (Model 2, Table 2). Third, only health zone level variables were included (Model 3, Table 2). Fourth, a full model including all individual and contextual level variables was estimated (Model 4, Table 2). The multilevel model allowed estimating both fixed and random effects [21]. The fixed effects, reported as adjusted odds ratios (aOR) along with their 95 % confidence intervals (CI), enabled the analysis of factors associated with access to care before 72 h. The fixed effects results of the full model (Model 4) were retained for interpretation and discussion, as the full model outperformed the first three models (lowest Akaike information criterion, AIC). Random effects, represented by the contextual variance, its standard deviation and the ICC, were used to analyze the variability in access to health care explained by individual and contextual level factors. To assess the significance of this variability, the likelihood ratio (LR) test was used. This test compared the variability in access to care explained by the variables included in each model with that explained by the null model. The Wald test was used to test whether the contextual variance in each model was not significantly different from 0. The multilevel model (AIC = 2615.9, Table 2) fitted the data better than the logistic model (AIC = 2662.3).

We tested for possible collinearity between the explanatory variables using generalized variance inflation factors, GVIF [22]. The results (Supplementary Table 1) showed no evidence of high collinearity among the explanatory variables (mean GVIF = 1.19, median GVIF = 1.12, maximum GVIF = 2.09, and minimum GVIF = 1.03).

There were 8 % missing values in the dataset. We replaced missing values using multiple imputation. To assess the effect of imputing missing values on the results, we ran a two-level multilevel model after dropping all rows with missing data. The results were very similar to those reported in Table 2.

Variables with a *p*-value less than 0.05 were considered to have a statistically significant effect on access to care. However, those with a *p*-value ≥ 0.05 but < 0.075 were identified as exhibiting a trend towards significance. This nuanced approach, distinguishing between full statistical significance and trending significance, allows us to

broaden the discussion to include variables that suggest important trends in practice for access to post-rape care. Although these variables do not meet the conventional threshold for statistical significance, their *p*-values in the specified range may point to potential patterns or trends deserving of attention for their practical implications in understanding and improving access to care. Analyses were performed using the *lme4* and *mice* packages of R software, version 4.3.2.

2.5. Ethical consideration

The database used is totally anonymous. Patients are identified by a numerical code that does not allow them to be identified in any way.

2.6. Data availability statement

Access to the data requires a request, accompanied by the study project, to the ICART Research Center of the Panzi Foundation. Data on health zones are available in a document, 'the health pyramid', published by the Ministry of Health of the province of South Kivu in 2018.

3. Results

3.1. Sample description and bivariate analysis

The study encompassed a total of 4048 women, of whom approximately 13 % accessed care within 72 h following the incident of rape. Most of the victims are over 18 years old (70 %), married (40 %) or single (38.9 %), have no diploma (44.6 %), are not heads of household (74.3 %), live in a rural area (67.2 %), live an average of 84 kms from the hospital, have no relationship with their perpetrators (71.5 %), have been raped before (79.6 %). Half of them (50 %) were attacked by a single person; 43.2 % were attacked by an armed person (see Table 1).

The bivariate analysis of factors associated with access to post-rape care within 72 h is presented in Table 1. Most victims access care after 72 h (87.1 %), while a minority (12.9 %) access medical consultation before 72 h, confirming the problem of the present study. Access to care before 72 h varies significantly (p -value < 0.05) according to age, education, tribe, being head of household, occupation, urban or rural environment, isolation of the area of residence, disability, time of rape, presence of a relationship with the perpetrator, number of perpetrators, type of perpetrator, distance, number of health facilities in the health zone, number of Panzi partner NGOs and number of health facilities in the victim's health zone of residence.

3.2. Multivariate analysis of factors associated with access to post-rape care before 72 h

Table 2 (full model) shows the individual and health zone-level determinants of access to post-rape care within 72 h.

