Journal of Biosocial Science (2022), 54: 4, 572–582
doi:10.1017/S0021932021000262

CAMBRIDGE UNIVERSITY PRESS

RESEARCH ARTICLE

Awareness of HIV serostatus by sex partners of women living with HIV in North-Central Nigeria: correlates and predictive analyses

Ejemai Amaize Eboreime[1,2*], Ijeoma Uchenna Itanyi[3,4], Amaka Grace Ogidi[3], Theddeus Iheanacho[6], Olanrewaju Olayiwola[7], Chima Ariel Onoka[3,4] and Echezona Edozie Ezeanolue[3]

[1]Department of Psychiatry, Faculty of Medicine and Dentistry, University of Alberta, Alberta, Canada, [2]National Primary Health Care Development Agency, Abuja, Federal Capital Territory, Nigeria, [3]Center for Translation and Implementation Research, University of Nigeria Nsukka, Enugu, Nigeria, [4]Department of Community Medicine, University of Nigeria Nsukka, Enugu, Nigeria, [5]Department of Psychiatry, Yale School of Medicine, Connecticut, USA, [6]Yale Institute of Global Health, Yale School of Medicine, Connecticut, USA and [7]Caritas Nigeria, Abuja, Federal Capital Territory, Nigeria
*Corresponding author. Email: eboreime@ualberta.ca

(Received 4 January 2021; revised 20 April 2021; accepted 21 April 2021; first published online 24 June 2021)

Abstract

Non-communication of HIV status among sex partners is a notable hurdle in halting transmission, largely due to socio-cultural factors. This study aimed to predict the determinants of male partners' awareness of women's serostatus. A total of 8825 women of reproductive age living with HIV who were clients at five comprehensive HIV treatment centres in Benue State, North-Central Nigeria were surveyed between June and December 2017, and 6655 reported having a sexual partner at the time of the survey selected for analysis. A regression model was used to estimate the determinants of male partner awareness of serostatus from the perspective of women. Conditional marginal analyses were conducted to evaluate the marginal effects of identified predictors on the probability of outcomes. Partners of married women were found to have greater odds of being aware of their spouse's serostatus (adjusted OR (aOR): 3.20; 95%CI: 2.13–4.81) than non-married partners. Similarly, the odds of male partner awareness increased with the years women had been on antiretroviral therapy (aOR: 1.13; 95%CI: 1.07–1.20). The probability of partners of married respondents being aware of their spouse's HIV serostatus was 97%. The conditional marginal effects of being educated to primary or higher level were 1.2 (95% CI: −0.2 to 2.7) and 1.8 (95% CI: 0.09–3.4) percentage points higher respectively when compared with women with no formal education. Being unemployed or being a trader significantly decreased the probability of partners being aware of respondents' serostatus when compared with farmers; conditional marginal effects of −6.7 (95% CI: −12.0 to −1.4) and −3.9 (95% CI: −5.7 to −2.2) percentage points, respectively. The study found that relationship status and girl-child education are factors that can improve communication of HIV status to sex partners. Policies and interventions aimed at improving the social determinants of health, and social support for healthy communications in relationships, are recommended to reduce HIV transmission between sex partners.

Keywords: Sexual partners; Partner disclosure; HIV

Introduction

Promoting mutual awareness of HIV serostatus among sex partners is increasingly being recognized as a core component of HIV prevention and control programmes across the world (Hart *et al.*, 2005; Bachanas *et al.*, 2013; Jennings *et al.*, 2015). Encouraging serostatus disclosure is recognized as a key strategy to achieve the targeted 90% reduction in HIV incidence and

AIDS-related mortality by 2030 (Barnhart 2016; Stover *et al.,* 2016; Granich *et al.,* 2017; Ajayi *et al.,* 2019; Karatzas *et al.,* 2019). This is because awareness of a partner's HIV status can lead to improved sexual behaviours, which mitigate the risk of transmission of the infection (Groves *et al.,* 2012; Jennings *et al.,* 2015). Studies have shown that partner awareness through disclosure can reduce inconsistent or no condom use, having multiple sex partners, indulgence in casual sex and sex-related substance abuse (Marks *et al.,* 2005; Hart *et al.,* 2005; Xia *et al.,* 2006; Loubiere *et al.,* 2009; Benki-Nugent *et al.,* 2011; Irungu *et al.,* 2012; Conserve *et al.,* 2013). Such frank communication between sex partners can also facilitate the utilization of HIV care services such as HIV testing and counselling (HTC), and related shared sexual health decision-making approaches (Millson *et al.,* 1994; Clark *et al.,* 2007; Bachanas *et al.,* 2013; Clark *et al.,* 2014).

In many low- and middle-income countries (LMICs), while HTC rates have significantly improved over the years following efforts by the United States President's Emergency Plan for AIDS Relief (PEPFAR) (Karatzas *et al.,* 2019), disclosure rates vary significantly between and within countries (Dessalegn *et al.,* 2019). Partner notification rates in LMICs range from 16% to 86% (average: 52%), compared with 42% to 100% (average: 71%) in high-income countries (Maman & Medley, 2003; Dessalegn *et al.,* 2019). Lower disclosure rates may contribute to the poor linkage to care observed in the HIV care continuum in many LMICs, including Nigeria (Karatzas *et al.,* 2019).

