AIDS and Behavior (2022) 26:2653–2663
https://doi.org/10.1007/s10461-022-03612-w

ORIGINAL PAPER

Factors Influencing HIV Status Disclosure to Partners Among Antiretroviral Therapy Clients in the Upper East Region, Ghana

Thomas Abugbilla Atugba[1] · Enoch Aninagyei[2] · Fred Newton Binka[1] · Kwabena Obeng Duedu[2]

Accepted: 30 January 2022 / Published online: 5 February 2022

Abstract

In Ghana, HIV status disclosure to partners is voluntary. This study sought to determine the factors associated with HIV status disclosure to partners among antiretroviral therapy (ART) clients in the Upper East Region. A matched case–control study (1:1) was carried out in nine ART sites in the Upper East region in which 100 ART sexually active clients who had not disclosed their status to their partners were compared with 100 ART sexually ART clients who had disclosed their status to their partners. To each of the 200 study participants, a structured questionnaire was administered to elicit relevant responses. Discordant pair analysis was done with Mantel–Haenszel matched test to determine associations between variables. The study found persons with informal education more likely to disclose HIV status, whereas persons living apart or not having children with a partner were less likely to disclose their status to their sexual partners. On the other hand, active involvement or participation in ART-related services were more likely going to impact HIV status disclosure. Early initiation of ART, while adherence to ART services and the use of treatment monitors were less associated with disclosure. Active participation in ART related services such as prompt initiation of ART following diagnosis, adherence promotion, and treatment monitoring should be encouraged to promote HIV status disclosure among sexual partners.

Keywords HIV status disclosure · People living with HIV/AIDS · Antiretroviral therapy · HIV among couples

Abbreviations

HIV	Human immunodeficiency virus
AIDS	Acquired Immune Deficiency Syndrome
STIs	Sexually Transmission Infections
ART	Antiretroviral therapy
PMTCT	Prevention of Mother-to-Child Transmission
HTC	HIV testing and counselling
PLHIV	People living with HIV
DHIMS2	District Health Information Management System 2
ANC	Antenatal care
HSS	HIV Sentinel Survey

Background

The prevention of new human immunodeficiency virus (HIV) infections and treatment of infected persons emphasizes the importance of HIV status disclosure among HIV-infected clients, particularly to their sexual partners [1]. In sub-Saharan Africa (SSA), more than 90% of adults acquire HIV infection through unprotected sexual intercourse with infected partners in discordant relationships [2]. Partners in HIV sero-discordant relationships are at most risk of getting infected [3]. Therefore, HIV status disclosure among partners has overarching implications for safer sex practices, treatment adherence and consequently, has the potential to limit new infections [4]. In SSA, almost 70% of males were HIV negative at the time their partners were tested positive. During their marriage, about one-third of the negative partners become infected [5]. In Ghana, more women know their HIV status than men due to HIV testing and counselling (HTC) during antenatal care with the aim of prevention-mother-to-child-transmission [6]. To prevent the continuous spread of the infection, by reducing the incidence of the infection in a locality, status disclosure is essential for safe sex practicing. Some antiretroviral therapy (ART) clients

✉ Kwabena Obeng Duedu
kduedu@uhas.edu.gh

[1] School of Public Health, University of Health and Allied Sciences, PMB 31, Ho, Ghana

[2] School of Basic and Biomedical Sciences, University of Health and Allied Sciences, PMB 31, Ho, Ghana

disclose their status for various reasons. For instance, some have indicated that they disclose because they want to help others adopt preventive behaviors to remain uninfected, whereas others disclose because they want support from their partners [7]. However, disclosure has been reported to be associated with some risks. Others did not disclose their status for fear of the partner's withdrawal/divorce, physical violence, fear of abandonment, blame, disruption of relationships, physical and emotional abuse [8]. Although disclosure has some negative consequences, it may motivate partners to seek testing, cause behavioral change, provide support for treatment, and ultimately decrease transmission of HIV [7].

The Upper East Region is one of the sixteen administrative regions in Ghana. Over the last 10 years (2010–2019), the average prevalence of HIV in the region was 1.7%. The prevalence ranged from 1.3 to 2.4%; the lowest prevalence (1.3%) was recorded in 2017. From 2017 to 2019, there was an increase in the prevalence to 2.1%, a marginally higher prevalence than the national average of 2.0%. The nature of the prevalence in the region over the 10-year period was undulating [9]. In the region, polygamy is common [10]. This practice has been reported to increase the risk for HIV infections [11, 12]. Considering the fact that the HIV prevalence in the region was marginally higher than the national average, together with the fact that polygyny is common in the region, it is imperative to understand some of the dynamics of the infection in the region while Gazimbi et al. [13], in their review, did not associate polygyny with HIV transmission. Therefore, this study was designed to identify factors associated with HIV disclosure in the Upper East Region of Ghana [13].

