Low acceptance of intimate partner violence by pregnant women in Uganda predicts higher uptake of HIV self-testing among their male partners

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Introduction: Heterosexual couples are at high risk for HIV acquisition in sub-Saharan Africa, and HIV self-testing (HST) is an additional approach to expand access to HIV testing services. However, it is not well known how gender equality is associated with HST.

Methods: We used intervention-arm data from a cluster-randomised controlled HST intervention trial (N = 1,618) conducted in Uganda to determine the association between attitudes towards intimate partner violence (IPV), decision-making power and male partner’s uptake of HST among heterosexual couples expecting a child in south-central Uganda. The original study question was to assess the impact of providing pregnant women with HST kits to improve male partner’s HIV testing rates. For this analysis, the primary exposures were gender equality (measured by male partner’s and female partner’s attitudes towards IPV and the female partner’s household decision-making power), and the primary outcome was the male partner’s uptake of HST. Multivariate logistic regression was used for analysis.

Results: We found that male partner HST uptake did not vary depending on male partner’s attitudes towards IPV or decision-making power; however, male partner HST uptake did depend on the female partner’s attitude towards IPV, with 1.76 times more testing (95% CI 1.06–2.92) in couples where the woman had “medium” versus “high” acceptance of IPV, and 1.82 times more testing (95% CI 1.08–3.08) in couples where the woman had “low” versus “high” acceptance of IPV.

Conclusions: This study shows the importance of appropriate negative attitudes by women to IPV in increasing male partner’s HST uptake to integrate HST into national health care policies.

Keywords: antenatal care, decision-making power, gender-based violence, gender equality, sub-Saharan Africa
implemented HST as an additional approach for delivering HIV testing services in Uganda since September of 2018 (Ministry of Health Uganda AIDS Control Program, 2018). HST is an acceptable testing method and reduces barriers to testing (Choko et al., 2017; Krause et al., 2013; Lippman et al., 2015; Stevens et al., 2017), and has also been shown to increase testing rates compared to conventional HIV testing (Gichangi et al., 2018; Johnson et al., 2017; Lippman et al., 2018; Masters et al., 2016; Zhang et al., 2017). Higher gender equality (referring to equal rights, responsibilities and opportunities of women and men and equality between women and men) (United Nations Women, n.d.) has been shown to be associated with improved HIV preventive behaviours, including condom use, pre-exposure prophylaxis, reduced partner concurrency, coverage and retention of people on antiretroviral treatment and conventional HIV testing among both women and men (Boer & Mashamba, 2007; Conroy et al., 2016; Decker et al., 2009; Dunkle et al., 2006; Fladseth et al., 2015; Jewkes et al., 2009; Jewkes et al., 2003; MacPherson et al., 2014; Safarnejad & Izazola-Licea, 2017; Singh et al., 2013; Stephenson, 2010; Teitelman et al., 2016). However, there has been little research on how gender equality in a relationship is associated with HST. This question is of increasing importance as the ministries of health in several African countries have begun to roll out HST for male partners of pregnant women through kits delivered by the pregnant women.

To our knowledge, this is the second study to assess how gender equality is associated with male partner’s uptake of HST after being delivered by their pregnant partner. Our current study in Uganda follows a similar (separately funded) study that we recently conducted in Kenya. In the earlier study in Kenya, we assessed gender equality and pregnant couples’ uptake of HST, finding that that lower acceptance of intimate partner violence was associated with increased couples’ uptake of HST (Vrana-Diaz et al., 2019). In the current study, we sought to build on these findings and further address the research question of gender equality and male partner’s uptake of HST. Therefore, in the current analysis, we used the intervention-arm data from a randomised controlled HST trial among heterosexual couples expecting a child in south-central Uganda. Our aim was to identify the associations between gender equality (measured by attitudes towards intimate partner violence [IPV] against women and decision-making power) and uptake of oral HST by the male partner. We hypothesised that higher gender equality would be associated with higher uptake of HIV self-testing by the male partner.