Despite the significant drop in prevalence of HIV in Nigeria over the years, significant sociocultural hurdles need to be overcome in order to achieve the 90-90-90 targets (Adepoju, 2019). One such hurdle is the persistent stigma inhibiting open communication about HIV serostatus, particularly among sexual partners (Odimegwu *et al.,* 2017). A recent survey indicates that 1.9 million (1.4%) Nigerians currently live with HIV (Adeyinka *et al.,* 2019). The prevalence of HIV among women of reproductive age is almost twice that of their male counterparts. The two states with the highest prevalence are Akwa-Ibom (5.5%), located in the South-South region, and Benue (5.3%) located in the North-Central region (National Agency for the Control of AIDS, 2019).

The purpose of this study was to evaluate the factors that determine HIV-positive women's awareness of their male sex partner's HIV serostatus in Benue State, Nigeria.

Methods

Study design, context and participants

A cross-sectional survey of 8825 women of reproductive age living with HIV was conducted between June and December 2017 in Benue State, North-Central Nigeria. The selected participants had participated in an integrated mHealth platform intervention at five comprehensive HIV treatment centres in the state. Details of the development of the integrated mHealth platform have been reported elsewhere (Gbadamosi *et al.,* 2018). In brief, the mHealth platform is capable of storing encrypted patient information on a patient-held smartcard and smartphone mobile application that is linked with a secure web-based database. The patients' records can be viewed on a mobile app without an internet connection, and this aids in health care decision-making at the point of care in low-resource environments. Benue State has an estimated total population of 5,138,531, of whom 49.6% are female. Most of the population reside in the rural areas and farming is the predominant occupation in the state (in 74.8% of the population) (Benue State Government, 2018). About 70% of the female population have attained less than secondary education with a literacy rate of 52.8% (National Population Commission and Inner City Fund International, 2014).

Study sites were selected using the following criteria: a comprehensive HIV treatment facility, received funding support from PEPFAR through Caritas Nigeria, had records of a high volume of HIV-infected women (≥2000 women on treatment) and offered free HIV testing services,

https://doi.org/10.1017/S0021932021000262 Published online by Cambridge University Press

antiretroviral therapy (ART) for both adults and children and services for the prevention of mother-to-child transmission of HIV. There were 21 comprehensive HIV treatment facilities in Benue State at the time of the survey: seven had ≥2000 women undergoing treatment, of which five were selected. Any HIV-infected women were eligible to participate in this study if they were of reproductive age (18–45 years) and received ART from any of the five selected treatment sites.

Of the total 8825 HIV-positive women surveyed, 6655 (75.4%) reported having a sexual partner at the time of the survey. Following the exclusion of observations with missing variables, a total of 5064 respondents were included in the final analyses.

Data collection

Trained health workers offered pre-printed mHealth smartcards with unique patient identifiers to eligible HIV-infected women as they presented for their routine pre-scheduled clinic appointments. The study's purpose and procedures were explained to the women after which informed consent was obtained from those who chose to participate in the study.

Semi-structured questionnaires were designed, pre-tested and used by trained research assistants to collect data on socio-demographic and clinical characteristics of the study participants. Socio-demographic characteristics included age, marital status, highest level of education, occupation, number of living children and sex partner's age. Clinical characteristics included viral load, ART start date, current ART regimen, partner's HIV status and partner's awareness about participant's HIV status.

Variables

The dependent variable was 'partner's awareness of respondent's HIV serostatus'. Respondents were asked if their partner was aware of their HIV status. The responses were coded as 0 for 'not aware' and 1 for 'aware'. Seven independent variables were extracted from the survey database, which included the socio-demographic profile of the participants (age, highest level of education, marital status, occupation), their family profiles (partner's age, number of children) and number of years the participants had been on ART.

Statistical analysis

Data analysis was performed using Stata version 15.0. Descriptive analysis of the independent and dependent variables was performed and presented on a frequency table indicating distribution of variables responses. Bivariable and multivariable binary logistic regression models were developed to estimate the association between the dependent and the independent variables presented as odds ratios (ORs) and 95% confidence intervals (CIs). Dummy variables with reference categories were created from categorical variables. 'Single' and 'Other' were designated as combined reference categories for 'marital status' due to the very small size of the 'Other' category.

Furthermore, post-estimation predictive margins and conditional marginal effects at means (MEM) analyses were conducted to evaluate the probability of outcomes with respect to each independent variable, holding other independent variable constant at their means.

