Original Article

Partner Notification and Associated Factors among People Living with Human Immunodeficiency Virus in Bushenge Hospital, Rwanda

Noella Benemariya, Joseph Ntaganira*

Department of Epidemiology and Biostatistics, School of Public Health, College of Medicine and Health Sciences, University of Rwanda, Kigali, Rwanda.

***Corresponding author:** Joseph Ntaganira. Department of Epidemiology and Biostatistics, School of Public Health, College of Medicine and Health Sciences, University of Rwanda, Kigali, Rwanda. Email: jntaganira@nursph.org.

Abstract

Introduction
Partner notification is among strategies adopted by WHO to identify people at risk of HIV infection among sexual partners with people living with HIV to achieve the 90-90-90 target. There is still a gap in Sub-Saharan Africa.
Objective
To assess the determinants of partner notification among people infected with HIV in Bushenge hospital.
Methods
An unmatched case control study was conducted, 141 people who successfully notified their sexual partners as controls and 141 who did not as cases were selected to identify the factors associated with partner notification. Data were analyzed with Stata V13.
Results
Most cases were female 81(58%); 91(64.5%) of cases and 97(68.8.5%) of controls were in couple, 40(28.8%)of cases and 67(48%) of controls had multiple partner. Thirty-five 35(25%) of cases and 51(36%) of controls were newly diagnosed; 73(74%) of cases and 78(86.6%) suppressed the viral load. Notification approach was associated with partner notification, aOR = 9, CI[2.8, 29].
Conclusion
Partner notification as one of the strategies to reach the first 90 requires more efficient and effective efforts. Different initiatives are needed especially in partner notification approach.
Rwanda J Med Health Sci 2022;5(3):53-60

Keywords: partner notification, factors, HIV

Background

Index testing is defined by the world health organization (WHO) as a focused approach of providing testing services to partners and biological children of people newly diagnosed with Human Immunodeficiency Virus(HIV).[1] Partner notification(PN) refers to asking HIV-positive individuals known as index clients to list their sexual partners then contacting and offering all listed partners an HIV test and linking all partners diagnosed as HIV-positive to anti-retroviral therapy(ART).[2] The WHO 2016 guidelines on partner notification were developed to increase the uptake of HIV PN and HIV-testing services to support the

United Nations target goal to diagnose 90percent of people living with HIV infection by 2020. [3]

In 2018, worldwide,79% of people living with HIV knew their status. About 8.1 million people did not know that they were living with HIV. Key populations and their sexual partners account for 25% of new HIV infections in eastern and southern Africa.[4] In Rwanda, much effort has been made by the government that it resulted in remarkable progress towards UNAIDS 90-90-90, but the largest gap to achieving epidemic control is still in HIV diagnosis, where only 83.8% of HIV-positive adults (those aged 15-64 years) were aware of their HIV-positive status (based upon self-report or the detection of ARVs): 85.6% of HIV-positive women and 80.4% of HIV-positive men.[5]

To address this gap, since 2018 the government of Rwanda through the ministry of health is strengthening the index testing and partner notification service to increase the number of diagnosed people and link them to treatment but in Bushenge Hospital catchment area the partner notification service was still at 20.8% in 2019, and little was known about this low adherence to the service and associated factors. This study aimed at assessing factors associated with partner notification among people living with HIV in Bushenge hospital, 2018-2019.

Methods

Study Design

This was an unmatched case control study, to analyze data of partner notification among people living with HIV in Bushenge hospital catchment area from 2018 to 2019. Quantitative research method and a structured research tool was used to collect data from patient files. All people living with HIV in Bushenge hospital catchment area from 2018 to 2019 constituted the study population. This study targeted all index clients newly diagnosed as HIV positive or old case aged over 18 years

Inclusion criteria

Only clients aged 18 and above, living in Bushenge hospital catchment area, and registered between 2018 and 2019 were part of the study.