Access to care before 72 h is statistically significantly and negatively associated with the isolation of the victim's health zone of residence (aOR = 0.29[0.14–0.63], $p = 0.002$), the distance between the home health zone and the hospital (aOR = 0.75[0.54–0.99], $p = 0.041$), having been raped in 2015 or earlier (aOR = 0.44[0.34–0.57], $p < 0.001$), being referred to the hospital by other health facilities or organizations (aOR = 0.78[0.61–1.00], $p = 0.049$), being Murega⁶ (aOR = 0.63[0.41–0.97], $p = 0.037$) and with the number of

⁶ Member of the Barea tribe. Most of the Barea live in health zones far from the hospital, landlocked, whereas the Bashi are more numerous in the city of Bukavu and have long been established in the territories surrounding the city.

⁵ significantly different from 0 according to Wald test

Table 2
Multilevel model of factors associated with access to post-rape care within 72 h.

Variables [Reference values]	Values	Model 1 (null model)		Model 2 (adjusted for individual-level predictors)		Model 3 (adjusted for contextual-level predictors)		Model 4 (full model)	
		OR[95 % CI] ^a	p-value	OR[95 % CI] ^a	p-value	OR[95 % CI] ^a	p-value	OR[95 % CI] ^a	p-value
Fixed effects — Individual level predictor variables									
(Intercept)		0.06[0.04–0.10]	<0.001***	0.21[0.10–0.46]	<0.001***	0.11[0.08–0.17]	<0.001***	0.29[0.15–0.56]	<0.001***
Age [Ref. ^a = <18 years old]	≥18 years old			0.75[0.52–1.07]	0.110			0.74[0.52–1.05]	0.092
Marital status [Ref. = Married]	Single			1.29[1.03–1.60]	0.025**			1.29[1.03–1.61]	0.024**
	Separated/Widow			0.79[0.59–1.07]	0.133			0.79[0.58–1.06]	0.118
Highest diploma [Ref. = No diploma]	Completed primary school			1.05[0.80–1.36]	0.731			1.05[0.80–1.37]	0.659
	Completed secondary school			0.87[0.65–1.17]	0.356			0.88[0.66–1.19]	0.413
Tribe [Ref.=Bashi]	Barega			0.59[0.38–0.90]	0.014**			0.63[0.41–0.97]	0.037**
	Other			1.16[0.88–1.53]	0.301			1.20[0.91–1.59]	0.199
Religion [Ref. = Protestant]	No religion			0.97[0.78–1.21]	0.438			0.96[0.77–1.20]	0.718
	Catholic			1.17[0.77–1.79]	0.805			1.21[0.79–1.85]	0.384
	Other			1.58[0.93–2.68]	0.091 [†]			1.56[0.92–2.66]	0.101
Head of home [Ref. = No]	Yes			0.91[0.66–1.25]	0.563			0.90[0.65–1.24]	0.521
Engaging in an income-generating activity [Ref. = No]	Yes			0.85 [0.62–1.17]	0.326			0.87[0.64–1.20]	0.401
Place of residence [Ref. = Urban]	Rural			0.64[0.66–1.25]	0.148			0.71[0.42–1.20]	0.200
Vulnerable [Ref. = No]	Yes			0.97[0.75–1.27]	0.835			0.96[0.74–1.25]	0.874
Disability [Ref. = No]	Yes			0.98[0.57–1.70]	0.932			0.96[0.55–1.67]	0.892
Displaced at the time of rape [Ref. = No]	Yes			0.76[0.58–1.00]	0.050*			0.78[0.59–1.02]	0.068*
Referred to the hospital [Ref. = No]	Yes			0.80[0.62–1.01]	0.064*			0.78[0.61–1.00]	0.049**
Rape cohort Ref. = [After 2015]	≤ 2015			0.44[0.34–0.57]	<0.001***			0.44[0.34–0.57]	<0.001***
Previous rape [Ref. = No]	Yes			1.25[0.98–1.61]	0.076			1.26[0.98–1.62]	0.072*
Relationship with perpetrator [Ref. = No]	Yes			0.93[0.72–1.19]	0.548			0.93[0.71–1.14]	0.277
Armed perpetrator [Ref. = No]	Yes			0.87[0.70–1.08]	0.214			0.89[0.70–1.09]	0.231
Number of perpetrators [Ref. = One]	Two or more			0.71[0.54–0.94]	0.016**			0.73[0.55–0.96]	0.024**
Kidnapped [Ref. = No]	Yes			0.98[0.66–1.25]	0.911			0.99[0.64–1.54]	0.966
Torture [Ref. = No]	Yes			1.68[1.23–2.30]	0.001***			1.69[1.23–2.32]	<0.001***
Fixed effects — Contextual level predictor variables									
Is the health zone of residence isolated? [Ref. = No]	Yes					0.24[0.15–0.56]	<0.001***	0.29[0.14–0.63]	0.002***
Distance						0.70[0.49–1.02]	0.064*	0.73[0.54–0.99]	0.041**
Number of health facilities in the health zone						1.16[0.79–1.70]	0.457	1.13[0.82–1.56]	0.463
Number of hospital NGO partners						1.40[0.98–2.00]	0.066*	1.33[0.99–1.80]	0.057*
Random effects									
Health zone variance (standard deviation)		1.121 (1.059)	<0.001***	0.703 (0.838)	<0.001***	0.585 (0.765)	<0.001***	0.337(0.580)	<0.001***
Intra-Class Correlation (ICC)		25.4 % ^{b, c}		17.6 % ^c		15.1 % ^c		9.2 % ^c	
Model statistics									
LR χ^2 (p-value)		Reference		$\chi^2 = 119.5$	<0.001***	$\chi^2 = 26.5$	<0.001***	$\chi^2 = 128.5$	<0.001***
Wald test χ^2 (p-value)		$\chi^2 = 399.6$	<0.001***	$\chi^2 = 486.4$	<0.001***	$\chi^2 = 440.1$	<0.001***	$\chi^2 = 528.2$	<0.001***
Number of observations		4048		4048		4048		4048	
Number of groups		32		32		32		32	
Akaike information criterion		2720.2		2648.7		2701.7		2615.9	
Deviance		2716.2		2596.7		2689.7		2572.9	