Results

Descriptive statistics

Table 1 presents the distribution of the socio-demographic characteristics of the study participants. Most of the study participants (74.8%) were married and 75.9% had a primary level education or higher (note that missing data were excluded from this analysis). The vast majority were farmers (67.8%). The median age of participants was 32 years (IQR: 28–37), while the

https://doi.org/10.1017/S0021932021000262 Published online by Cambridge University Press

Table 1. Descriptive socio-demographic characteristics of women of reproductive age living with HIV with a sexual partner at the time of survey, Benue State, Nigeria, $N = 5064$

Variable	*n*	%	Median	IQR
Partner aware of respondent's HIV status				
No	235	5.23		
Yes	4829	94.77		
Age (years)			32	28–37
Marital status				
Divorced	366	7.23		
Married	3786	74.76		
Other	11	0.22		
Single	487	9.62		
Widowed	414	8.18		
Highest level of education				
No formal education	1218	24.05		
Primary education	2163	42.71		
Secondary education or higher	1683	33.23		
Occupation				
Unemployed	137	2.71		
Civil servant	309	6.10		
Farmer	3434	67.81		
Other	209	4.13		
Trader	975	19.25		
Partner's age (years)			41	36–50
Number of children			3	1–4
Number of years on ART			5	3–7

median age of their partners was 41 years (IQR: 36–50). The median number of the children of participants was 3 years (IQR = 1–4 years), and the median number of years participants had been on ART was 5 (IQR = 3–7).

Bivariable and multivariable logistic regression

Table 2 shows the results of the bivariable (unadjusted) and multivariable (adjusted) regression models. Bivariable analyses showed significant association between marriage status and partner awareness. Partners of married women were three times as likely to be aware of the status of their spouses compared with partners of the reference categories (single women and 'others'). This finding was similar with the multivariable analysis (adjusted OR (aOR): 3.20; 95%CI: 2.13–4.81). Furthermore, the odds of male partners being aware of the respondent's HIV serostatus increased with each additional child the respondents had in bivariable model (aOR: 1.04; 95% CI: 0.99–1.11) but decreased in the multivariable model (aOR: 0.97; 95% CI: 0.90–1.05), but the association was not statistically significant in either models. The odds of partner awareness significantly increased by 1.13 times with each additional year on ART on both bivariable (95% CI: 1.07–1.18) and

https://doi.org/10.1017/S0021932021000262 Published online by Cambridge University Press

Table 2. Unadjusted and adjusted binary logistic regression on the association between explanatory variables and partner's awareness of respondent's HIV status

Variable	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Age (years)	0.99 (0.97–1.01)	0.99 (0.96–1.01)
Marital status		
Divorced	1.11 (0.68–1.81)	1.05 (0.62–1.77)
Married	3.20 (2.23–4.60)***	3.20 (2.13–4.81)***
Other (Ref.)		
Single (Ref.)		
Widowed	0.77 (0.50–1.20)	0.78 (0.45–1.30)
Highest level of education		
No formal education (Ref.)		
Primary education	1.11 (0.84–1.45)	1.37 (0.96–1.94)*
Secondary education or higher	1.12 (0.84–1.49)	1.60 (1.04–2.47)**
Occupation		
Unemployed	0.34 (0.19–0.60) ***	0.28 (0.15–0.54)***
Civil servant	0.70 (0.41–1.20)	0.54 (0.29–1.01)*
Farmer (Ref.)		
Other	1.30 (0.57–3.00)	1.08 (0.45–2.57)
Trader	0.48 (0.36–0.65)***	0.41 (0.29–0.57)***
Partner's age (years)	0.10 (0.99–1.01)	1.00 (0.98–1.01)
Number of children	1.04 (0.99–1.11)*	0.97 (0.90–1.05)
Number of years on ART	1.13 (1.07–1.18)***	1.13 (1.07–1.20)***

The likelihood ratio χ^2 if the logistic regression model was 136.27 ($p<0.001$). Pseudo R^2 was 0.0717 while post-estimation Hosmer-Lemeshow χ^2 was 11.80 ($p=0.161$). These diagnostic and goodness-of-fit tests indicate that the regression model was a good fit.
Ref., reference category.
***$p<0.001$; **$p<0.05$; *$p<0.10$.

multivariable (95% CI: 1.07–1.20) models. Whereas there was significant association between male partner awareness of respondent's serostatus and secondary or higher education (aOR: 1.60; 95%CI: 1.04–2.47) on the multivariable model, statistically significant association between these variables were not found on the bivariable model. Similarly, partner awareness was significantly associated with unemployed respondents (aOR: 0.28; 95%CI: 0.15–0.54) and traders (aOR: 0.41; 95%CI: 0.29–0.57) in the multivariable model in comparison to farmers (reference category).

Post-estimation predictive margins analyses

Figure 1 shows the outputs of the predictive margins analysis with respect to variables with significant outcomes in the logistic regression model (marital status, highest education, occupation and years on ART), while Figure 2 reports outcomes of the MEM model. The probability of women perceiving their male partners to be aware of their serostatus increased with the number of years the women had been on ART, with a conditional marginal effect of 0.004 (95% CI: 0.002–0.006). This indicates that the probability of perceived partner awareness of the respondent's serostatus increased by 0.4 percentage points with each additional year the women were on ART. The probability of partners of married respondents being aware of their

https://doi.org/10.1017/S0021932021000262 Published online by Cambridge University Press