Methods

Study Design and Study Setting

Case–control study approach was used for this study. This approach was deemed appropriate because the study sought to determine the demographic characteristics, socio-economic factors, and ART service-related factors associated with cases (respondents that had not disclosed their HIV status to their partners) using individuals that disclosed their HIV status to their partners as controls. Equal numbers of cases and controls were obtained from the respective ART sites. The cases and controls were matched on sex and age in years (±5) to control the confounding effects of those two variables. It shares borders with the Republic of Burkina Faso to the north, the Republic of Togo to the east, the Northern Region to the south and the Upper West Region to the west. The region has sixteen (16) administrative Districts/Municipalities [14].

Study Population

The study population consisted of all people living with HIV (PLHIV) aged 18 years or above, with sexual partners and are receiving routine ART services in selected ART sites in the Upper East Region.

Inclusion and Exclusion Criteria

For both cases and controls, respondents 18 years or more were included in this study, with prior consent. Respondents that were severely sick to provide accurate responses as well as respondents that could not provide historical events were excluded from the study.

Sample Size Determination

The sample size was calculated using a desired power of 80%, precision at 95% confidence level, and a ratio of cases to control as 1:1. The ratio of 1:1 for cases to controls is recommended for a matched case control study with more exposure variables, a single non-dichotomous or continuous variable [15]. Using the difference in proportion formula [16], a minimum sample size of 196 consisting of 98 cases and 98 controls was required for the study. However, a sample size of 200 consisting of 100 cases and 100 controls consented and participated in the study. The sample size for each ART site was determined proportionately by calculating the number of ART clients at that site out of the total number of ART clients from all selected sites in a zone by the overall sample size for the study.

Selection of ART Sites and Sampling of Respondents

A multistage sampling was used for the study (Fig. 1). The Upper East Region was stratified into Western (4 districts with 9 ART sites), Central (5 districts with 8 ART sites), and Eastern (6 districts with 9 ART sites) zones. In each stratum, the Districts/Municipals (subsequently referred to as districts) were ranked based on the number of active ART clients from the highest to lowest and the first or top three selected. In the districts/municipalities, the health facilities with ART sites were ranked based on the number of active ART clients from the highest to lowest and the first ART site selected. Clients who met the inclusion criteria for controls, were then selected based on the matching variables sex and age. Whenever a selected client dissented, the process was repeated to replace until the required sample size was obtained for that ART site. The ART client was classified as a "Case" if he/she was sexually active and did not disclose his/her status to the sexual partner. The number of active

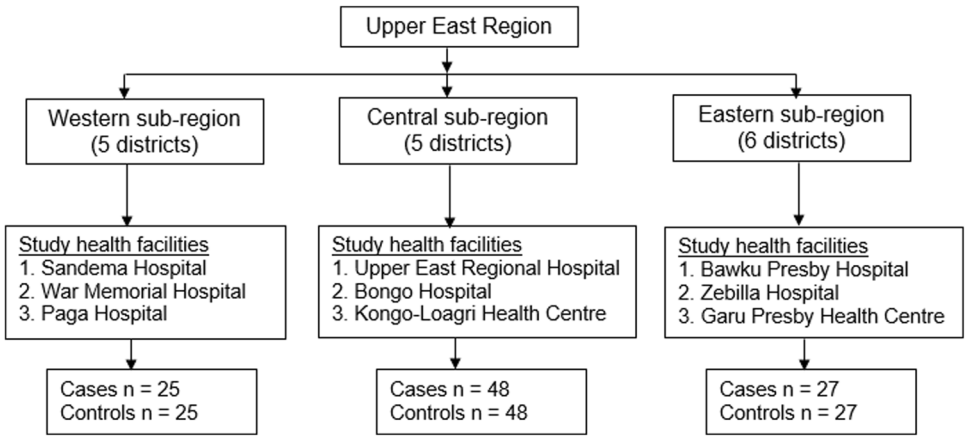

Fig. 1 The flow chart for selection of respondents. Cases were respondents that had not disclosed HIV status, control were respondents that had disclosed HIV status

ART clients in a selected ART site was used to proportionately determine the sample size for that ART site in each stratum [17]. In each selected ART site, systematic sampling was used to select cases [18]. Any consented ART client selected was surveyed. Within each ART site, respondents were systematically selected by selecting participants that were given even numbers in the order they visited the clinic.

Data Collection Procedure and Measurement of ART Adherence

Trained health care workers, namely, general nurses, public health, and community health nurses, administered the questionnaires. The instrument for data collection was adapted from similar studies in some parts of Ghana [19, 20]. The study respondents (PLHIV) were sampled at each ART site where they were receiving ART services. Data were collected on ART clinic days across the study sites for a period of 10 weeks. The data were collected using a pretested structured questionnaire and administered in a local language the respondents understood. Adherence to ART was assessed by timely attendance at appointments for delivery of antiretroviral drugs and counting the remaining tablets.

Study Variables

The structured questionnaire used for this study had three sections, namely, socio-demographic characteristics of respondents, knowledge of sexual partner's HIV status, and other factors associated with HIV status disclosure.

Socio-demographic factors surveyed were gender of respondents, religious affiliation, marital status, and highest educational level of respondents.