^a Odds-ratios (OR) whose confidence intervals (CI) do not contain 1 are significantly different from 1.

^b 25.4 % of the variation in access to post-rape care is attributed to whether a woman resided in one health zone or another at the time of rape.

^c The significant decrease ($p < 0.05$, see Wald and LR test results) in the ICC in the subsequent models indicates the relevance of the variables included at each level of analysis in explaining access to care. However, despite the observed decrease in ICC, the final value of 9.2 % (unexplained contextual variance) remains high (significantly different from 0 according to the Wald test), underscoring the importance of other factors not considered in this study in explaining access to post-rape care.

^d Ref = Reference category

*** p-value < 1 %.

** p-value < 5 %.

* p-value < 7.5 %.

[†] p-value < 10 %.

perpetrators (aOR = 0.73[0.55–0.96], $p = 0.024$). Being internally displaced at the time of rape (aOR = 0.78[0.59–1.02], $p = 0.068$) is associated with a trend towards decreased access to post-rape care. However, access to care before 72 h was statistically significantly and positively associated with being single (aOR = 1.29[1.03–1.61], $p = 0.024$), having been tortured during the rape (aOR = 1.69[1.23–2.32], $p < 0.001$), while having experienced a previous rape (aOR = 1.26[0.98–1.62], $p < 0.072$) and the number of Panzi partner NGOs working in the victim's health zone of residence (aOR = 1.33[0.99–1.80], $p = 0.057$) were associated with a trend towards increased access to care.

4. Discussion

4.1. Main findings

Our main findings highlight factors amenable to intervention by public health practitioners or policy makers aimed at enhancing access to care, or those presenting a significant public health concern [23,24]. Only about 13 % of sexual violence (SV) victims receive post-rape care within the crucial 72-hour window. Factors negatively impacting the likelihood of accessing timely post-rape care include being married, residing in an isolated health zone, greater distance between the home and hospital, incidents of rape occurring in 2015 or earlier, referrals from other health facilities or organizations, and being internally displaced at the time of the rape. Conversely, the presence of Panzi partner NGOs within a victim's health zone might facilitate access to post-rape care.

4.2. Factors associated with access to post-rape medical care within 72 h

All factors related to access to care before 72 h were grouped into socio-demographic factors, factors related to the context of the rape, geographical factors and factors related to care delivery.