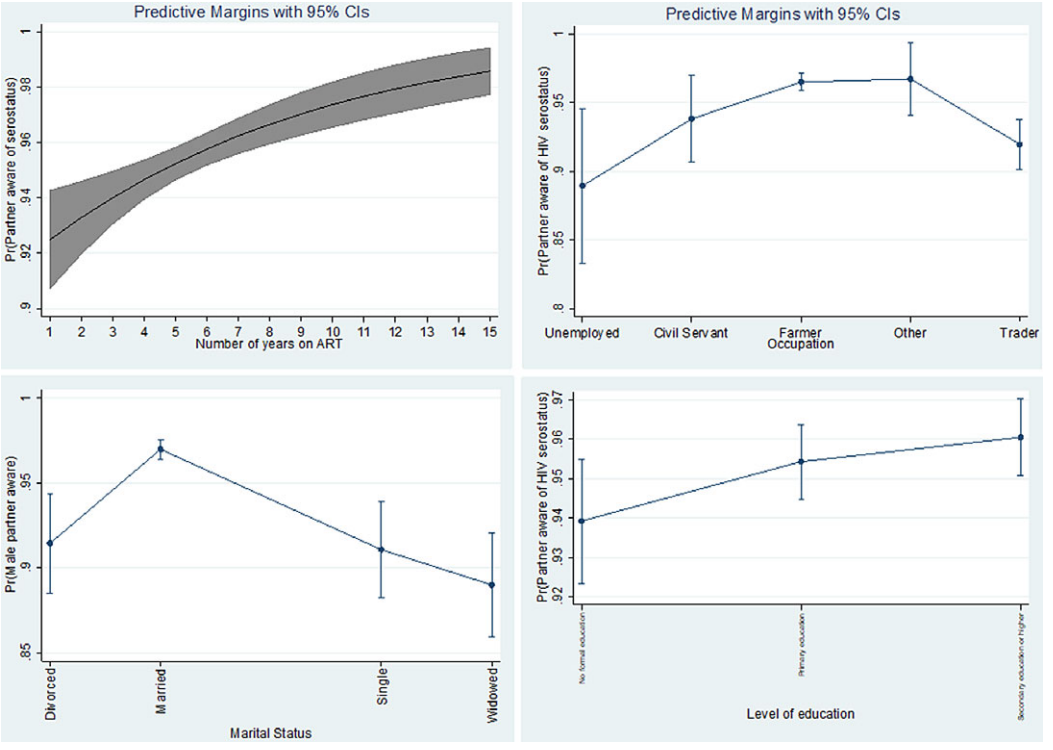

Figure 1. Predictive margins of significant independent variables with 95% confidence intervals (95% CI).

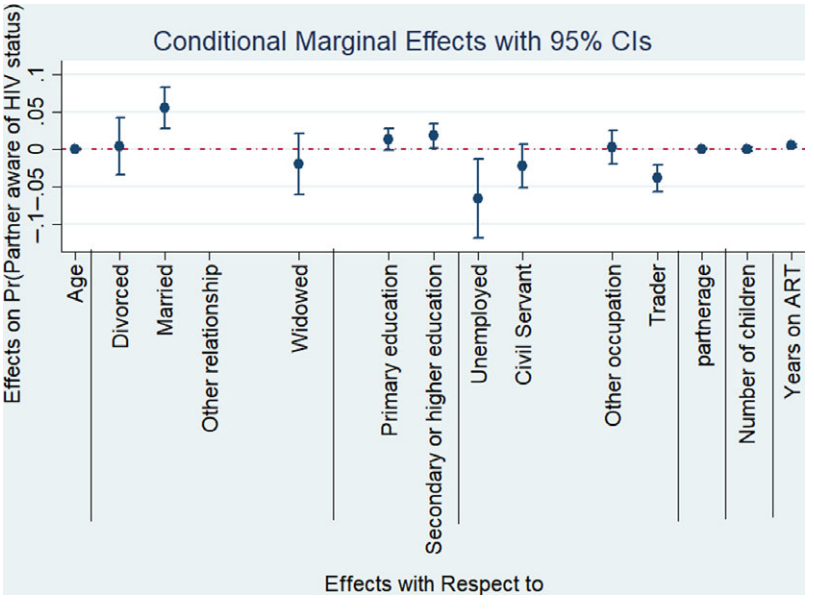

Figure 2. Conditional marginal effects of independent variables with 95% confidence intervals (95% CI).

https://doi.org/10.1017/S0021932021000262 Published online by Cambridge University Press

spouse's HIV serostatus was 97%; and 5.4 percentage points (95% CI: 2.7–8.2) higher than partners of single women, as revealed by the MEM analysis. The conditional marginal effects of being educated to primary or higher levels were 1.2 (95% CI: −0.2 to 2.7) and 1.8 (95% CI: 0.09–3.4) percentage points higher, respectively, when compared with women with no formal education. Being unemployed or being a trader significantly decreased the probability of partners being aware of the respondent's serostatus when compared with farmers, with conditional marginal effects of −6.7 (95% CI: −12.0 to −1.4) and −3.9 (95% CI: −5.7 to −2.2) percentage points, respectively.