Methods

**Design and study population**

These data stemmed from a two-arm cluster randomised HIV self-testing intervention trial in three clinics in south-central Uganda (Mpiigi, Nakaseke and Entebbe) from July 2016 to May 2018, with study information collected at baseline, one-month and three-months post-baseline. Inclusion criteria included: 1) woman’s age of at least 14 years old and currently pregnant (as pregnant women between 14 and 18 years old are considered emancipated minors in Uganda); and 2) attending one of the study’s three antenatal clinics for this pregnancy. Additionally, the woman needed to have a male partner of at least 18 years old, be interacting with the male partner at least once per week, with the HIV status of the male partner either HIV negative or unknown by the woman, and the male partner could not have tested for HIV in the past six months. These women could be either HIV positive or HIV negative. After the women provided informed consent, they were randomised by clinic day (randomly varying) into one of two arms: Arm 1, the standard of care for antenatal clinics in Uganda (which included education for women to encourage their partners to test for HIV at the health facility); and Arm 2, standard of care, plus up to four OraQuick HIV self-testing kits to be given to the male partner and up to three other adult members of the household, with training provided to the woman for use of the kit, interpretation of results, actions to be taken after a positive or negative result and strategies for presenting the kit to the male partner. At intervals of one month and three months after enrolment, the women were interviewed to determine whether their male partner tested for HIV as well as the method of testing. The male partners were also contacted at one month and three months, and those consenting to an interview were administered a questionnaire on sociodemographics and HIV testing history.

The risk of IPV was a primary concern of the investigators. At baseline, women in the intervention arm were counselled on strategies to bring up HIV self-testing to their partner, and were provided information on existing referral networks for IPV concerns, and participants were encouraged to directly contact the site coordinator with any experience of IPV. A social worker at each study site was assigned to handle all reported IPV cases. During follow-up, both the male partners and the women were asked (separately) about any instances of IPV, and those who reported either physical or sexual violence were referred to MIFUMI (mifumi.org), a community-based women’s rights agency focusing on support services for those experiencing violence or abuse, or any organisation of their choice dealing with IPV support. We assessed IPV as a secondary outcome of great interest; however, the original trial was not specifically designed to reduce the risk of IPV overall.

For the current analysis of IPV attitudes and decision-making power related to HST uptake, only the data from Arm 2 (the intervention arm) were used. At the time of the original trial, HIV self-testing kits were not yet approved for use in Uganda, so the only way to acquire these kits was through participation in the trial. As the primary outcome in this current analysis was the use of HIV self-testing kits by the male partner, we limited the analysis to participants in the intervention arm, since participants in the control arms had no way of acquiring these kits.

**Measurements**

The primary outcome variable was a binary variable of the male partner’s uptake of the HIV self-testing kit, as assessed by combining the woman’s and man’s reports. We assessed the man to have tested if either partner affirmed that he had tested; therefore we were able to include data for some couples where either the woman or the man (but not both) had missing data for this outcome measure.
The two primary exposure variables used for this analysis were two measures of gender equality – attitudes towards IPV against women (reported by the male and female partners, separately) and decision-making power (reported by the female partner). Attitudes towards IPV against women were measured by the man’s report and the woman's report for the validated Violence Domain of the Gender Equitable Scale, a five-item scale regarding hypothetical violence against women, with available responses on a three-point scale, where 1 = agree, 2 = partially agree and 3 = disagree (Cronbach’s alpha = 0.81) (Compendium of Gender Scales, n.d.). The five items were as follows: 1) “There are times when a woman deserves to be beaten”; 2) “A woman should tolerate violence to keep her family together”; 3) “It is alright for a man to beat his wife if she is unfaithful”; 4) “A man can hit his wife if she won’t have sex with him”; and 5) “A man using violence against his wife is a private matter that shouldn’t be discussed outside the couple” (Compendium of Gender Scales, n.d.). The responses to these five questions were summed together (separately for the man and the woman), and the overall score was categorised into three levels based on equal distributional balance per guidance from the Compendium of Gender Scales: high acceptance of IPV (score of 5–11), medium acceptance of IPV (score of 12–13), and low acceptance of IPV (score of 14–15), where the higher the score, the lower acceptance of IPV (i.e. higher support for gender-equitable norms) (Compendium of Gender Scales, n.d.).

Decision-making power was measured by the woman’s report of an extended version of the validated Household Decision-Making Scale (Cronbach’s alpha = 0.71) (Compendium of Gender Scales, 2011), with decision-making for: the woman’s earnings; the woman’s health care; major household purchases; daily household needs; and visiting family or relatives. Available answers included the woman alone, her male partner or someone else alone, or a joint decision between the male and female partners. Each response to the five questions was dichotomised, with a value of 1 if the woman reported that a decision was made by either herself or jointly, and 0 if the decision was made by her male partner or someone else. An index was created by summing the five dichotomised responses, with a value of 0 if the woman made none or only 1 decision by herself or jointly (low decision-making power), 1 if she made two or three decisions by herself or jointly (medium decision-making power), and 2 if she made either four or all five decisions by herself or jointly (high decision-making power).