4.2.1. The role of sociodemographic factors

Our results showed that married victims were less likely to access post-rape care before 72 h than single victims. This finding, which confirms that of Leye et al. [16], could be explained by the fear of rejection by the husband and implies total discretion on the part of the victim. In fact, in the African context and particularly in South Kivu, non-marital rape of a married woman is one of the multiple causes of couple separation [25]. This rejection is often based on the feeling that these women are contaminated with STIs [26]. Aware that women who are raped by someone other than their husbands are likely to be rejected by their husbands, Panzi Hospital mediates between rape victims and their husbands, talking to the husbands so that the victims can be calmly reintegrated into their families. The low propensity of married women to seek post-rape care before 72 h means that awareness raising is also needed not only among husbands whose wives have been raped, but also among husbands whose wives have not been raped and in the community. Women's lack of confidentiality with certain health workers or peer mediators in their village of residence may be another factor explaining married women's low propensity to seek treatment, as other studies have shown [27,28]. Provisions for confidentiality or anonymity would probably be necessary to encourage more women to go to health facilities to receive post-rape medical care.

4.2.2. The role of factors related to rape context

Access to care before 72 h was associated with factors related to the context of the rape. Victims raped in 2015 or before have less access to care than those raped after 2015. This would be mainly the result of greater access to information leading to changes in knowledge and attitudes about SV. Several factors may have contributed to this improvement in access to care over

time, including, first, the media and various community awareness activities carried out by Panzi Hospital⁷ and other NGOs [15]; second the community health programs run by NGOs, offering health education to all members of the community in partnership with local providers, addressing negative gender norms through education and awareness-raising [30]. The effectiveness of such programs has been highlighted in the literature on prevention and response to sexual violence [31].

Internally displaced (IDPs) victims are less likely to receive care within 72 h. Refugees and IDPs are more vulnerable to sexual violence [32,33]. They are also less likely to have access to health care, as we have just found and as other studies have shown [34]. Factors contributing to poor access to reproductive health care among IDPs include lack of availability of care, lack of knowledge about services, lack of financial resources, and language barriers between patients and health care providers [35,36]. Although many efforts have been made by NGOs to facilitate access to reproductive health care for displaced people [37], our findings underscore the need for further efforts to provide care by strengthening existing programs or changing intervention strategies.

Victims raped by two or more people are less likely to access care before 72 h. However, victims who have been tortured are more likely to access care before 72 h. These findings highlight two opposing mechanisms through which conflict affects access to post-rape care. On the one hand, discouragement and despair following gang rape limit access to care before 72 h. On the other hand, in cases of torture, victims are more likely to seek treatment for their wounds, as other studies have shown [38].

4.2.3. The role of factors related to care delivery

Victims referred to Panzi are less likely to receive preventive care before 72 h. Those who refer victims to Panzi Hospital include the police, community or religious leaders, health structures and NGOs. This low propensity to seek post-rape care within 72 h for referred victims may be explained by a stock-out or lack of post-exposure prophylaxis (PEP) kits [29] at the health facilities where the victim first went immediately after the rape, or by the fact that some victims first seek legal assistance from the police before being referred by the police to Panzi Hospital.

According to our findings, the number of NGOs in the health zone facilitates access to care before 72 h. In the limited context of access to health care at Panzi Hospital, the NGO's work on access to care before 72 h consists of raising awareness of the right attitudes to adopt in the event of SV. Some local NGOs that do not have sufficient funds facilitate the transportation of victims to Panzi Hospital by paying for the transportation and then being reimbursed by the hospital. In some cases, the international NGOs also help to overcome the obstacles of distance, insecurity and isolation of the victim's home. For example, some patients are brought to Panzi by air (for example, by Aviation Without Borders or by the United Nations Organization Mission in Congo, MONUSCO [17]). However, the role of NGOs in addressing sexual violence and promoting access to health care is much broader. They contribute, among other things, to the management of emergency rape care, the provision of PEP kits and equipment to health facilities [40], the coordination and capacity building of local actors in the fight against sexual and gender-based violence, the empowerment of victims [41], the collection of data on sexual violence and the reporting of cases of sexual violence [42].