Under knowledge of the sexual partner's HIV status, the following questions were used to elicit responses: how old (in years) were you when you were diagnosed with HIV? Why did you get tested for HIV? Do you know your sexual partner's HIV status? What is your sexual partner's HIV status? How did you get to know your sexual partner's HIV status?

Under other factors associated with HIV status disclosure, responses were elicited using the following questions: Have you received any counselling with respect to HIV status disclosure? Were you ever abused by your partner before HIV diagnosis? Were you aware of your partner's involvement in other sexual relationships prior to diagnosis? How many other sexual partners did your partner have prior to diagnosis? What is the highest educational level of your partner? What is the occupation of your partner? Which of the following best describes the average monthly income of your partner? How long did it take you to start taking ART after the diagnosis? How long have you been into ART? Why did you choose him/her as your treatment monitor?

Data Management and Analysis

The questionnaire was designed with validation rules in EpiData manager version 4.0.2.101 and the data collected was entered using EpiData entry client version 4.0.2.49. The data was first exported to STATA v 14.1 for entry accuracy and completeness checks and then exported to MS Excel 2016 for further cleaning. Study variables were assessed using Stata to determine the Cronbach's Alpha (CA) value (range 0–1.0) of the instrument. A CA value in the range of 0.60–10 was considered desirable. The cleaned data was then imported into STATA v 14.1 for analysis. Descriptive analysis was done for some variables and presented as frequencies and percentages using cross tabulations and presented in tables. Data on the independent variables were exported to excel for concordant and discordant pair analysis to draw the triplet's pair two-by-two and calculate the respective odds ratios [Mantel Haenszel matched odds ratio (OR_{MH})] for each variable studied. The cases and controls were discordant or not with respect to the exposure variable. The OR_{MH} is the ratio of the sum of the discordant pairs in which the case is exposed over the sum of the discordant

pairs in which the case is not exposed. Concordant pairs (in which the case and the control are either both exposed or both unexposed) do not contribute to the numerator nor to the denominator of the OR_{MH}. Bivariate analysis using conditional logistic regression was done to determine the crude association between the independent variables and HIV status disclosure to a partner. Variables with p value of less than 0.05 were included in the multiple regression analysis to adjust for confounding.

Ethical Consideration

This study was reviewed and approved by the University of Health and Allied Sciences Research Ethical Committee (UHAS-REC) with the reference number UHAS-REC A. 1 [40] 19–20. A written informed consent was obtained from the selected individual respondents before the questionnaire was administrated.

Results

Distribution of the Study Participants

Samples were collected from nine out of the fifteen districts and municipalities (subsequently referred to as districts) in the region. The study districts were Bawku municipal, Bawku West district, Bolgatanga municipal, Bingo district, Builsa North district, Garu district, Kassena Nankana municipal, Kassena Nankana West district and Nabdam district. From each district, an equal number of cases and controls were collected. Majority of the cases and controls were contributed by the Upper East regional hospital located in Bolgatanga municipal (33%) while Paga hospital in the Kassena Nankana West District contributed the least cases and controls (4%) (Table 1).

Demographic Characteristics of Study Respondents

The mean age of the cases was 35.4 ± 7.5 years (range: 19–50 years) while that of the controls was 36.1 ± 8.1 years (range: 21–55 years). The age distribution between cases and controls was comparable ($t = 0.65$, $p = 0.5112$). Similarly, cases and controls were comparable in terms of gender, type of settlements, and family type. Cases and controls only differed in terms of educational level (Table 2).

Mantel–Haenszel Matched Odds Ratio (OR_{MH}) Test of the Association Between Demographic Characteristics and HIV Status, Disclosure to Partners

None of the demographic variables associated with HIV status disclosure except educational status where ART clients which no formal education were 2.4 times more likely to disclose their HIV status to their partners compared to those who had formal education [$OR_{MH} = 2.4$; 95% CI (1.15–5.02) $p = 0.020$] (Table 3).

Mantel–Haenszel Matched Odds Ratio (OR_{MH}) Test of the Association Between Socio-Economic Factors and HIV Status Disclosure to Partners

ART clients who were not staying with their partners were 70% less likely to disclose their HIV status to their partners compared to those who were staying together with their partners [$OR_{MH} = 0.3$; 95% CI (0.14–0.61) $p < 0.001$], Similarly, ART clients who had no children with their partners were also less likely to disclose their status to their partners compared to those who had children [$OR_{MH} = 0.3$; 95% CI (0.11–0.88) $p = 0.022$]. The other variables did not associate with partner HIV disclosure (Table 4).