Sample collection and processing

A ratio of 1:1 for cases and controls aged 18 years and above was used. Cases were people living with HIV who did not notify their sexual partners during 2018 and 2019, while controls were people living with HIV who elicited and notified their sexual partners during the same period. The number of controls were 141 in the catchment area and were all selected for research by consecutive sampling. One hundred forty-one cases were selected randomly among those 18years old who did not notify their partners, thus the total sample size was 282.

Data were extracted from the ART clinic files and registers in Bushenge hospital and health centers of the catchment area and filled in data collection forms created in Epi info7.0. For assistance in the research, qualified nurses and data clerk working in HIV clinics of the hospital and health centers were recruited and trained for three days on data collection tools and how to enter data in Epi info. Data filled in the forms included socio-demographic characteristics of the index client, behavioural characteristics such as sexual behaviour, and some psychosocial factors such as history of gender based violence, mental disorders, and relationship with the sexual partner. Clinical factors included CD4, viral load and whether the client was new or old case.

Data were checked daily for completeness and consistency by the researcher. Errors or gaps to be addressed were directly communicated to research assistants and were corrected before starting the task of the following day. For both cases and controls, variables were categorized in two groups: independent and dependent variables.

Dependent variables: index client notified the partner, index client did not notify the partner summarized in partner notification.
Independent variables: they are grouped into subcategories
Socio demographic: Age, Sex, marital status, education, occupation, residence and Religion
Behavioural factors: Multiple partners, Sex with commercial sex worker, Condom use habit Drug user, MSM
Psychosocial factor: Victim of GBV, Mental disorders, Relationship with the partner (spouse, girlfriend, casual partner).
Clinical characteristics of the index client: whether the index client is newly diagnosed or an old case in the service, CD4counts and last viral load.
Intermediate factors: these include the notification approach that is used, service and policies availability

Data storage and analysis
Data entered in epi info forms were transferred into excel sheet and were imported and analyzed with Stata SE 13 version. Means, frequencies percentages, were generated for descriptive analysis to analyze the distribution of socio-demographic characteristics and other factors for both cases and controls.

Bivariate analysis was performed where odds ratio with their 95% confidence interval (CI) was considered to measure the association between risk factor and partner notification. The P values were calculated to assess the statistical significance. Risk factors with a p value<0.05were considered for the multivariable analysis, where logistic regression was done to check for the association between more than one independent variable and the dependent variable.

Ethical considerations
Ethical clearance was obtained from the Institutional Review Board (IRB) of the College of Medicine and Health Sciences, University of Rwanda (Reference NO: CMHS IRB/068/21). The permission to conduct this secondary data analysis was sought and obtained from Bushenge provincial hospital. Codes were used instead of names for confidentiality.

Results

A total of 282 index clients were selected and included in the study (Table 1). Among them, 141 did not notify their partners (cases) and 141 notified (control). Among selected cases 81(58%) were female while among controls female were71 (51%). The age group of 44 and above was the most frequent among cases and controls with 53(37.6%) and 56(40%) individuals respectively. Farming was the most frequent occupation comprising 103(73%) and 92(65.6.3%) of the cases and controls respectively. Cases in couple were 91(64.5%) and corresponding controls were 97(68.8%). Seventy-seven (54.4%) of the cases and 98(69.5%) of the controls reported having casual partner relationship. About the level of literacy 91(64.5%) of cases and 91(65%) of controls had primary education. Regarding behavioural characteristics, 29(28%) of cases and 68(48%) of controls reported to have multiple partners, among the cases 38 (31.6%) and 66(47%) among controls had between 2 and 5 partners. For the condom use habit, 74(52.5%) of the cases and 61(43.3%) of the control were found to use it sometimes.