⁷ Panzi Hospital has a communication department whose mission is to raise awareness about the right behavior to adopt in case of sexual violence. Awareness-raising is carried out in local media, schools, neighborhoods, public markets in rural areas, churches, etc. The Panzi Foundation also has a Mobile Clinic with a mobile team that provides preventive care against SV in remote areas of the city of Bukavu and the DRC (<https://panzifoundation.org/fr/mobile-clinics-and-rapid-response-missions/>).

4.2.4. The role of geographic factors

Access to post-rape care before 72 h is negatively associated with the distance between the victim's health zone of residence and the Panzi hospital. Behind this distance barrier are economic barriers, including transportation costs, physical infrastructure, travel time and its opportunity costs [39,43].

There are also disparities in access to care before 72 h between landlocked and non-landlocked health zones where the victim lives. Women living in landlocked health zones have less access to care before 72 h due to lack of viable roads and transportation.

4.3. Strengths and limitations

The first strength of this study is its sample size. Conflict was measured indirectly, mainly through practices such as being attacked by armed men, torture or kidnapping. This points to the relevance of more objective measures of conflict, such as deaths by health zone or the number of armed groups operating in each health zone of the victim's residence during the period covered by the study. This information was not found by health zone of residence of the victim and was therefore not analyzed in this study. The results of this study are based on an empirical approach. They can be complemented by a qualitative study in the form of an interview in which victims are asked about the reasons why they did or did not have access to medical care within 72 h of the rape. Due to a lack of data, we were unable to analyze the characteristics of Panzi Hospital's partner organizations, which transfer more victims to the hospital after 72 h. Knowledge of these organizations (police, local NGOs, international NGOs, community leaders, churches, working conditions, headquarters, etc.) would help guide the hospital's actions and collaborations to facilitate access to care before 72 h.

5. Conclusion

These findings underscore the critical need to enhance access to post-rape medical care by focusing on targeted awareness campaigns, particularly among married women and their husbands. To overcome the various barriers—be they material, financial, or organizational—that lead some organizations to refer patients to the hospital after the crucial 72-hour window, it is imperative to strengthen collaborations with law enforcement, healthcare facilities, and all partnering organizations. Enhancements in security measures, the construction or improvement of roads connecting major cities to currently inaccessible or isolated areas, bolstering the efforts of both local and international NGOs, and ensuring the provision of reproductive health care to internally displaced women and those residing in affected health zones are vital steps toward facilitating timely access to post-rape care.

Authors' contributions

Guerschom MUGISHO: conception of the study, drafting of the manuscript, drafting of the methodology, statistical analysis; Ali Alexandre: revision and drafting of the manuscript; Armelle ANDRO: supervision of the study and revision of the manuscript, methodological guidance. All authors approved the manuscript.

Competing interests

The authors declare that they have no competing interests.

Acknowledgements

This work benefited from a French government grant managed by the National Research Agency under the "Investissements d'avenir" programme with the reference ANR-17-EURE-0011. We would like

to thank an anonymous reader from Aix-Marseille University and the ICART Research Center for facilitating access to the data. We would also like to thank the peer reviewers and the editors for their valuable comments.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi: 10.1016/j.jep.2024.202534.