Discussion

The results of this study indicate that partner awareness of HIV status among HIV-positive women in the study population was generally high (94.77%), which may indicate a high disclosure rate. This rate is consistent with findings in other sub-Saharan African countries (Cameroon, Ghana, Tanzania, Kenya, Uganda, South Africa, Malawi and Namibia), where disclosure rates have been shown to be over 80% (King *et al.,* 2008; Bachanas *et al.,* 2013; Conroy & Wong, 2015; Obiri-Yeboah *et al.,* 2016; Brittain *et al.,* 2018; Wambiya *et al.,* 2018). However, many African countries and communities still report partner notification rates as low as 16% (Maman & Medley, 2003).

As with many studies in sub-Saharan Africa (Deribe *et al.,* 2008; King *et al.,* 2008; Amoran, 2012; Kouanda *et al.,* 2012; Yaya *et al.,* 2015), being a married woman or educated to at least secondary level were associated with increased odds of male partners being aware of respondent's serostatus. Similarly, the odds of male partner awareness increased by 13% with each additional year respondents remained on ART. Conversely, male partners of traders and unemployed women had 62% and 74% lower odds, respectively, of being aware of the respondent's serostatus than employed participants with unspecified occupations.

Compared with men, African women are more constrained from disclosing their HIV status to their sex partner(s), as well as being informed about their partner's HIV status (Bachanas *et al.,* 2013). This is not unconnected with the social stigma associated with disclosure of serostatus. Previous studies have identified prior knowledge of male partners' positive status as a key determinant of female partner disclosure. Other determinants include strong partner support against discrimination (Amoran, 2012; Ezeanolue *et al.,* 2017; Hallberg *et al.,* 2019). These may be more likely to be experienced in a marital relationship, thus, may explain the strong association between marriage and disclosure. Monogamous marriages have also been associated with better disclosure when compared with polygamous marriages (Amoran, 2012). This may be indicative of a possible higher feeling of trust and commitment, leading to better communication within marital unions. However, the fear of domestic violence following disclosure is a very common finding in sub-Saharan Africa. This fear may preclude women from disclosing their status to their partners, particularly when their partner's status is unknown or negative (Obiri-Yeboah *et al.,* 2016; Ngonzi *et al.,* 2019). Disruption of a relationship has also been identified as a common fear among sub-Saharan African women, which impedes disclosure (Baba-Ari *et al.,* 2018). Although common across various relationship types, unmarried women may be more affected by this fear (Arrey *et al.,* 2015). Yet male partner involvement is crucial for better outcomes of prevention of mother-to-child transmission of HIV (Ezeanolue *et al.,* 2015, 2017; Colvin, 2019).

The number of years on ART was positively associated with male partner awareness of the respondents' serostatus. This may be a proxy indicator of the confidence built over the years from counselling services received by the women during clinic sessions. However, it may also be a reverse association, such that prior disclosure may have resulted in adherence to the ART regimen over the years. This assumption is supported by other studies from similar sub-Saharan African contexts (Bulali *et al.,* 2018; Dessie *et al.,* 2019).

https://doi.org/10.1017/S0021932021000262 Published online by Cambridge University Press

The relatively high rate of formal education among the women in this study (76% had at least primary level education) may also explain the understanding of the need to communicate their status with partners. Several studies have identified education as a determinant of disclosure rates (Batterham *et al.,* 2005; Amoran, 2012; Kiula *et al.,* 2013; Yaya *et al.,* 2015). In particular, girl-child education is associated with a decrease risk of HIV transmission (Alsan & Cutler, 2013).

Similarly, being economically empowered helps allay some of the fears associated with women disclosing their status to their partners. Thus, the low unemployment rate (3%) may also have contributed to the high male partner awareness rates in the study population. Loss of employment is a common fear mitigating against disclosure of status by women (Sowell *et al.,* 2003; Amoran, 2012). Being mostly farmers (thus self-employed), the women may be able to fend for themselves and their children. Consequently, the fear of being economically incapacitated following disclosure may be mitigated. However, trading was significantly associated with lower male partner awareness.

The findings from this study suggest that strategies aimed at improving women's education and economic independence, as well as facilitating frank communication between sex partners, may encourage disclosure of HIV status to partners. Training peer educators to provide support for safe disclosure may prove to be a useful strategy, as part of a comprehensive policy intervention, to promote partner notification. Successful models can be adapted from those of other countries (Bergman *et al.,* 2015; Katz *et al.,* 2016; Karatzas *et al.,* 2019), but contextual variations such as socio-cultural and political nuances must be taken into cognizance. Furthermore, gender sensitivity should be given adequate consideration in the development and promulgation of policies, legislation and programmes relating to HIV/AIDS.

The study reports male partner awareness from the female partner's perspective, which may be subject to respondent bias. Future studies may seek to confirm responses by follow-up interviews with the male partners barring ethical restrictions. Given that this study retrospectively analysed data collected towards objectives of a broader study, some other 'awareness-specific' explanatory variables, such as number of sex partners and other social and behavioural characteristics reported in other studies, were not collected (Batterham *et al.,* 2005; Amoran, 2012; Kiula *et al.,* 2013; Arrey *et al.,* 2015; Obiri-Yeboah *et al.,* 2016). Future studies may also employ a mixed-methods approach to identify and test possible context-specific explanatory variables.