Table 1 Distribution of the ART clients that participated in the study

Study district	Study site	Total active clients[a]	Cases	Controls	Total sample size by site
Bawku Municipal	Presbyterian Hospital	493	11	11	22 (11%)
Bawku West District	Zebilla Hospital	332	8	8	16 (8%)
Bolgatanga Municipal	Upper East Regional Hospital	1434	33	33	66 (33%)
Bongo District	Bongo Hospital	445	10	10	20 (10%)
Builsa North District	Sandema Hospital	352	8	8	16 (8%)
Garu District	Presbyterian Health Centre	322	8	8	16 (8%)
Kassena Nankana Municipal	War Memorial Hospital	566	13	13	26 (13%)
Kassena Nankana West District	Paga Hospital	192	4	4	8 (4%)
Nabdam District	Kongo-Loagri Health Centre	222	5	5	10 (5%)
	Total	4358	100	100	200 (11%)

[a]As at June 2019

Table 2 Background characteristics of respondents

Variable	Frequency (%)		Totals (n = 200) n (%)	Statistic value (p value)
	Cases (n = 100) n (%)	Controls (n = 100) n (%)		
Age (in years)	35.4 ± 7.5	36.1 ± 8.1	35.7 ± 7.8	0.65 (0.5112)[a]
18–29	23 (23)	22 (22)	43 (22.5)	
30–39	43 (43)	42 (42)	85 (42.5)	
≥ 40	34 (34)	36 (36)	70 (35)	
Gender				0 (1.000)[b]
Male	36 (36)	36 (36)	72 (36)	
Female	64 (64)	64 (64)	128 (64)	
Educational level				4.16 (0.041)[b]
No formal education	31 (31)	45 (45)	76 (38)	
Formal education	69 (69)	55 (55)	124 (62)	
Type of settlement				2.64 (0.104) [b]
Rural	59 (59)	70 (70)	129 (64.5)	
Urban	41 (41)	30 (30)	71 (35.5)	
Type of family				0.02 (0.877)[b]
Nucleated	30 (30)	29 (29)	59 (29.5)	
Extended	70 (70)	71 (71)	141 (70.5)	

[a]Unpaired t test

[b]Chi square test

Association Between ART Service-Related Factors and HIV Status Disclosure to Partners

ART clients who were on ART for more than 3 years were 2.2 times more likely to disclose their HIV status to their partners compared to those who were on ART for less than 3 years or 3 years [$OR_{MH} = 2.2$; 95% CI (1.07–4.53) $p = 0.028$]. The ART clients who were not adhering to ART were less likely to disclose their HIV status to their partners compared to those who adhered to ART [$OR_{MH} = 0.1$; 95% CI (0.01–0.53) $p < 0.001$]. Moreover, respondents who did not have treatment monitors were less likely to disclose their HIV status to their partners compared to those who had treatment monitors [$OR_{MH} = 0.1$; 95% CI (0.02–0.19) $p < 0.001$]. Additionally, ART clients who started ART in less than 1 month after diagnosis were 3.7 times more likely to disclose their HIV status to their partners as compared to those who started ART in 1 month or more [$OR_{MH} = 3.7$; 95% CI (1.44–11.05) $p < 0.001$] (Table 5).

Discussion

HIV sero-positivity disclosure has been previously shown in several studies to result in better adherence to ART treatment, good treatment outcomes, and reduction in the risk of HIV transmission among couples [21, 22]. However, previous studies have reported between 7 and 79% of partner disclosure rates [23–25]. HIV status disclosure to partners is essential to reduce the spread of the virus to an uninfected partner, therefore, identifying factors that will encourage status disclosure will inform post testing counselors the areas to emphasize during posttest counselling. Although factors affecting HIV status disclosure have been published from other parts of Ghana [26–28], no such study has been done in multicenter in the Upper East Region of Ghana, a region with high prevalence of polygamy [10].

In this study, ART clients who adhered to treatment were more likely to disclose their HIV status to their partners compared to those who did not. The higher adherence among the disclosed group could be because of a strong believe that there will be acceptance and support by the partner. Furthermore, to be able to adhere to ART services, the infected partner may have accepted his or her status and therefore could manage issues that may come out after disclosure. This support in turn has had an appositive impact by ensuring the partner adheres to the ART. This is consistent with findings from other studies that found significant associations between HIV status disclosure to partners and ART adherence [29–31]. However, Mabunda et al. [32] did not find an association between HIV status disclosure to partners and ART adherence. This finding suggests that reduced adherence to ART could cause nondisclosure of status as previously reported by Tsega and others [33]. The reverse has been previously reported where lack of disclosure has been associated with reduced ART adherence. This is because lack of disclosure is often associated with reduced social support, increased anxiety and depression,

Table 3 Association between demographic characteristics and HIV status disclosure to partner

Variable	Controls			OR_{MH} (95% CI)	p value
	Formal	No formal	Total		
Educational status					
Cases					
Formal	45	24	69		
No formal	10	21	31	2.4 (1.15–5.02)	0.020*
Total	55	45	100		
	Christian	Non-Christian	Total	OR_{MH} (95% CI)	p value
Religion					
Cases					
Christian	37	20	57		
Non-Christian	26	17	43	0.8 (0.41–1.43)	0.461
Total	63	37	100		
	Extended	Nucleated	Total	OR_{MH} (95% CI)	p value
Family type					
Cases					
Extended	55	15	70		
Nucleated	17	13	30	0.9 (0.41–1.88)	0.86
Total	72	28	100		
	Artisan	Others	Total	OR_{MH} (95% CI)	p value
Occupation					
Cases					
Artisan	20	17	37		
Others	22	41	63	0.8 (0.38–1.52)	0.522
Total	42	58	100		
	Rural	Urban	Total	OR_{MH} (95% CI)	p value
Type of settlement					
Cases					
Rural	43	16	59		
Urban	27	14	41	0.6 (0.30–1.14)	0.126
Total	70	30	100		
	Employed	Unemployed	Total		
Employment status					
Cases					
Employed	32	15	47		
Unemployed	18	35	53	0.8 (0.39–1.75)	0.728
Total	50	50	100		
	Dependent	Independent	Total		
Financial status					
Cases					
Dependent	23	17	40		
Independent	16	44	60	1.1 (0.50–2.24)	1.000
Total	39	61	100		