Covariates included site facility (Mpigi, Nakasere, or Entebbe), age of both the woman and male partner (categorised from a continuous variable into meaningful developmental age categories), education level (primary or lower, and secondary or higher), religion (Catholic, Protestant/other Christian, or other), employment status (employed for wages, self-employed, or other), marital status (currently legally married or not married), woman’s report on the male partner’s additional sexual partners, food insecurity, woman’s HIV status at baseline, equality in earnings (the proportion of household expenses met by the woman’s earnings: none; less than half; half; more than half; or all), male partner’s support with antenatal clinic issues, relationship quality (very good, good, sometimes difficult, or very difficult) and ease of discussing HIV with the male partner (very easy, easy, or somewhat hard/hard/very hard). Many of these covariates were found to be associated with our primary exposures of attitudes towards IPV and decision-making power in previous analyses, so they were included in this study.

**Data analysis**

Descriptive statistics included mean/SD for continuous variables and proportions for categorical variables. We used the Cochran Mantel-Haenzel statistic or Cochran-Armitage Trend test to make comparisons between groups. All modelling analyses used a multivariate logistic regression framework to estimate the odds ratios (OR) and corresponding 95% CI. The first set of analyses used gender equality with the marker of attitudes towards IPV against women from the male’s report as the primary exposure. The second set of analyses used gender equality with the marker of attitudes towards IPV against women from the female’s report as the primary exposure. And the third set of analyses had a primary exposure of gender equality measured by decision-making power from the female’s report. We ran sequential modelling for each set of analyses, first running unadjusted analysis and then added sets of domains (demographic variables, demographic variables, economic variables and behavioural variables; then all of the previous variables and relationship quality variables). We used -2 log likelihood and R-squared values to assess model fit, and assessed confounding and potential modification through the inclusion of appropriate covariate and interaction terms. The 95% CI not including 1 was used for significance for our primary exposures in both sets of analyses, as well as an alpha of less than or equal to 0.05 to denote statistical significance. SAS 9.4 (SAS Institute) was used for all analyses.

**Ethical approval**

The original trial was approved by the institutional review boards of the Medical University of South Carolina and Makerere University in Kampala, Uganda (#392), and the Uganda National Council for Science and Technology (HS2022). Written informed consent was obtained from all participants. The current data analysis was performed on completely de-identified data.

**Results**

Table 1 shows the sociodemographic characteristics of the women and their male partners in the intervention arm of the original trial. Overall, 1,618 women were enrolled and randomised into the study, with 847 women enrolled and randomised into the intervention arm. The original study attempted to reach all 847 male partners in the intervention arm, and 639 (75%) of the male partners consented and were interviewed. For women, the average age was 25.1 years old, and the majority had a secondary or higher education (58.8%), were currently not legally married (85.5%), were currently not aware of their husbands having other sexual partners (81.9%), their household always had enough food and the types of food they wanted (55.9%), had more than half or all of the household expenses met...
by their earnings (75.3%) and were HIV negative (87.7%).
Of the minority of women who responded to the religion and
employment questions, they were mostly Catholic or other
(Pentecostal, Muslim, or other) religion (40.6% and 33.5%
respectively) and had an employment status of “other”
(59.2%). For the men, the average age was 31.9 years and
the majority had a secondary or higher education (54.2%),
were mostly Catholic or other (Pentecostal, Muslim, Born
Again, or other) religion (28.3 and 35.5% respectively), were
self-employed (53.0%), were currently not legally married

Table 1: Characteristics of women attending antenatal care at baseline and characteristics of male partners at
month 1 in south-central Uganda