In conclusion, the high rates of participants' reported partner awareness of their HIV serostatus in this study in Benue State, Nigeria, indicates that the dynamics of disclosure in this population may be shifting positively. This may be influenced by increasing girl-child education and economic empowerment, which instil greater confidence in women of reproductive age. Consequently, prioritizing interventions aimed at improving these social determinants of health may significantly reduce the burden of HIV transmission in the population.

Acknowledgments. The authors acknowledge the support of the heads and staff of the participating health facilities, the patients and the staff of Caritas Nigeria and the staff of Center for Translation and Implementation Research (CTAIR) of the University of Nigeria, Nsukka, Enugu. The dataset used for this study is available from the corresponding author on reasonable request.

Funding. This study was funded by the Fogarty International Center of the US National Institutes of Health (NIH) (Grant No. R21TW010252) and the Eunice Kennedy Shriver National Institute of Child Health & Human Development of the NIH (Grant Nos R01HD087994 and R01HD087994-S1). The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH.

Author Contributions. EEE, IUI, OO and AGO conceptualized and designed the study. Data was collected by AGO, OO and EEE. EAE and EEE analysed the data. Data interpretation was done by EAE, IUI, CAO and EEE. EAE and IUI drafted the initial manuscript while EAE, IUI, TI, CAO and EEE critically revised the manuscript. All authors read and approved the final draft.

Conflicts of Interest. The EEE owns shares in the database platform Vitira Smart Solutions. This was supported by Fogarty International Center of the US National Institutes of Health (NIH) (Grant No. R21TW010252) and commercialized by Vitria Health LLC.

https://doi.org/10.1017/S0021932021000262 Published online by Cambridge University Press

Ethical Approval. Ethical approval for this study was obtained from the Health Research Ethics Committee of the University of Nigeria Teaching Hospital (NHREC/05/01/2008B-FWA00002458-1RB00002323). Approval was obtained from the health administrators of all the study sites and written informed consent was obtained from participants. Informed consent was obtained for all participants in this study.

References

Adepoju P (2019) Nigeria's new HIV/AIDS conundrum. *Lancet HIV* **6**, E351–E352.

Adeyinka DA, Olakunde BO, Oladimeji O and Ezeanolue EE (2019) HIV Indicator and Impact Survey: considerations for Nigeria. *Lancet HIV* **6**, E348–E350.

Ajayi AI, Abioye AO, Adeniyi OV and Akpan W (2019) Concerns about contracting HIV, knowing partners' HIV sero-status and discussion of HIV/STI with sexual partners as determinants of uptake of HIV testing. *Journal of Biosocial Science* **51**, 549–561.

Alsan MM and Cutler DM (2013) Girls' education and HIV risk: evidence from Uganda. *Journal of Health Economics* **32**, 863–872.

Amoran OE (2012) Predictors of disclosure of sero-status to sexual partners among people living with HIV/AIDS in Ogun State, Nigeria. *Nigerian Journal of Clinical Practice* **15**, 385–390.

Arrey AE, J Bilsen, P Lacor, and R Deschepper (2015) "It's my secret": fear of disclosure among sub-Saharan African migrant women living with HIV/AIDS in Belgium. *PloS One* **10**(3), e0119653

Baba-Ari F, Eboreime EA and Hossain M (2018) Conditional cash transfers for maternal health interventions: factors influencing uptake in North-Central Nigeria. *International Journal of Health Policy Management* **7**, 934–942.

Bachanas, P, Medley A, Pals S, Kidder D, Antelman G, Benech I *et al.* (2013) Disclosure, knowledge of partner status, and condom use among HIV-positive patients attending clinical care in Tanzania, Kenya, and Namibia. *AIDS Patient Care STDS* **27**, 425–435.

Barnhart S (2016) PEPFAR: is 90-90-90 magical thinking? *Lancet* **387**, 943–944.

Batterham P, Rice E and Rotheram-Borus MJ (2005) Predictors of serostatus disclosure to partners among young people living with HIV in the pre- and post-HAART eras. *AIDS and Behavior* **9**, 281–287.

Benki-Nugent S, Chung MH, Ackers M, Richardson BA, McGrath CJ, Kohler P *et al.* (2011) Knowing a sexual partner is HIV-1-uninfected is associated with higher condom use among HIV-1-infected adults in Kenya. *Sexually Transmitted Diseases* **38**, 808–810.

Benue State Government (2018) *Benue State: Quick Facts*. URL: https://benuestate.gov.ng/quick-facts/ (accessed 10th November 2020).

Bergman J, Gratrix J, Pillay T, Houston S, Cooper R, Charlton CL *et al.* (2015) Intensive HIV partner notification is effective in identifying new and previously diagnosed HIV Infections in Edmonton, Canada. *AIDS Patient Care and STDs* **29**, 419–422.

Brittain, K, Mellins CA, Remien RH, Phillips T, Zerbe A, Abrams EJ and Myer L (2018) Patterns and predictors of HIV-status disclosure among pregnant women in South Africa: dimensions of disclosure and influence of social and economic circumstances. *AIDS and Behavior* **22**, 3933–3944.

