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Amber Peterman, Malick Dione, Agnes Le Port, Justine Briaux, Fatma Lamesse, Melissa Hidrobo

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Abstract

Measures of violence against women and girls (VAWG) are widely collected in surveys, yet estimates are acknowledged to be lower bounds of the true prevalence. This study reports on a survey experiment randomly assigning 3,400 women and girls to either face-to-face interviews or audio computer-assisted self-interviews (ACASI), a modality that increases privacy and confidentiality of responses. Results show the ACASI group discloses higher prevalence of lifetime intimate partner violence by 4 to 7 percentage points compared to face-to-face interviews. Differences in disclosure for nonpartner VAWG are even larger, ranging from 6 to 12 percentage points. Tests for correlates of characteristics that might lead to increased disclosure show few notable patterns. Overall results suggest ACASI are a promising way to encourage disclosure, however trade-offs include limits in the complexity of questions that can be asked and higher time costs associated with development and implementation of surveys.

JEL classification: C83, J12, J16

Keywords: violence against women and girls, intimate partner violence, measurement, Senegal

Amber Peterman (corresponding author) is a Research Associate Professor in the Department of Public Policy at the University of North Carolina, Chapel Hill, N.C., 27599, United States; her email address is amberpeterman@gmail.com. Malick Dione is a Research Analyst in the Nutrition, Diets, and Health Unit at the International Food Policy Research Institute (IFPRI), Dakar, Senegal; his email address is Malick.Dione@cgiar.org. Agnes Le Port is a Research Fellow at the Montpellier Interdisciplinary center on Sustainable Agri-food systems (MoISA), University of Montpellier, CIRAD, CIHEAM-IAMM, INRAE, Institut Agro, IRD, 34394, Montpellier, France; her email address is agnes.leport@ird.fr. Justine Briaux is a Public Health and Nutrition Specialist in the Program Section at United Nations Children's Fund (UNICEF), West and Central Africa Regional Office (WCARO), Dakar, Senegal; her email address is jbriaux@unicef.org. Fatma Lamesse is a Reproductive Health and Rights Specialist at Carrefour International, Dakar, Senegal; her email address is flamesse@cintl.org. Melissa Hidrobo is a Senior Research Fellow in the Poverty, Gender, and Inclusion Unit at IFPRI, Washington, D.C., 20005, United States; her email address is m.hidrobo@cgiar.org.

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1. Introduction

Violence against women and girls (VAWG) measures are widely collected in surveys and important metrics for health, human rights, and gender equality, as reflected in Sustainable Development Goals (SDG) targets. VAWG includes, but is not limited to physical, sexual, and psychological violence perpetrated by intimate partners, family, co-workers, acquaintances, or strangers—both in and outside the home. Despite advancements in data collection methodologies, estimates from household surveys are universally acknowledged to be lower-bound estimates of the true prevalence (Sardinha et al. 2022). While the magnitude of under-reporting is thought to vary by data source, target group, and type of violence—evidence suggests under-reporting can be substantial. For example, a cross-country paper examining nationally representative samples in 24 low- and middle-income countries (LMICs) found that only 40 percent of females aged 15 to 49 experiencing physical and/or sexual VAWG had previously disclosed it to anyone, and only 7 percent reported it to a formal source (e.g., health, legal, or social service) (Palermo, Bleck, and Peterman 2014). Administrative data from formal sources is thus widely recognized to represent only the most severe cases, influenced by access to, and trust in, services, perceptions around impunity and financial ability to seek formal assistance, among others. While household surveys are understood to be closer to the true prevalence, disclosure in household survey data collection may be affected by a myriad of factors, including shame and stigma, fear of retaliation, distrust of interviewers, or desire to keep the perpetrator's identity confidential (Palermo, Bleck, and Peterman 2014; Pereira et al. 2020). Rates of disclosure have implications for data quality and the understanding of impacts of programs and policies to prevent and respond to VAWG, as well as for directing resources towards the issue as an investment in public health and human rights.

Researchers have sought to understand how to accurately capture VAWG measures through different strategies. These include design of survey instruments to capture multiple behaviorally specific and diverse violent acts, specialized training of enumerators, and modification of data collection protocols to build rapport and create a safe space for disclosure. A set of studies also focus on rigorously testing different survey-administration techniques to increase disclosure and protect participant confidentiality. These studies typically randomize enumerator-administered face-to-face surveys to audio computer-assisted self-interviewing (ACASI) techniques; however, other comparisons include phone interviewing, sealed envelope methods, and qualitative methods (see table S1.1 in the supplementary online appendix for a list of studies).[1] The basic assumption across studies is that soliciting responses with methods that provide increased privacy and confidentiality will mitigate response bias by reducing shame, stigma, social desirability, and fear of adverse consequences linked to disclosure. Six of the eight studies reviewed find significant differences in prevalence of VAWG in the hypothesized direction, although many studies also show heterogeneity in these differences across different settings or violence outcomes (Assefa et al. 2022; Barr et al. 2017; Cullen 2023; Park et al. 2022; Punjabi et al. 2021; Rathod et al. 2011; Stark et al. 2017; van der Elst et al. 2009). Studies varied in the type of violence analyzed (for example, whether violence was perpetrated by an intimate partner or not), how it was measured (using multiple questions or only one question), and the target sample and size. This variation makes it difficult to draw nuanced lessons across studies and contexts.

collection process, as well as the women and adolescent girls interviewed for this study. Participants at the Sexual Violence Research Initiative (SVRI) forum 2022 and the PacDev Conference 2023 provided helpful comments. The views expressed in this article are those of the authors, and do not reflect those of the funding agencies. The data underlying this article and analysis replication files are provided as online supplementary materials. A supplementary online appendix is available at the *World Bank Economic Review* website.