References

- [1] Gérard C. Conséquences d'un abus sexuel vécu dans l'enfance sur la vie conjugale des victimes à l'âge adulte. *Carnet de Notes Sur les Maltraitements Infantiles* 2014;3(1):42–8 [cited 2019 Nov 1]; Available from <http://www.cairn.info/revue-carnet-de-notes-sur-les-maltraitements-infantiles-2014-1-page-42.htm>.
- [2] Omba Kalonda J. Les violences sexuelles en République Démocratique du Congo: quelles conséquences sur le plan de la santé publique? *Méd Trop* 2008;68(6):576–8.
- [3] Golding JM, Cooper ML, George LK. Sexual assault history and health perceptions: seven general population studies. *Health Psychol* 1997;16(5):417–25.
- [4] Hanson RF, Davis JL, Resnick HS, Saunders BE, Kilpatrick DG, Holmes M, et al. Predictors of medical examinations following child and adolescent rapes in a national sample of women. *Child Maltreat* 2001;6(3):250–9 [cited 2020 May 21]. doi: 10.1177/1077559501006003006.
- [5] Khisa W, Kamau R. Traumatic fistula resulting from sexual violence: a case study in Kenya. *Afr J Midwif Women's Health* 2011;5(4):203–4 [cited 2020 Aug 19] Available from <https://www.magonlineibrary.com/doi/abs/10.12968/ajmw.2011.5.4.203>.
- [6] Jina R, Thomas LS. Health consequences of sexual violence against women. *Best Pract Res Clin Obstet Gynaecol* 2013;27(1):15–26 Feb 1 [cited 2023 Oct 28] Available from <https://www.sciencedirect.com/science/article/pii/S1521693412001344>.
- [7] Mukwege DM, Nangini C. Rape with extreme violence: the new pathology in South Kivu, Democratic Republic of Congo. *PLOS Med* 2009;6(12):e1000204 Dec 22 [cited 2019 Sep 18] Available from <https://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1000204>.
- [8] Bartels S, Scott J, Leaning J, Mukwege D, Lipton R, VanRooyen M. Surviving sexual violence in eastern Democratic Republic of Congo. *J Int Women's Stud* 2010;11(4):37–49.
- [9] Mugisho GM, Maroyi R, Nabami S, Kasherwa AC, Bitenga A, Mukwege D. Sexual and gender-based violence victims' satisfaction of the support services through the holistic model of care in the Democratic Republic of Congo. *Discov Soc Sci Health* 2022;2(1):22. [cited 2024 Feb 17] Available from. doi: 10.1007/s44155-022-00025-x.
- [10] Resick P. The psychological impact of rape. *J Interpers Viol* 1993;8(2):223–55 [cited 2024 Feb 3]. doi: 10.1177/088626093008002005.
- [11] Ba I, Bhopal RS. Physical, mental and social consequences in civilians who have experienced war-related sexual violence: a systematic review (1981–2014). *Public Health* 2017;142:121–35 Jan 1 [cited 2019 Oct 6] Available from <http://www.sciencedirect.com/science/article/pii/S003350616301901>.
- [12] Dossa NI, Zunzunegui MV, Hatem M, Fraser WD. Mental health disorders among women victims of conflict-related sexual violence in the Democratic Republic of Congo. *J Interpers Viol* 2015;30(13):2199–220 [cited 2024 Feb 13]. doi: 10.1177/0886260514552447.
- [13] Banza-Nsungu A. Ampleur des violences sexuelles en République Démocratique du Congo : analyse à partir des données rapportées par les acteurs de terrain 2014:37.
- [14] Mukwege D, Berg M. A holistic, person-centred care model for victims of sexual violence in Democratic Republic of Congo: The Panzi Hospital one-stop centre model of care. *PLOS Med* 2016;13(10):e1002156 [cited 2024 Feb 16] Available from <https://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1002156>.
- [15] OMS. Recommandations conjointes OMS/OIT sur la prophylaxie post-exposition pour prévenir l'infection à VIH. Genève: OMS-IOT; 2008.
- [16] Leye MMM, Diouf AA, Diongue M, Seck I, Dia AT. Étude des facteurs associés au retard de consultation sanitaire des victimes de viols au Sénégal. *Rev d'Épidémiol Santé Publ* 2019;67(5):329–35.
- [17] Bartels S, Scott JA, Leaning J, Kelly JT, Mukwege D, Joyce NR, et al. Sexual violence trends between 2004 and 2008 in South Kivu, Democratic Republic of Congo. *Prehosp Disaster Med* 2011;26(6):408–13.
- [18] Moufflet V. Le paradigme du viol comme arme de guerre à l'Est de la République Démocratique du Congo. *Afr Contemp* 2008(3):119–33.
- [19] Les ailes de la santé. Hôpital Panzi – RDC - Dr Denis Mukwege. [cited 2023 Oct 24]. Available from <https://www.youtube.com/watch?v=MZKYrhJagcs>.
- [20] Lo SK, Li IT, Tsou TS, See L. Non-significant in univariate but significant in multivariate analysis: a discussion with examples. *Changcheng Yi Xue Za Zhi* 1995;18(2):95–101 Jun.
- [21] Peugh JL. A practical guide to multilevel modeling. *J School Psychol* 2010;48(1):85–112 [cited 2024 Mar 18] Available from <https://www.sciencedirect.com/science/article/pii/S0022440509000545>.