| Characteristic                                | Women (n = 847) | Male partners (n = 639) |
|-----------------------------------------------|----------------|------------------------|
| Age (years), mean ± standard deviation        | 25.1 ± 5.5     | 31.9 ± 8.2             |
| Missing                                       | 9 (1.1)        | 10 (1.6)               |
| Age categories                                |                |                        |
| 15–19 (women), 18–24 (men)                    | 120 (14.3)     | 106 (16.9)             |
| 20–24 (women), 25–34 (men)                    | 330 (39.4)     | 325 (51.7)             |
| 25–29 (women), 35–44 (men)                    | 219 (26.1)     | 146 (23.2)             |
| 30–49 (women), 45–68 (men)                    | 169 (20.2)     | 52 (8.3)               |
| Missing                                       | 9 (1.1)        | 10 (1.6)               |
| Level of education                            |                |                        |
| Primary or lower                              | 344 (41.3)     | 291 (45.8)             |
| Secondary or higher                           | 490 (58.8)     | 344 (54.2)             |
| Missing                                       | 13 (1.5)       | 4 (0.6)                |
| Religion                                      |                |                        |
| Catholic                                      | 97 (40.6)      | 168 (38.3)             |
| Protestant/other Christian                    | 62 (25.9)      | 115 (26.2)             |
| Other                                         | 80 (33.5)      | 156 (35.5)             |
| Missing                                       | 608 (71.8)     | 200 (31.3)             |
| Employment status                             |                |                        |
| Employed for wages                            | 35 (14.6)      | 134 (30.7)             |
| Self-employed                                 | 63 (26.3)      | 231 (53.0)             |
| Other (business partnership, unemployed, student, housewife, retired, other) | 142 (59.2) | 71 (16.3) |
| Missing                                       | 607 (71.7)     | 203 (31.8)             |
| Marital status                                |                |                        |
| Currently married                             | 121 (14.5)     | 84 (13.2)              |
| Not married                                   | 712 (85.5)     | 551 (86.8)             |
| Missing                                       | 14 (1.7)       | 4 (0.6)                |
| Male partner has other sexual partners         |                |                        |
| Yes                                           | 151 (18.1)     | –                      |
| No/don’t know                                 | 684 (81.9)     | –                      |
| Missing                                       | 12 (1.4)       | –                      |
| Food insecurity                               |                |                        |
| Always have enough food and the kinds we want | 467 (55.9)     | –                      |
| Have enough food, but not always the kinds we want | 315 (37.7) | – |
| Sometimes don’t have enough to eat            | 37 (4.4)       | –                      |
| Often don’t have enough to eat                | 17 (2.0)       | –                      |
| Missing                                       | 11 (1.3)       | –                      |
| Proportion of expenses met by woman’s earnings |                |                        |
| None                                          | 24 (2.9)       | –                      |
| Less than half                                | 78 (9.3)       | –                      |
| Half                                          | 105 (12.6)     | –                      |
| More than half                                | 247 (29.6)     | –                      |
| All                                           | 382 (45.7)     | –                      |
| Missing                                       | 11 (1.3)       | –                      |
| HIV status                                    |                |                        |
| Positive                                      | 100 (12.3)     | 22 (3.8)               |
| Negative/indeterminate/didn’t receive results | 713 (87.7)     | 561 (96.2)             |
| Missing                                       | 34 (4.0)       | 56 (8.8)               |
| Health facility                               |                |                        |
| Nakaseke                                      | 177 (20.9)     | 157 (24.6)             |
| Mpigi                                         | 292 (34.5)     | 231 (36.2)             |
| Entebbe                                       | 378 (44.6)     | 251 (39.3)             |

SD, standard deviation

* Columns may not total to 100 due to missing values.
(86.8%) and the vast majority were HIV negative at baseline (96.2%), due to the inclusion criteria of the HIV status of the male partner needing to either be HIV negative or unknown by the woman. Overall, 31.3% of the men showed high acceptance of hypothetical IPV against women, 29.6% had moderate acceptance of IPV against women and 39.1% had low acceptance of IPV against women. From the female’s report, 39.1% of the women showed high acceptance of hypothetical IPV against women, 30.2% had moderate acceptance of IPV against women and 30.8% had low acceptance of IPV against women. For decision-making power, 16.7% of the women had low decision-making power, 45.3% of the women had medium decision-making power and 38.0% had high decision-making power. Overall, 61% of the male partners used the HIV self-testing kit.

Table 2 shows the bivariate association between the primary exposures and male partner’s uptake of HIV self-testing. Neither male partner’s attitudes towards IPV against women nor decision-making power were significantly associated with male partner’s uptake of the HIV self-testing kits. However, the female partner’s attitudes towards IPV against women was statistically significantly associated with male partner’s uptake of the HIV self-testing kits, showing that the woman’s lower acceptance of IPV against women was associated with higher male partners’ HIV self-testing uptake ($p < 0.01$).