Table 1.Descriptive analysis of socio-demographic and other characteristics

Variables	Cases (n=141)		Controls (n=141)	
	n	%	n	%
Marital status				
Single	50	35.5	44	31.2
In couple	91	64.5	97	68.8
occupation				
Salaried	10	7	11	7.8
Farmer	103	73	92	65.3
Unemployed	13	9.3	16	11.3
Small scale business	15	10.7	22	15.6
Age group				
18-24	11	7.8	10	7
25-34	26	18.4	39	27
35-44	51	36	33	24
44 and above	53	37.6	59	42
Relationship with the partner				
Formal partner (husband/wife)	56	39.5	39	27.7
Casual partner	77	54.5	98	69.5
Girl/boyfriend	8	6	4	2.8
Behavioral characteristics				
Multiple partners				
Yes	40	28	67	48
No	101	72	74	52
Number of partners				
1	80	67	74	52.5
2-5	38	31.6	66	46.8
>5	2	1.4	1	0.7
Clinical Factors				
Newly diagnosed	35	25	51	36
Old case	105	74.5	89	63
Viral load (last)	**n=99**		**n=9**0	
≤200	73	74	78	86.67
201-999	15	15	6	6,67
≥1000	11	11	6	6.67

Bivariate analysis

Bivariate analysis was performed to check for association between different independent variables and partner non-notification summarized in partner notification which was the outcome variable under study (Table 2). Logistic regression was performed for each factor separately, and only those with significant p value < 0.05 were selected for the next step of analysis. Socio demographic factors did not show any association or significant statistical difference between variables.

Behavioral factors such as relation with the partner: casual partner, OR= 1.9, P = 0.026, CI[1.08, 3.5], number of partners2-5,OR =1.9, P = 0.012, CI[1.15, 3.2), condom use habit, OR = 0.43, P = 0.007, CI [0.23, 0.79]; condom use in last intercourse, OR = 1.7, P = 0.021, CI[1.08,2.8], showed the association and statistical significance at 95% confidence level and P value<0.05. Among the clinical factors no variable with statistical significance was found was associated with the partner notification (P = 0.6). The dual notification approach was also associated with the partner notification, OR = 0.09, P<0.001,CI [0.03, 0.2]

Table2.Bivariate analysis of the factors associated with partner notification

Variable	Cases (n=141)		Controls (n=141)		COR	95% CI		P-Value
	n	%	n	%		Lower	Upper	
Marital status								
Single	50	35.5	44	31.2	0.8	0.5	1.3	0.4
In couple	91	64.5	97	68.8	1			
Occupation								
Salaried	10	7	11	7.8	1.2	0.5	3.0	0.6
Farmer	103	73	92	65.3	1			
Unemployed	13	9.3	16	11.3	1.02	0.4	2.4	0.9
Small scale business	15	10.7	22	15.6	1.6	0.8	3.3	0.17
Relationship with the partner								
Formal partner(husband/wife	32	39.5	39	27.7	1			
Casual partner	44	54.5	98	69.5	1.9	1.08	3.5	**0.026**
Girl/boyfriend	5	6	4	2.8	0.5	0.10	2	0.35
Number of partners								
1	80	67	74	52.5	1			
2-5	38	31.6	66	46.8	1.9	1.15	3.2	**0.012**
>5	2	1.4	1	0.7	0.5	0.04	6	0.6
Condom use habit								
Never	44	31	36	25.5	0.42	0.21	0.83	**0.013**
Sometimes	74	52.5	61	43.3	0.43	0.23	0.79	**0.007**
Always	23	16.5	44	31.2	1			
Viral load								
≤200	73	74	91	87	0.67	0.37	1.7	0.2
201-999	15	15	7	6,5	1.3	1.68	1.06	0.6
≥1000	11	11	7	6.5	1			
Elicitation								
Yes	67	47.5	139	98.6	1			
No	69	49	2	1.4	0.01	0.003	0.05	**<0.001**
Notification approach								
Provider referral	7	22.6	40	28.6	0.6	0.2	1.8	0.42
Dual referral	14	45.2	13	9.3	0.09	0.03	0.2	**<0.001**
Client referral	10	32.2	87	62.1	1			

Factors associated with partner notification among PLWHIV

After performing bivariate analysis, the characteristics that were statistically significant (P < 0.05) with partner non-notification were selected for multivariable analysis using logistic regression (Table 3). Notification approach and condom use habit were found to be associated with partner non-notification in Bushenge hospital catchment area.

Index clients using client referral approach are 9 times more likely to not notify their sexual partners than those preferring dual referral approach (client referral OR = 9, P<0.001,CI[2.8, 29]. Unlike those who always use condoms, clients who use condoms sometimes, are 0.1times not likely to notify their sexual partners, OR = 0.1, P = 0.02 CI [0.05, 0.7].