*Significant association at $p < 0.05$; OR_{MH} = Mantel Haenszel matched odds ratios

Table 4 Association between socio-economic factors and HIV status disclosure to partner

Variable	Controls			OR_{MH} (95% CI)	p value
	Formal	No formal	Total		
Partner's educational status					
Cases					
Formal	33	28	61		
No formal	21	18	39	1.3 (0.73–2.47)	0.391
Total	54	46	100		
	Farmer	Others	Total	OR_{MH} (95% CI)	p value
Partner's occupation					
Cases					
Farmer	18	24	42		
Others	22	36	58	1.1 (0.59–2.04)	0.883
Total	40	60	100		
	Yes	No	Total	OR_{MH} (95% CI)	p value
Staying with partner					
Cases					
Yes	40	11	51		
No	36	13	49	0.3 (0.14–0.61)	< 0.001*
Total	76	24	100		
	< 3 years	≥ 3 years	Total	OR_{MH} (95% CI)	p value
Duration of sexual relations with partner					
Cases					
< 3 years	14	18	32		
≥ 3 years	9	59	68	2.0 (0.85–5.10)	0.122
Total	76	24	100		
	Yes	No	Total	OR_{MH} (95% CI)	p value
Children with partner					
Cases					
Yes	53	6	59		
No	18	23	41	0.3 (0.11–0.88)	0.022*
Total	71	29	100		
	Aware	Not aware	Total	OR_{MH} (95% CI)	p value
Partner involved in other sexual relations					
Cases					
Aware	16	25	41		
Not aware	17	42	59	1.5 (0.76–2.90)	0.28
Total	33	67	100		

*Significant association at $p < 0.05$

reduced emotional support as well as reduced financial support. These limit adherence to ART services participation [34, 35].

The educational status of the ART client was significantly associated with HIV status disclosure. In this study, those who had no formal education were more likely to disclose their status to their partners than those who had some level of formal education. A previous study gave the reason why HIV infected with formal education were less likely to disclose their HIV status to anyone. Notably, among the reasons were fear of loss of social standing and fear of stigmatization in the face of their high social status [36].

Table 5 Association between ART service-related factors and HIV status disclosure to partner

Variable	Controls			ORMH (95% CI)	p value
	≤ 3 years	> 3 years	Total		
Duration on ART					
Cases					
≤ 3 years	35	28	63		
> 3 years	13	24	27	2.2 (1.07–4.53)	0.028*
Total	48	52	100		
	Yes	No	Total	ORMH (95% CI)	p value
Adherence to ART					
Cases					
Yes	82	2	84		
No	16	0	16	0.1 (0.01–0.53)	< 0.001*
Total	98	2	100		
	Yes	No	Total	ORMH (95% CI)	p value
Treatment monitoring					
Cases					
Yes	12	4	16		
No	57	27	84	0.1 (0.02–0.19)	< 0.001*
Total	69	31	100		
	Sick	Other	Total	ORMH (95% CI)	p value
Reason for HIV test					
Cases					
Sick	27	33	60		
Other	20	20	40	1.7 (0.91–3.03)	0.098
Total	47	53	100		
	≥ 1 month	< 1 month	Total	ORMH (95% CI)	p value
Initiation of ART					
Cases					
≥ 1 month	7	22	29		
< 1 month	6	65	71	3.7 (1.44–11.05)	0.004*
Total	13	87	100		
	Yes	No	Total	ORMH (95% CI)	p value
Condom use					
Cases					
Yes	34	21	55		
No	19	26	45	1.10 (0.57–2.17)	0.875
Total	53	47	100		
	Yes	No	Total	ORMH (95% CI)	p value
Have other sexual relations					
Cases					
Yes	2	13	15		0.059
No	5	80	85	2.6 (0.87–9.31)	
Total	7	93	100		
	Yes	No	Total	ORMH (95% CI)	p value
Sex without condom					
Cases					

Table 5 (continued)

	Yes	No	Total	ORMH (95% CI)	p value
Yes	46	23	69		
No	20	11	31	1.2 (0.60–2.20)	0.647
Total	66	34	100		