Table 3 shows the modelling of male partner’s uptake of HIV self-testing by gender equality. Unadjusted models found that in couples where the women had low acceptance of IPV against women, the male partners were more likely to use the HIV self-testing kits compared to couples where women had high acceptance of IPV against women (OR 1.74, 95% CI 1.15–2.62). After model adjustments for facility, age, education, food insecurity, additional sexual partners, female’s baseline HIV status, antenatal clinic support, relationship quality and ease of HIV discussion, the model remained statistically significant. In couples where the women had medium acceptance of IPV against women or low acceptance of IPV against women, the male partners were almost two times more likely to use the HIV self-testing kits compared to couples where the woman had high acceptance of IPV against women (OR 1.76, 95% CI 1.06–2.92; OR 1.82, 95% CI 1.08–3.08 respectively). Both in unadjusted and in sequential adjusted models, neither male partners’ attitudes towards IPV against women nor decision-making power were significantly associated with male partner’s uptake of the HIV self-testing kits.

There were also a few other variables within the multivariable models of male partner’s uptake of HIV self-testing by gender equality. The other variables that were significantly associated with male partner’s uptake of HIV self-testing were male partner support of antenatal clinic issues, relationship quality and ease of discussing HIV with the male partner. In the model with male attitudes towards IPV as the primary exposure, male uptake of the HIV self-testing kits was two times higher when the relationship quality was described as “very good with no disagreements” when compared to the relationship quality of either “sometimes difficult and sometimes good/very difficult” (OR 2.04, 95% CI 1.03–4.02), and male uptake of the HIV self-testing kits was almost two times higher when the ease of discussing HIV with the male partner was “very easy” compared to “somewhat hard/hard/very hard” (OR 1.9, 95% CI 1.07–3.38). In the model with female attitudes towards IPV as the primary exposure, male uptake of the HIV self-testing kits was 0.3 times higher when the male partner did not support the woman with antenatal care issues compared to when he did support her (OR 0.29, 95% CI 0.12–0.75), and male uptake of the HIV self-testing kits was over two times higher when the ease of discussing HIV with the male partner was “very easy” compared to “somewhat hard/hard/very hard” (OR 2.08, 95% CI 1.11–3.88). In the model with decision-making power as the primary exposure, male uptake of the HIV self-testing kits was two times higher when the relationship quality was described as “very good with no disagreements” when compared to the relationship quality of either “sometimes difficult and sometimes good/very difficult” (OR 1.997, 95% CI 1.02–3.89), and male uptake of the HIV self-testing kits was almost two times higher when the ease of discussing HIV with the male partner was “very easy” compared to “somewhat hard/hard/very hard” (OR 1.82, 95% CI 1.03–3.22).

Discussion

In this study, we assessed the association between gender equality (measured here by male partner’s attitudes towards IPV against women, women’s attitudes towards IPV against women and woman’s report of her decision-making power) and male partner’s uptake of HIV self-testing among heterosexual couples expecting a child in south-central Uganda. Our rationale for this study was that these measures of gender equality may reflect bidirectional relationship dynamics related to communication and cooperation. With the woman introducing HIV testing into the relationship, we hypothesised that attitudes about IPV, for example, could be related to the male partner’s willingness to listen to the woman and consider her request to participate in the study and to be tested for HIV. Furthermore, if attitudes about IPV and women’s decision-making can be changed, these relationship factors could be intervention targets to improve male uptake of HIV testing. The relatively high level of IPV acceptance among both men and women in our study reveals a large swath of this population who would benefit from interventions to reduce IPV acceptance and potentially improve HST uptake. In this study, we found that uptake of HST by the male partners was high (between 59% and 65%, depending on levels of decision-making power; between 62% and 70%, depending on level of male partner’s attitudes towards IPV against women; and between 61% and 73%, depending on level of female partner’s attitudes towards IPV against women). We found that neither male partner’s attitudes towards IPV against women nor women’s decision-making power were significantly associated with the male partner’s uptake of HIV self-testing. Interestingly, we did find that the pregnant female partner’s lower acceptance of IPV against women was significantly associated with higher rates of the male partner’s uptake of HIV self-testing. In an analysis of the same measures of gender equality and couples’ uptake of HIV self-testing among heterosexual couples expecting a child in central Kenya, we found that male partner’s lower acceptance of IPV against women was
Table 2: Bivariate analysis of sociodemographics, gender equality (measured by attitudes towards IPV and decision-making power) and male uptake of HIV self-testing