- [22] Fox J, Monette G. Generalized collinearity diagnostics. *J Am Statist Assoc* 1992;87(417):178–83 [cited 2023 Apr 27] Available from <https://www.tandfonline.com/doi/abs/10.1080/01621459.1992.10475190>.
- [23] Salmi LR, Saillour-Glénisson F, Alla F, Boussat B. L'évaluation et la recherche sur les interventions en santé publique. *Rev d'Épidémiol Santé Publ* 2023;71(2):101836 [cited 2024 Mar 29] Available from <https://www.sciencedirect.com/science/article/pii/S0398762023004170>.
- [24] Stevens N, Alla F. Population health intervention research, health technology assessment, health services research and intervention implementation research: convergences and singularities. *Rev Epidemiol Sante Publ* 2023;71(2):101424 [cited 2024 Mar 29]. doi: [10.1016/j.respe.2023.101424](https://doi.org/10.1016/j.respe.2023.101424).
- [25] Bartels S, Kelly J, Scott J, Leaning J, Mukwege D, Joyce N, et al. Militarized sexual violence in south Kivu, Democratic Republic of Congo. *J Interpers Viol* 2013;28(2):340–58.
- [26] Amisi C, Apassa RB, Cikara A, Østby G, Nordås R, Rustad SA, et al. The impact of support programmes for survivors of sexual violence: micro-level evidence from eastern Democratic Republic of the Congo. *Med Confl Surv* 2018;34(3):201–23 [cited 2024 Feb 16]. doi: [10.1080/13623699.2018.1541625](https://doi.org/10.1080/13623699.2018.1541625).
- [27] Frerich EA, Garcia CM, Long SK, Lechner KE, Lust K, Eisenberg ME. Health care reform and young adults' access to sexual health care: an exploration of potential confidentiality implications of the affordable care act. *Am J Public Health* 2012;102(10):1818–21 [cited 2024 Feb 16] Available from <https://ajph.aphapublications.org/doi/full/10.2105/AJPH.2012.300857>.
- [28] Kamke K, Mullin TM, Goodman KL. Barriers to seeking medical care among youth victims of sexual violence. *J Adolesc Health* 2023;73(6):1077–82 [cited 2024 Feb 16] Available from <https://www.sciencedirect.com/science/article/pii/S1054139X23003452>.
- [29] Bress J, Kashemwa G, Amisi C, Armas J, McWhorter C, Ruel T, et al. Delivering integrated care after sexual violence in the Democratic Republic of the Congo. *BMJ Glob Health* 2019;4(1):e001120 [cited 2020 Sep 6] Available from <https://gh.bmj.com/content/4/1/e001120>.
- [30] Kohli A, Makambo MT, Ramazani P, Zahiga I, Mbika B, Safari O, et al. A Congolese community-based health program for survivors of sexual violence. *Confl Health* 2012;6(1):6. [cited 2024 Feb 16]. doi: [10.1186/1752-1505-6-6](https://doi.org/10.1186/1752-1505-6-6).
- [31] Robbers GML, Morgan A. Programme potential for the prevention of and response to sexual violence among female refugees: a literature review. *Reproduct Health Matters* 2017;25(51):69–89 [cited 2024 Feb 16]. doi: [10.1080/09688080.2017.1401893](https://doi.org/10.1080/09688080.2017.1401893).
- [32] Vu A, Adam A, Wirtz A, Pham K, Rubenstein L, Glass N, et al. The prevalence of sexual violence among female refugees in complex humanitarian emergencies: a systematic review and meta-analysis. *PLoS Curr* 2014;6 [cited 2024 Feb 16] ecur-rents.dis.835f10778fd80ae031aac12d3b533ca7. Available from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4012695/>.
- [33] Ward J, Vann B. Gender-based violence in refugee settings. *Lancet* 2002;360:s13–4 [cited 2024 Feb 16] Available from [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(02\)11802-2/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(02)11802-2/fulltext).