Bulali RE, Kibusi SM and Mpondo BCT (2018) Factors associated with HIV status disclosure and its effect on treatment adherence and quality of life among children 6-17 years on antiretroviral therapy in Southern Highlands Zone, Tanzania: unmatched case control study. *International Journal of Pediatrics*, doi: 10.1155/2018/8058291.

Clark JL, Long CM, Giron JM, Cuadros JA, Caceres CF, Coates TJ *et al.* (2007) Partner notification for sexually transmitted diseases in Peru: knowledge, attitudes, and practices in a high-risk community. *Sexually Transmitted Diseases* **34**, 309–313.

Clark JL, Segura ER, Perez-Brumer AG, Reisner SL, Peinado J, Salvatierra HJ *et al.* (2014) Potential impact and acceptability of internet partner notification for men who have sex with men and transgender women recently diagnosed as having sexually transmitted disease in Lima, Peru. *Sexually Transmitted Diseases* **41**, 43–45.

Colvin CJ (2019) Strategies for engaging men in HIV services. *Lancet HIV* **6**, E191–E200.

Conroy AA and Wong LH (2015) How reliable are self-reports of HIV status disclosure? Evidence from couples in Malawi. *Social Science & Medicine* **144**, 28–37.

Conserve D, Sevilla L, Mbwambo J and King G (2013) Determinants of previous HIV testing and knowledge of partners hiv status among men attending a voluntary counseling and testing clinic in Dar es Salaam, Tanzania. *American Journal of Men's Health* **7**, 450–460.

Deribe K, Woldemichael K, Wondafrash M, Haile A and Amberbir A (2008) Disclosure experience and associated factors among HIV positive men and women clinical service users in southwest Ethiopia. *BMC Public Health* **8**, 81.

Dessalegn NG, Hailemichael RG, Shewa-amare A, Sawleshwarkar S, Lodebo B, Amberbir A and Hillman RJ (2019) HIV disclosure: HIV-positive status disclosure to sexual partners among individuals receiving HIV care in Addis Ababa, Ethiopia. *PloS One* **14**(2), e0211967.

https://doi.org/10.1017/S0021932021000262 Published online by Cambridge University Press

Dessie G, Wagnew F, Mulugeta H, Amare D, Jara D, Leshargie CT *et al.* (2019) The effect of disclosure on adherence to antiretroviral therapy among adults living with HIV in Ethiopia: a systematic review and meta-analysis. *BMC Infectious Diseases* **19**, 528.

Ezeanolue EE, Obiefune MC, Ezeanolue CO, Ehiri JE, Osuji A, Ogidi AG *et al.* (2015) Effect of a congregation-based intervention on uptake of HIV testing and linkage to care in pregnant women in Nigeria (Baby Shower): a cluster randomised trial. *Lancet Global Health* **3**, E692–E700.

Ezeanolue EE, Obiefune MC, Yang W, Ezeanolue CO, Pharr J, Osuji A *et al.* (2017) What do you need to get male partners of pregnant women tested for HIV in resource limited settings? *The Baby Shower Cluster Randomized Trial. AIDS and Behavior* **21**, 587–596.

Gbadamosi SO, Eze C, Olawepo JO, Iwelunmor J, Sarpong DF, Ogidi AG *et al.* (2018) A patient-held smartcard with a unique identifier and an mhealth platform to improve the availability of prenatal test results in rural Nigeria: demonstration study. *Journal of Medical Internet Research* **20**(1), e18.

Granich R, Williams B, Montaner J and Zuniga JM (2017) 90-90-90 and ending AIDS: necessary and feasible. *Lancet* **390**, 341–343.

Groves AK, Maman S and Moodley D (2012) HIV+ women's narratives of non-disclosure: resisting the label of immorality. *Global Public Health* **7**, 799–811.

Hallberg D, Kimario TD, Mtuya C, Msuya M and Björling G (2019) Factors affecting HIV disclosure among partners in Morongo, Tanzania. *International Journal of Africa Nursing Sciences* **10**, 49–54.

Hart TA, Wolitski RJ, Purcell DW, Parsons JT, Gomez CA and Seropositive Urban Men's Study (2005) Partner awareness of the serostatus of HIV-seropositive men who have sex with men: impact on unprotected sexual behavior. *AIDS and Behavior* **9**, 155–166.

Irungu E, Chersich MF, Sanon C, Chege R, Gaillard P, Temmerman M *et al.* (2012) Changes in sexual behaviour among HIV-infected women in west and east Africa in the first 24 months after delivery. *AIDS* **26**, 997–1007.

Jennings L, Rompalo AM, Wang J, Hughes J, Adimora AA, Hodder S *et al.* (2015) Prevalence and correlates of knowledge of male partner HIV testing and serostatus among African-American women living in high poverty, high HIV prevalence communities (HPTN 064). *AIDS and Behavior* **19**, 291–301.

Karatzas N, Peter T, Dave S, Fogarty C, Belinsky N and Pai NP (2019) Are policy initiatives aligned to meet UNAIDS 90-90-90 targets impacting HIV testing and linkages to care? Evidence from a systematic review. *PloS One* 14, doi.org/10.1371/journal.pone.0216936.