*Significant association at $p < 0.05$

In another study in the Volta Region of Ghana, a similar finding was reported [19]. In contrast, Gultie et al. (2015) posited that educated persons were more likely to disclose their status than those who had no formal education [37]. Possible reasons for this finding were that, unlike the educated people living with HIV, individuals who had no formal education may be less knowledgeable on HIV/AIDS, they had much trust in health workers and paid attention to them. However, Longinetti et al. (2014), found no significant association between educational level and HIV status disclosure in a study in South Africa [38]. Findings from this study and that of Amavih, 2017 [19] is rather worrying because, globally and in developing countries, there are concerted effort to improve literacy and numeracy rates through formal education. This could be due to the reason that health care givers may assume that the educated are more likely to understand and hence, may not give adequate education. This area needs further research to generate data to contribute to policy and practice. It is therefore important that health care workers are encouraged to provide adequate information, education, and communication literature to everyone, especially those with some level of formal education and offer comprehensive post-testing counselling on the importance of status disclosure to these cohorts of individuals. This will promote partner status disclosure in individuals with formal education living with HIV.

It was interesting to observe that starting ART in less than 1 month after diagnosis and being on ART for more than 3 years associated with HIV disclosure. This could be explained that newly diagnosed persons may still be in the state of denial, hence, likely to disclose to the partner, especially as the partner is polygynous. On the other hand, persons that have been on ART for over three years might have had experience with their colleagues with the advantages of disclosure, hence could easily disclose their status as has been previously reported [39]. Furthermore, continuous counselling to the person on ART may reduce self-stigma, hence encourage disclosure [40].

This study found a significant association between having a treatment monitor and HIV status disclosure to a partner. In Ghana, a treatment monitor is a person an ART client trusts and has full confidence in, that the client voluntarily present to his or her health care providers to monitor compliance to treatment. The person also assists in the detection of adverse reactions to the drugs. In this study, ART clients who had treatment monitors were more likely to disclose their HIV status to their partners relative to those who did not have treatment monitors. This finding is similar to what was found in the Central region of Ghana by Boampong-Konam [20]. Contrary to the findings of this study, Amavih (2017), reported that having a treatment monitor was not associated with HIV status disclosure to a sexual partner. With this finding, possibly ART clients who did not have treatment monitors were not in marital or stable relationships, anticipated negative reactions from their partners, or were not getting enough emotional support from their partners to foster disclosure. It must be emphasized that adequate privacy was not ensured during post-test and in-treatment counselling in the study sites. This was because the counselling session was interrupted on a few occasions by other clients and health workers. Notwithstanding that observation, the counselling room was very conducive for effective counselling.

Conclusion

This study employed an age-gender case–control matched study approach to determine factors that affected HIV status disclosure among sexual partners. In summary, the following factors are associated with increased odds of HIV status and partner disclosure; without formal education, being on ART for more than 3 years, having treatment monitors; living with a sexual partners; having children with sexual partners; adherence to ART and starting ART in less than 1 month after diagnosis. It is recommended to promote HIV status disclosure through adequate post testing counselling by trained counselling and testing personnel. Furthermore, it is important that treatment is initiated as soon as the test result are ready and an assurance is given to clients on the benefit of the treatment. During treatment, counselling should be intensified for clients to come to terms with the need to disclose their status to their partners. Finally, it is imperative to ensure adequate privacy during posttest counseling and in-treatment counselling.

Limitations of the Study

The findings reported in the study cannot be generalized because some of the frequencies of the variables tested were few. Additionally, this study was done in a setting with high HIV prevalence, therefore, the findings may not be applicable to other regions with different HIV prevalence and socio-cultural characteristics. Finally, inadequate privacy during counselling may affect the results reported in this study. This is because the presence of other health care providers in the counselling room may not provide adequate security and trust when sensitivity issues are being discussed.

Acknowledgements We are grateful to all the participants who volunteered and offered their time and information for this study. We also wish to acknowledge the heads of the centres where the study was conducted.

Author Contributions TA, FNB and KOD: Conceptualization; TA, EA, FNB and KOD: methodology; TA, EA, FNB and KOD: formal analysis and investigation; TA and EA: writing—original draft preparation; FNB and KOD: writing—review and editing; TA: resources; FNB and KOD: supervision.

Funding The authors did not receive support from any organization for the submitted work. No funding was received to assist with the preparation of this manuscript. No funding was received for conducting this study. No funds, grants, or other support was received.

Data Availability Raw data has been deposited at the Harvard Dataverse repository and can be assessed from https://doi.org/10.7910/DVN/WYTYMS.

Code Availability Not applicable.

Declarations

Conflict of interest The authors have no relevant financial or non-financial interests to disclose. The authors have no conflicts of interest to declare that are relevant to the content of this article. All authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript. The authors have no financial or proprietary interests in any material discussed in this article.

Ethical Approval The study was reviewed and approved by the University of Health and Allied Sciences Research Ethical Committee (UHAS-REC) with reference number UHAS-REC A. l [40] 19–20. In addition, permission was obtained from the respective health directorates that oversaw the facilities in the study areas.

Consent to Participate All participants gave an informed consent to participate in the study.

Consent for Publication Not applicable.