Table 3. Multivariable logistic regression for factors associated with partner notification

Variables	aOR	95% CI		P value
		Lower	Upper	
Relationship				
Formal partner	1			
Casual partner	1.6	0.47	3.8	0.5
Girl/boyfriend	0.2	0.02	1.5	0.1
Number of sexual partner				
1	1			
2-5	0.5	0.2	1.6	0.3
>5	1.00			
Condom use habit				
Never	0.4	0.06	2	0.32
Sometimes	0.1	0.05	0.7	**0.020**
Always	1			
Elicitation				
Yes	1			
No	0.6	0.08	5.2	0.6
Notification approach				
Provider referral	1			
Dual referral	4	1.2	16	0.023
Client referral	9	2.8	29	**0.000**

Discussion

This study aimed at determining the factors associated with partner non-notification among HIV index clients in Bushenge Hospital catchment area from 2018 to 2019. It included 141 index clients who successfully notified their partners and 141 index clients who failed to notify their sexual partners.

Our study revealed that socio demographic characteristics such as gender, occupation, marital status did not have any association with partner notification. This differed with a study conducted in Tanzania where married people were more likely to successfully notify than unmarried people,[6] but was similar with a study done in Spain where there was no difference in marital status age, sex, place of birth in partner notification service. [7]

Clinical factors such as being newly diagnosed and viral load did not show any association with partner notification. This is different from a study conducted in the US where viral load was associated with incomplete notification among casual partners.[8]

In this study, a behavioural factor such as having multiple partners was not associated with sexual partner notification. This is unlike the study conducted in Tanzania where having more than one sexual partner was associated with notifying at least one partner.[6]

Condom use habit among behavioral factors and Notification approach as one of intermediate factors were associated with partner non-notification in Bushenge hospital catchment area during 2018 and 2019.

In this study condom use habit has shown an association with partner notification where index clients who use condom sometimes are less likely to not notify their sexual partners than those who always use it.

The reason may be that those who always use condoms feel no need of notification as the risk of transmission may be minor with regular condom use. This is different from the findings of study in the US where inconsistent condom use was associated with incomplete sexual partner notification. [8]

The feasibility of partner notification has been reported to be linked with various aspects. Our study revealed that notification approach was associated with partner notification in Bushenge hospital catchment area as index clients who preferred the client referral approach were 9 times more likely not to notify their sexual partners than those who preferred the dual referral approach. This is in line with the study conducted in Spain where the combined approach was also preferred.[7] Likewise, findings of this study were similar to those from Indonesia where index clients preferred dual referral approach to notify their sexual partner.[9] Our findings also corroborate the Chicago study where notifying contacts or sexual partner was associated with being visited by HIV outreach worker.[10]

Conversely, this study is discordant with the study in Malawi and Tanzania where respondents preferred the provider referral approach for easily notifying their casual partners.[11] Similarly, in Cameroun, the majority of index people notified their partners using the provider referral approach; and in a study in Kenya, the dual referral was the least preferred.[13-14] Furthermore, the dual referral approach was also not preferred by index cases from Cote d'Ivoire as revealed by a study conducted to identify notification approaches in this country.[12]

The success of the dual referral in partner notification may be due to the efforts and cooperation of the index client and the health care provider that are put together and result in successful sexual partner notification.

Study limitations

This study was conducted in Nyamasheke district, Bushenge provincial hospital only and this may not allow the generalizability of the findings, because people living with HIV/AIDS are across the country.

Extracting information from the patients' file also has not only been a barrier to get some information that was needed in the study, but also led to the rejection of some study participants, thus resulting in a small sample size.

Finally, because this was a secondary data analysis, we worked with healthcare providers and were not allowed to give us access to the secret book used in partner notification; thus, missing some information for this study.