- [34] Casey SE. Evaluations of reproductive health programs in humanitarian settings: a systematic review. *Confl Health*. 2015;9(1):S1. [cited 2024 Feb 16]. doi: [10.1186/1752-1505-9-S1-S1](https://doi.org/10.1186/1752-1505-9-S1-S1).
- [35] Sawadogo PM, Sia D, Onadja Y, Beogo I, Sangli G, Sawadogo N, et al. Barriers and facilitators of access to sexual and reproductive health services among migrant, internally displaced, asylum seeking and refugee women: a scoping review. *PLoS ONE* 2023;18(9):e0291486 [cited 2024 Feb 16] Available from <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0291486>.
- [36] Kisindja RM, Kimona C, Etoy M, Dorme F, Benfield N. Family planning knowledge and use among women in camps for internally displaced people in the Democratic Republic of the Congo. *Int J Gynecol Obstetr* 2017;138(3):256–60 [cited 2024 Feb 16] Available from <https://onlinelibrary.wiley.com/doi/abs/10.1002/ijgo.12220>.
- [37] Chynoweth SK. Advancing reproductive health on the humanitarian agenda: the 2012–2014 global review. *Confl Health* 2015;9(1):11. [cited 2024 Feb 16]. doi: [10.1186/1752-1505-9-S1-11](https://doi.org/10.1186/1752-1505-9-S1-11).
- [38] Zinzow HM, Resnick HS, Barr SC, Danielson CK, Kilpatrick DG. Receipt of post-rape medical care in a national sample of female victims. *Am J Prevent Med* 2012;43(2):183–7 [cited 2020 Aug 19] Available from <http://www.sciencedirect.com/science/article/pii/S0749379712002048>.
- [39] Bartels SA, Scott JA, Leaning J, Kelly JT, Joyce NR, Mukwege D, et al. Demographics and care-seeking behaviors of sexual violence survivors in South Kivu Province, Democratic Republic of Congo. *Disast Med Public Health Preparedness* 2012;6(4):393–401 [cited 2020 Jun 2] Available from <http://www.cambridge.org/core/journals/disaster-medicine-and-public-health-preparedness/article/ demographics-and-care-seeking-behaviors-of-sexual-violence-survivors-in-south-kivu-province-democratic-republic-of-congo/37CD3B2385B121D11996E7E5904803F7>.
- [40] Duroch F, Schulte-Hillen C. Care for victims of sexual violence, an organization pushed to its limits: the case of Médecins Sans Frontières. *Int Rev Red Cross* 2014;96(894):601–24 [cited 2024 Feb 16] Available from <https://www.cambridge.org/core/journals/international-review-of-the-red-cross/article/care-for-victims-of-sexual-violence-an-organization-pushed-to-its-limits-the-case-of-medecins-sans-frontieres/B650C6F97B40EF01D5626D202D9EEFE>.
- [41] Quattrochi J, Biaba R, Nordås R, Østby G, Allدن S, Cikara A, et al. Effects of an empowerment program for survivors of sexual violence on attitudes and beliefs: evidence from the Democratic Republic of Congo. *Int J Equity Health* 2019;18(1):149. [cited 2024 Feb 16]. doi: [10.1186/s12939-019-1049-4](https://doi.org/10.1186/s12939-019-1049-4).
- [42] Delisle H, Roberts JH, Munro M, Jones L, Gyorkos TW. The role of NGOs in global health research for development. *Health Res Policy Syst* 2005;3(1):3. [cited 2024 Feb 16]. doi: [10.1186/1478-4505-3-3](https://doi.org/10.1186/1478-4505-3-3).
- [43] Timyan J, Brechin SJG, Measham DM, Ogunleye B. Access to care: more than a problem of distance. *The health of women*. Routledge; 1993. Available from <https://www.taylorfrancis.com/chapters/edit/10.4324/9780429496455-11/access-care-problem-distance-judith-timyan-susan-griffey-brechin-diana-measham-bisi-ogunleye>.