References

1. Simbayi LC, et al. HIV serostatus disclosure to sexual partners among sexually active people living with HIV in South Africa: results from the 2012 National Population-Based Household Survey. AIDS Behav. 2017;21(1):82–92. https://doi.org/10.1007/s10461-015-1278-5.
2. Eyawo O, de Walque D, Ford N, Gakii G, Lester RT, Mills EJ. HIV status in discordant couples in sub-Saharan Africa: a systematic review and meta-analysis. Lancet Infect Dis. 2010;10(11):770–7. https://doi.org/10.1016/S1473-3099(10)70189-4.
3. Kharsany ABM, Karim QA. HIV Infection and AIDS in Sub-Saharan Africa: current status, challenges and opportunities. Open AIDS J. 2016;10(1):34–48. https://doi.org/10.2174/1874613601610010034.
4. Patel R, Ratner J, Gore-Felton C, Kadzirange G, Woelk G, Katzenstein D. HIV disclosure patterns, predictors, and psychosocial correlates among HIV positive women in Zimbabwe. AIDS Care. 2012;24(3):358–68. https://doi.org/10.1080/09540121.2011.608786.
5. Chemaitelly H, Awad SF, Shelton JD, Abu-Raddad LJ. Sources of HIV incidence among stable couples in sub-Saharan Africa. J Int AIDS Soc. 2014;17(1):18765. https://doi.org/10.7448/IAS.17.1.18765.
6. The Global Fund. Scaling up programs to remove human rights-related barriers to HIV services. Geneva: The Global Fund; 2019.
7. Gaskins S, Payne Foster P, Sowell R, Lewis T, Gardner A, Parton J. Reasons for HIV disclosure and non-disclosure: an exploratory study of rural African American men. Issues Ment Health Nurs. 2011;32(6):367–73. https://doi.org/10.3109/01612840.2011.571807.
8. Olagbuji BN, Ezeanochie MC, Agholor KN, Olagbuji YW, Ande AB, Okonofua FE. Spousal disclosure of HIV serostatus among women attending antenatal care in urban Nigeria. J Obstet Gynaecol (Lahore). 2011;31(6):486–8. https://doi.org/10.3109/01443615.2011.563637.
9. Ghana Health Service. National HIV/AIDS Control Programme 2019 Annual Report. Ghana Health Service; 2019.
10. de Groot R, Kuunyem MY, Palermo T. Child marriage and associated outcomes in northern Ghana: a cross-sectional study. BMC Public Health. 2018;18(1):285. https://doi.org/10.1186/s12889-018-5166-6.
11. Fox AM. Marital concurrency and HIV risk in 16 African countries. AIDS Behav. 2014;18(4):791–800. https://doi.org/10.1007/s10461-013-0684-9.
12. World Health Organization. Gender dimensions of HIV status disclosure to sexual partners: rates, barriers and outcomes; 2014. https://apps.who.int/iris/handle/10665/42717.
13. Gazimbi MM, Magadi MA, Onyango-Ouma W, Walker E, Cresswell RB, Kaseje M. Is polygyny a risk factor in the transmission of HIV in sub-Saharan Africa? A systematic review. Afr J Reprod Health. 2020. https://doi.org/10.29063/ajrh2020/v24i4.20.
14. Ghana Statistical Service. Ghana Maternal Health Survey 2017: key Indicators Report. Accra: Ghana Statistical Service; 2018.
15. Hennessy S, Bilker WB, Berlin JA, Strom BL. Factors influencing the optimal control-to-case ratio in matched case–control studies. Am J Epidemiol. 1999;149(2):195–7. https://doi.org/10.1093/oxfordjournals.aje.a009786.
16. Kelsey WD, J. L., Whittemore JL, Evans AS, Thompson WD. Methods in observational epidemiology. Monographs in epidemiology and biostatistics. Oxford: Oxford University Press; 1996.
17. Bianciotto M, et al. Drug use and upper gastrointestinal complications in children: a case–control study. Arch Dis Child. 2013;98(3):218–21. https://doi.org/10.1136/archdischild-2012-302100.