Conclusion

Partner notification as one of the strategies to reach the first 90 requires more efficient and effective efforts. Our study has added to the existing evidence that partner notification service is working across the country especially in Bushenge hospital catchment area. However, different initiatives are needed especially in notification approach; the huge determinant of partner notification in the catchment area, and we would recommend to support the dual referral approach as it is the most successful.

Acknowledgements and Funding

I would like to express my gratitude to the University of Rwanda CMHS/School of public health staff, especially FELTP/ Rwanda and AFENET for the supervision and financial support in data collection, without which this study would not have been possible. My deep gratitude also goes to Nyamashekedistrict/Bushenge provincial Hospital leaders for granting me the permission to conduct this study.

Conflict of interests

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be

construed as a potential conflict of interest. All authors read and approved the final manuscript.

Author contributions

NB designed the study, collected cleaned analyzed, and interpreted data and drafted the manuscript. JN directed the whole process of the study and manuscript writing.

References

1. WHO. Hiv Self-Testing and Partner notification guidelines. 2016. https://apps.*who.int/iris/bitstream/handle/10665/251655/9789241549868-*eng.pdf
2. Mahachi N, Muchedzi A, Tafuma TA, Mawora P, Kariuki L, Semo B werq, et al. Sustained high HIV case-finding through index testing and partner notification services: experiences from three provinces in Zimbabwe. *J Int AIDS Soc*. 2019;22:23–30.
3. Brown LB, Miller WC, Kamanga G, Nyirenda N, Mmodzi P, Pettifor A, et al. HIV partner notification is effective and feasible in sub-Saharan Africa: Opportunities for HIV treatment and prevention. *J Acquir Immune Defic Syndr*. 2011;56:437–42.
4. Fisher R, Kling J. Community Mobilization on HIV. *Urban Aff Q*. 2022;25:200–11.
5. Ministry of Health of Rwanda. Rwanda Population-based HIV Impact Assessment RPHIA 2018-2019. 2019;2–7. *https://www.rbc.gov.rw/fileadmin/user_upload/report2019/53059%20RPHIA_Report_V9_Web.pdf*
6. Plotkin M, Kahabuka C, Christensen A, Ochola D, Betron M, Njozi M, et al. Outcomes and Experiences of Men and Women with Partner Notification for HIV Testing in Tanzania: Results from a Mixed Method Study. *AIDS Behav. Springer US*; 2018;22:102–16.
7. De Olalla PG, Molas E, Barberà MJ, Martín S, Arellano E, Gosch M, et al. Effectiveness of a pilot partner notification program for new HIV cases in Barcelona, Spain. *PLoS One*. 2015;10:1–11.
8. Jonathan Posner, James A. Russell and BSP. Sexual Partner Notification of HIV Infection Among a National United States-Based Sample of HIV-Infected Men. Bone [Internet]. *PMC*. 2008;23:1–7. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3624763/pdf/nihms412728.pdf
9. Wirawan GBS, Januraga PP, Mahendra IGAA, Harjana NPA, Mahatmi T, Luhukay L, et al. Perspectives on voluntary assisted partner notification among providers, people with HIV and the general population in Indonesia: a formative qualitative study. *BMC Public Health*. 2021;21:1–9.
10. Gore D, Ferreira M, Khanna AS, Schneider J. Human Immunodeficiency Virus Partner Notification Services among a Representative Sample of Young Black Men Who Have Sex with Men Demonstrates Limited Service Offering and Potential Benefits of Clinic Involvement. *Sex Transm Dis*. 2018;45:636–41.
11. Gouda HN, Charlson F, Sorsdahl K, Ahmadzada S, Ferrari AJ, Erskine H, et al. Burden of non-communicable diseases in sub-Saharan Africa, 1990–2017: results from the Global Burden of Disease Study 2017. *Lancet Glob Heal*. 2019;7:e1375–87. Available from: http://dx.doi.org/10.1016/S2214-109X(19)30374-2
12. Kingbo MHKA, Isaakidis P, Lasry A, Takarinda KC, Manzi M, Pringle J, et al. Partner Notification Approaches for Sex Partners and Children of Human Immunodeficiency Virus Index Cases in Côte d'Ivoire. *Sex Transm Dis*. 2020;47:450–7.