Katz DA, Dombrowski JC, Kerani RP, Aubin MR, Kern DA, Heal DD *et al.* (2016) Integrating HIV testing as an outcome of Std partner services for men who have sex with men. *AIDS Patient Care and STDs* **30**, 208–214.

King R, Katuntu D, Lifshay J, Packel L, Batamwita R, Nakayiwa S *et al.* (2008) Processes and outcomes of HIV serostatus disclosure to sexual partners among people living with HIV in Uganda. *AIDS and Behavior* **12**, 232–243.

Kiula ES, Damian DJ and Msuya SE (2013) Predictors of HIV serostatus disclosure to partners among HIV-positive pregnant women in Morogoro, Tanzania. *BMC Public Health* **13**, 433.

Kouanda S, Yameogo WME, Berthe A, Bila B, Yaya FKB, Somda A *et al.* (2012) Self-disclosure of a HIV-positive serostatus: factors favoring disclosure and consequences for persons living with HIV/AIDS in Burkina Faso. *Revue D epidemiologie et de sante publique* **60**, 221–228.

Loubiere S, Peretti-Watel P, Boyer S, Blanche J, Abega SC and Spire B (2009) HIV disclosure and unsafe sex among HIV-infected women in Cameroon: results from the ANRS-EVAL study. *Social Science & Medicine* **69**, 885–891.

Maman S and Medley A (2003) *Gender Dimensions of HIV Status Disclosure to Sexual Partners: Rates Barriers and Outcomes.* World Health Organization, Geneva.

Marks G, Crepaz N, Senterfitt JW and Janssen RS (2005) Meta-analysis of high-risk sexual behavior in persons aware and unaware they are infected with HIV in the United States – implications for HIV prevention programs. *Journal of Acquired Immune Deficiency Syndromes* **39**, 446–453.

Millson ME, Rasooly I, Scott EAF, Oxman AD, Frank JW, Sellors JW *et al.* (1994) Partner notification for sexually-transmitted diseases – proposed practice guidelines. *Canadian Journal of Public Health-Revue Canadienne De Sante Publique* **85**, S53–S55.

National Agency for the Control of AIDS (2019) *Nigeria HIV/AIDS Indicator and Impact Survey Fact Sheets*. National Agency for the Control of AIDS.

National Population Commission and Inner City Fund International (2014) *Nigeria Demographic and Health Survey 2013.* National Population Commission (NPC) [Nigeria], Abuja, Nigeria, and ICF International, and Rockville, MD, USA.

Ngonzi J, Mugyenyi G, Kivunike M, Mugisha J, Salongo W, Masembe S *et al.* (2019) Frequency of HIV status disclosure, associated factors and outcomes among HIV positive pregnant women at Mbarara Regional Referral Hospital, southwestern Uganda. *Pan African Medical Journal* **32**, 200.

Obiri-Yeboah D, Amoako-Sakyi D, Baidoo I, Adu-Oppong A and Rheinlander T (2016) The fears of disclosing HIV status to sexual partners: a mixed methods study in a counseling setting in Ghana. *AIDS and Behavior* **20**, 126–136.

Odimegwu CO, Akinyemi JO and Alabi OO (2017) HIV-stigma in Nigeria: review of research studies, policies, and programmes. *Aids Research and Treatment*, ID 5812650.

Sowell RL, Seals BF, Phillips KD and Julious CH (2003) Disclosure of HIV infection: how do women decide to tell? *Health Education Research* **18**, 32–44.

Stover J, Bollinger L, Izazola JA, Loures L, DeLay P, Ghys PD and **Fast Track Modeling Working Group** (2016) What is required to end the AIDS epidemic as a public health threat by 2030? The cost and impact of the fast-track approach. *PloS One* 11, doi.org/10.1371/journal.pone.0154893

Wambiya EOA, Atela M, Eboreime E and Ibisomi L (2018) Factors affecting the acceptability of isoniazid preventive therapy among healthcare providers in selected HIV clinics in Nairobi County, Kenya: a qualitative study. *BMJ Open* **8**, e024286.

Xia Q, Molitor F, Osmond DH, Tholandi M, Pollack LM, Ruiz JD and Catania JA (2006) Knowledge of sexual partners HIV serostatus and serosorting practices in a California population-based sample of men who have sex with men. *AIDS* **20**, 2081–2089.

Yaya I, Saka B, Landoh DE, Patchali PM, Patassi AA, Aboubakari AS, Makawa MS *et al.* (2015) HIV status disclosure to sexual partners, among people living with HIV and AIDS on antiretroviral therapy at Sokode regional hospital, Togo. *PloS One* **10**, e0118157.

Cite this article: Eboreime EA, Itanyi IU, Ogidi AG, Iheanacho T, Olayiwola O, Onoka CA, and Ezeanolue EE (2022). Awareness of HIV serostatus by sex partners of women living with HIV in North-Central Nigeria: correlates and predictive analyses. *Journal of Biosocial Science* **54**, 572–582. https://doi.org/10.1017/S0021932021000262