18. Mann PS. Introductory statistics. 7th ed. In: Albanese J, Keohane E, editors. New York: Laurie Rosatone; 2010.
19. Amavih AA. Factors influencing HIV positive status disclosure among sexual partners in the Volta Region of Ghana. Accra: University of Ghana; 2017.
20. Boampong-Konam KA. Barriers to disclosure of HIV positive status to sexual partner (S) in the Central Region, Ghana. Accra: University of Ghana; 2015.
21. Kenu E, Obo-Akwa A, Nuamah GB, Brefo A, Sam M, Lartey M. Knowledge and disclosure of HIV status among adolescents and young adults attending an adolescent HIV clinic in Accra, Ghana. BMC Res Notes. 2014;7(1):844. https://doi.org/10.1186/1756-0500-7-844.
22. Muhindo R, Nakalega A, Nankumbi J. Predictors of couple HIV counseling and testing among adult residents of Bukomero sub-county, Kiboga district, rural Uganda. BMC Public Health. 2015;15(1):1171. https://doi.org/10.1186/s12889-015-2526-3.
23. Atwiine B, Kiwanuka J, Musinguzi N, Atwine D, Haberer JE. Understanding the role of age in HIV disclosure rates and patterns for HIV-infected children in southwestern Uganda. AIDS Care. 2015;27(4):424–30. https://doi.org/10.1080/09540121.2014.978735.
24. McHugh G, et al. Familial silence surrounding HIV and non-disclosure of HIV status to older children and adolescents. AIDS Care. 2018;30(7):830–5. https://doi.org/10.1080/09540121.2018.1434118.
25. Ubesie AC, et al. HIV status disclosure rate and reasons for non-disclosure among infected children and adolescents in Enugu, southeast Nigeria. SAHARA J J Soc Asp HIV/AIDS. 2016;13(1):136–41. https://doi.org/10.1080/17290376.2016.1226942.
26. Kallem S, Renner L, Ghebremichael M, Paintsil E. Prevalence and pattern of disclosure of HIV status in HIV-infected children in Ghana. AIDS Behav. 2011;15(6):1121–7. https://doi.org/10.1007/s10461-010-9741-9.
27. Hayfron-Benjamin A, Obiri-Yeboah D, Ayisi-Addo S, Siakwa PM, Mupepi S. HIV diagnosis disclosure to infected children and adolescents; challenges of family caregivers in the Central Region of Ghana. BMC Pediatr. 2018;18(1):365. https://doi.org/10.1186/s12887-018-1330-5.
28. Gyamfi E, Okyere P, Appiah-Brempong E, Adjei RO, Mensah KA. Benefits of disclosure of HIV status to infected children and adolescents: perceptions of caregivers and health care providers. J Assoc Nurses AIDS Care. 2015;26(6):770–80. https://doi.org/10.1016/j.jana.2015.08.001.
29. Adeniyi OV, Ajayi AI, Ter Goon D, Owolabi EO, Eboh A, Lambert J. Factors affecting adherence to antiretroviral therapy among pregnant women in the Eastern Cape, South Africa. BMC Infect Dis. 2018;18(1):175. https://doi.org/10.1186/s12879-018-3087-8.
30. Yaya I, et al. HIV status disclosure to sexual partners, among people living with HIV and AIDS on antiretroviral therapy at Sokodé regional hospital, Togo. PLoS ONE. 2015;10(2): e0118157. https://doi.org/10.1371/journal.pone.0118157.
31. Igwegbe AO, Ugboaja JO, Nwajiaku L. Prevalence and determinants of non-adherence to antiretroviral therapy among HIV$^-$ positive pregnant women in Nnewi, Nigeria, September, 2010.
32. Mabunda K, Ngasama E, Babalola J, Zunza M, Nyasulu P. Determinants of adherence to antiretroviral treatment among human immunodeficiency virus infected young adults attending care at Letaba Hospital HIV Clinic, Limpopo Province, South Africa. Pan Afr Med J. 2019. https://doi.org/10.11604/pamj.2019.32.37.17722.
33. Tsega B, Srikanth BA, Shewamene Z. Determinants of non-adherence to antiretroviral therapy in adult hospitalized patients, Northwest Ethiopia. Patient Prefer Adherence. 2015;9:373–80. https://doi.org/10.2147/PPA.S75876.
34. Yonah G, Fredrick F, Leyna G. HIV serostatus disclosure among people living with HIV/AIDS in Mwanza, Tanzania. AIDS Res Ther. 2014;11(1):5. https://doi.org/10.1186/1742-6405-11-5.
35. Tshweneagae GT, Oss VM, Mgutshini T. Disclosure of HIV status to sexual partners by people living with HIV. Curationis. 2015. https://doi.org/10.4102/curationis.v38i1.1174.
36. Osingada CP, Okuga M, Nabirye RC, Sewankambo NK, Nakanjako D. Prevalence, barriers and factors associated with parental disclosure of their HIV positive status to children: a cross-sectional study in an urban clinic in Kampala, Uganda. BMC Public Health. 2016;16(1):547. https://doi.org/10.1186/s12889-016-3235-2.
37. Gultie T, Genet M, Sebsibie G. Disclosure of HIV-positive status to sexual partner and associated factors among ART users in Mekelle Hospital. HIV/AIDS Res Palliat Care. 2015. https://doi.org/10.2147/HIV.S84341.
38. Longinetti E, Santacatterina M, El-Khatib Z. Gender perspective of risk factors associated with disclosure of HIV status, a cross-sectional study in Soweto, South Africa. PLoS ONE. 2014;9(4):e95440. https://doi.org/10.1371/journal.pone.0095440.
39. Ssali SN, et al. Reasons for disclosure of HIV status by people living with HIV/AIDS and in HIV care in Uganda: an exploratory study. AIDS Patient Care STDS. 2010;24(10):675–81. https://doi.org/10.1089/apc.2010.0062.
40. Naigino R, et al. HIV status disclosure and associated outcomes among pregnant women enrolled in antiretroviral therapy in Uganda: a mixed methods study. Reprod Health. 2017;14(1):107. https://doi.org/10.1186/s12978-017-0367-5.