| Sociodemographic characteristics                          | Combined man’s and woman’s report | Did not use HIV self-testing or did not test n (%) |
|------------------------------------------------------------|-----------------------------------|-----------------------------------------------|
|                             | Man tested using HIV self-testing n (%) |                                               |
| Male’s attitudes towards IPV                                 |                                   |                                               |
| High acceptance of IPV                                      | 114 (61.6)                       | 71 (38.4)                                    |
| Medium acceptance of IPV                                     | 120 (69.8)                       | 52 (30.2)                                    |
| Low acceptance of IPV                                       | 152 (67.0)                       | 75 (33.0)                                    |
| Female’s attitudes towards IPV                               |                                   |                                               |
| High acceptance of IPV                                      | 150 (61.2)                       | 95 (38.8)                                    |
| Medium acceptance of IPV                                     | 126 (66.3)                       | 64 (33.7)                                    |
| Low acceptance of IPV                                       | 140 (73.3)                       | 51 (26.7)                                    |
| Decision-making power                                       |                                   |                                               |
| No decision-making power                                    | 81 (64.8)                        | 44 (35.2)                                    |
| Low decision-making power                                   | 197 (59.0)                       | 137 (41.0)                                   |
| High decision-making power                                  | 171 (60.9)                       | 110 (39.1)                                   |
| Women’s age categories                                      |                                   |                                               |
| 15–19                                                       | 69 (64.5)                        | 38 (35.5)                                    |
| 20–24                                                       | 182 (62.1)                       | 111 (37.9)                                   |
| 25–29                                                       | 117 (59.4)                       | 80 (40.6)                                    |
| 30–49                                                       | 88 (57.5)                        | 65 (42.5)                                    |
| Men’s age categories*                                       |                                   |                                               |
| 18–24                                                       | 68 (73.9)                        | 24 (26.1)                                    |
| 25–34                                                       | 203 (67.2)                       | 99 (32.8)                                    |
| 35–44                                                       | 89 (62.7)                        | 53 (37.3)                                    |
| 45–68                                                       | 27 (55.1)                        | 22 (44.9)                                    |
| Women’s level of education                                  |                                   |                                               |
| Primary or lower                                            | 180 (59.6)                       | 122 (40.4)                                   |
| Secondary or higher                                         | 274 (61.7)                       | 170 (38.3)                                   |
| Men’s level of education                                    |                                   |                                               |
| Primary or lower                                            | 177 (64.4)                       | 98 (35.6)                                    |
| Secondary or higher                                         | 213 (67.4)                       | 103 (32.6)                                   |
| Women’s religion                                            |                                   |                                               |
| Catholic                                                    | 36 (46.8)                        | 41 (53.3)                                    |
| Protestant/other Christian                                  | 24 (55.8)                        | 19 (44.2)                                    |
| Other                                                       | 23 (44.2)                        | 29 (55.7)                                    |
| Men’s religion                                              |                                   |                                               |
| Catholic                                                    | 116 (69.1)                       | 52 (30.9)                                    |
| Protestant/other Christian                                  | 81 (70.4)                        | 34 (29.6)                                    |
| Other                                                       | 109 (69.9)                       | 47 (30.1)                                    |
| Women’s employment                                          |                                   |                                               |
| Employed for wages                                          | 11 (36.7)                        | 19 (63.3)                                    |
| Self-employed                                               | 27 (54.0)                        | 23 (46.0)                                    |
| Other                                                       | 46 (49.5)                        | 47 (50.5)                                    |
| Men’s employment                                            |                                   |                                               |
| Employed for wages                                          | 96 (71.6)                        | 38 (28.4)                                    |
| Self-employed                                               | 155 (67.1)                       | 76 (32.9)                                    |
| Other                                                       | 53 (74.7)                        | 18 (25.3)                                    |
| Marital status                                              |                                   |                                               |
| Currently married                                           | 61 (57.0)                        | 46 (43.0)                                    |
| Not married                                                 | 392 (61.4)                       | 246 (38.6)                                   |
| Male partner has other sexual partners*                     |                                   |                                               |
| Yes                                                         | 73 (53.3)                        | 64 (46.7)                                    |
| No/don’t know                                               | 381 (62.4)                       | 230 (37.6)                                   |
| Food insecurity*                                            |                                   |                                               |
| Always have enough food and the kinds they want             | 263 (64.3)                       | 146 (35.7)                                   |
| Have enough food, but not always the kinds we want/         | 192 (56.6)                       | 147 (43.4)                                   |
| Sometimes don’t have enough/Often don’t have enough         |                                   |                                               |
| Proportion of expenses met by woman’s earnings               |                                   |                                               |
| None                                                        | 12 (50.0)                        | 12 (50.0)                                    |
| Less than half                                              | 46 (63.0)                        | 27 (37.0)                                    |
| Half                                                        | 57 (59.4)                        | 39 (40.6)                                    |
| More than half                                              | 137 (61.2)                       | 87 (38.8)                                    |
| All                                                         | 204 (61.6)                       | 127 (38.4)                                   | continued
### Table 2 continued

| Sociodemographic characteristics | Man tested using HIV self-testing | Did not use HIV self-testing or did not test | n (%) | n (%) |
|----------------------------------|----------------------------------|-------------------------------------------|------|------|
| **Women’s HIV status**           |                                  |                                           |      |      |
| Positive                         | 51 (54.8)                        | 42 (45.2)                                 |      |      |
| Negative/indeterminate/didn’t receive results | 392 (61.4)                        | 246 (38.6)                                 |      |      |
| **Male partner supports with antenatal care-related issues** |                                  |                                           |      |      |
| Yes                              | 440 (61.9)                        | 271 (38.1)                                 |      |      |
| No                               | 15 (39.5)                         | 23 (60.5)                                  |      |      |
| **Relationship quality**         |                                  |                                           |      |      |
| Very good with no disagreements  | 136 (64.1)                        | 76 (35.9)                                  |      |      |
| Good with a few disagreements    | 271 (61.7)                        | 168 (38.3)                                 |      |      |
| Sometimes difficult and sometimes good/ Very difficult with frequent disagreements | 45 (47.4)                        | 50 (52.6)                                  |      |      |
| **Ease of discussing HIV with male partner** |                                  |                                           |      |      |
| Very easy                        | 171 (62.4)                        | 103 (37.6)                                 |      |      |
| Easy                             | 228 (63.3)                        | 132 (36.7)                                 |      |      |
| Somewhat hard/hard/very hard     | 56 (49.6)                         | 57 (50.4)                                  |      |      |

*p < 0.05, ** p < 0.01

### Table 3: Multivariable modelling between gender quality (measured by attitudes towards IPV and decision-making power) and male uptake of HIV self-testing

| Model 1 | Model 2 | Model 3 | Model 4 |
|---------|---------|---------|---------|
| OR (95% CI) | OR (95% CI) | OR (95% CI) | OR (95% CI) |

#### Male’s attitudes towards IPV (Ref = high acceptance of IPV)

| Medium acceptance | 1.44 (0.93, 2.23) | 1.39 (0.89, 2.18) | 1.36 (0.86, 2.16) | 1.30 (0.81, 2.09) |
| Low acceptance    | 1.26 (0.84, 1.89)  | 1.21 (0.79, 1.85)  | 1.21 (0.79, 1.88)  | 1.21 (0.77, 1.90)  |

4Unadjusted
5Adjusted for facility, age and education (both male and female)
6Adjusted for facility, age, education, food insecurity, additional sexual partners and female’s baseline HIV status
7Adjusted for facility, age, education, food insecurity, additional sexual partners, female’s baseline HIV status, antenatal clinic support, relationship quality and ease of HIV discussion

#### Female’s attitudes towards IPV (Ref = high acceptance of IPV)

| Medium acceptance | 1.25 (0.84, 1.85) | 1.61 (0.99, 2.62) | 1.61 (0.984, 2.64) | 1.76 (1.06, 2.92) |
| Low acceptance    | 1.74 (1.15, 2.62)  | 1.69 (1.03, 2.78)  | 1.87 (1.12, 3.13)  | 1.82 (1.08, 3.08)  |

4Unadjusted
5Adjusted for facility, age and education (both male and female)
6Adjusted for facility, age, education, food insecurity, additional sexual partners and female’s baseline HIV status
7Adjusted for facility, age, education, food insecurity, additional sexual partners, female’s baseline HIV status, antenatal clinic support, relationship quality and ease of HIV discussion

#### Decision-making power (Ref = low)

| Medium decision-making power | 0.78 (0.51, 1.20) | 0.70 (0.43, 1.17) | 0.72 (0.43, 1.20) | 0.69 (0.41, 1.17) |
| High decision-making power  | 0.84 (0.55, 1.31)  | 0.83 (0.49, 1.43)  | 0.84 (0.49, 1.46)  | 0.84 (0.48, 1.47)  |

4Unadjusted
5Adjusted for facility, age and education (both male and female)
6Adjusted for facility, age, education, food insecurity, additional sexual partners and female’s baseline HIV status
7Adjusted for facility, age, education, food insecurity, additional sexual partners, female’s baseline HIV status, antenatal clinic support, relationship quality and ease of HIV discussion
significantly associated with more than double the odds of HIV self-testing as a couple, compared to those with high acceptance of IPV against women (Vrana-Diaz et al., 2019). These similar results are encouraging, as this points towards a potential intervention target to not only decrease acceptance of IPV, but also increase male partner uptake of HIV self-testing.

There has been limited research on gender equality and HIV testing in sub-Saharan Africa, but one study using demographic and health survey data found that the belief that gender-based violence is never acceptable (a key gender equality measure) was positively associated with older married women testing for HIV in Kenya and Zambia, and high financial decision-making power was associated with older married women testing for HIV in Zimbabwe (Singh et al., 2013). A study in rural Uganda found that women experiencing greater social support from their partner (perhaps reflecting better relationship quality) was significantly associated with their male partner testing for HIV (Kiene et al., 2017). Between 2016 and 2017, the proportion of women who tested for HIV during their pregnancy in Uganda was extremely high, at 95%, while only 31% of their male partners tested for HIV at the antenatal clinic during that pregnancy (Uganda AIDS Commission, 2017). It is imperative that the male partners of pregnant women get tested for HIV to prevent mother-to-child transmission of HIV, as well as to identify HIV-positive men in need of linking to care. Women’s attitudes about IPV could be an important indicator of communication and power balance within the relationship, which could be an important predictor of and even impact the man’s likelihood of being tested for HIV, either at a clinic or through HIV self-testing. Future research exploring additional predictors of low uptake of HST is warranted to prioritise those couples for interventions, as well as determining the reasons for not using HST among those male partners who did not use this novel testing method. We also found that higher relationship quality, the male partner supporting the female partner with antenatal care-related issues and ease of discussion about HIV with the male partner were also significantly important for the male partner to use the HIV self-testing kit. These relationship factors are also potential targets to improve male partner testing for HIV.

Conclusions

In summary, the male partner’s attitudes towards intimate partner violence against women and female partner’s decision-making power were not significantly associated with male partner’s uptake of HIV self-testing. However, in couples with lower acceptance of IPV against women from the female partner, the male partners had higher uptake of HIV self-testing compared to couples where the woman had higher acceptance of IPV against women. Uptake of HIV self-testing was relatively high overall among the male partners and our results provide some comfort against the concern that some men may not respond well to their female partners bringing home HST kits from the antenatal clinic. Our findings offer a potentially valuable tool for planning and implementing the roll-out of HIV self-testing in countries like Uganda and Kenya, as woman’s acceptance of IPV against women (measured by her response to the Violence Domain of the Gender Equitable Scale) appears to be a marker for relationship factors that significantly predict the successful uptake of HIV self-testing among male partners of pregnant women who bring their kits home from the antenatal clinic. Thus, responses to this scale may assist us to be able to predict better which male partners may be more resistant to testing and more effectively direct resources to maximise uptake. It is also possible that effective interventions could be implemented to decrease pregnant women’s acceptance of IPV against women and other relationship imbalances, empowering them to better engage their male partners in efforts to maintain their own health and the health of their infants.

Strengths and limitations

The strengths of this analysis include that it uses high quality data (a cluster-randomised controlled trial in three high-volume antenatal clinics) and is one of the first attempts to assess how gender equality is associated with male partner’s uptake of HST once delivered by a pregnant partner. There are a few notable limitations in this analysis. First, these data stemmed from a randomised controlled trial, so these results may not be generalisable to the broader population. Only men believed (by the women) to be HIV negative (or of unknown status) were eligible to participate in the study. However, men who were HIV positive or who did not believe in gender equality might have been less likely to participate in the study and, in particular, might have been less receptive to an HIV self-testing kit offered to them by their female partner. Since this study was randomised to either standard of care or provision of the HIV self-testing kits, however, we do not believe that this potential problem was likely to substantially bias our results. The primary outcome for this analysis was based on self-report measures of testing behaviours, so there are some limitations with no confirmation of this measure, as we accepted a report by either the man or the woman of male partner testing, which might have resulted in discordant results. Gender equality in this study was measured by attitudes towards intimate partner violence against women and decision-making power. We might have found different results if gender equality were measured in a different manner. As this study was an observational study, the association between woman’s acceptance of IPV and man’s HST uptake could be confounded by upstream personality factors that made it more likely for them to get together as a couple. However, even if that is the case, we believe that woman’s low acceptance of IPV would still be a useful marker of relationship quality associated with higher uptake of HST by the male partner, with clear implications for HIV testing programmes. Furthermore, this study focused on women and men in a partnership expecting a child, so these gender equality measures might not represent the experiences of those not expecting a child or not in a stable partnership. The men who participated could be different in some way than the male partners who did not participate. Finally, this is a correlational study, so we cannot establish causal relationships between our predictors and outcomes.
Note

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

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