1 A related group of studies examines differences in reporting with across face-to-face surveys using indirect (versus direct) methods for soliciting responses. For example, studies may use the "list randomization" technique, vignettes, or ask about experiences of neighbors or other community members (Cullen 2023; Lépine et al. 2020; Peterman 2021; Peterman et al. 2018).

The closest to the current study based on geography, methods, and outcomes are Cullen (2023) and Park et al. (2022), who randomize ACASI and face-to-face surveys to collect measures of intimate partner violence (IPV) and nonpartner violence in Rwanda, and measures of IPV in Liberia and Malawi. In Rwanda, Cullen (2023) finds that women report higher sexual violence from nonpartners (3 percentage points, pp) using ACASI, but no differences in physical IPV. Likewise, men in Rwanda disclose higher rates of perpetration for some but not all emotional IPV questions using ACASI compared to face-to-face administration. Park et al. (2022) find that women report higher values for all forms of IPV in Malawi when using ACASI (ranging from 5 to 18 pp); however, in Liberia, higher rates are seen only for sexual IPV and controlling behaviors using ACASI. Based on responses to nonsensitive questions, Park et al. (2022) suggest that increased prevalence in ACASI surveys may be in part due to "spurious reporting" driven by inability of participants to correctly key in responses on tablets. However, misuse of ACASI due to low comprehension of how to use tablets may be less of a concern for adolescents and youth. In addition, these challenges may be overcome even in areas with low digital literacy through close training and quality assurance.

This paper adds to the literature on the role of survey administration on disclosure of VAWG. The study reports on a survey experiment randomly assigning approximately 3,400 adolescent girls and young women aged 15 to 35 in rural Senegal to either face-to-face interviews or ACASI. Results show participants in the ACASI group disclose higher prevalence of lifetime IPV by 4 to 7 pp compared to face-to-face interviews and these differences are more pronounced for more sensitive types of violence. Differences in reporting for nonpartner VAWG are even larger, ranging from 6 to 12 pp, for physical violence and sexual harassment, respectively. For the preferred measures of any physical and/or sexual violence, these differences equate to a 39 percent increase in prevalence for IPV and a 23 percent increase in prevalence for nonpartner VAWG among participants using ACASI (as compared to face-to-face administration). Results for continuous measures of violent acts and for past-year measures mirror those for lifetime experience. Tests for correlates of characteristics that might lead to increased disclosure show few notable patterns to explain these findings. Results suggest that self-administered surveys are a promising way to encourage disclosure, however acknowledged trade-offs include the limited complexity of questions that can be asked and higher time costs associated with development and implementation of ACASI surveys.

This study contributes to existing literature in a number of ways. First, it shows how rates of disclosure vary by survey administration in a rural and conservative setting among a large sample of adolescent girls and young women. Adolescent girls and young women are a key target population for violence prevention, as they are often at higher risk for IPV as compared to older women and simultaneously are important for primary prevention intervention prior to relationship formation (Peterman, Bleck, and Palermo 2015; Sardinha et al. 2022). Second, it examines holistic measures of nonpartner violence, including violence women and girls may experience outside the home, such as sexual harassment. While there is a growing evidence-base on VAWG experienced in public spaces and work environments, there is less understanding of the role of stigma and potential for low disclosure (Borker 2021; Folke and Rickne 2022). This study examines how disclosure rates vary with different levels of severity, but also by type of VAWG and proximity (closeness) to perpetrators. Previous experimental studies on the role of survey administration have focused on IPV or on other specific forms of violence against children (e.g., school violence), often with limited outcome indicators, rather than holistic scales. This study avoids limitations from previous studies, which have examined either fewer questions or single types of VAWG, thus limiting generalizability of findings. Third, analysis is conducted to show if disclosure varies by characteristics hypothesized to influence participant's ability and willingness to report VAWG. These include examination of logistical factors encountered in survey work, as well as validated scales capturing violence attitudes and norms. While few factors stood out as being strong correlates, in theory these factors can help unpack which groups are more or less likely to under-report in typical household surveys or in response to a particular intervention. Finally, the study highlights lessons from development and implementation of the ACASI, with

implications for future survey efforts aiming to conduct similar data collection efforts. Key evidence gaps for future research are discussed, focusing on the role of survey administration to increase the accuracy of VAWG measures, while implementing data collection in a participant-focused and ethical manner.

2. Context

Acceptability and Prevalence of VAWG in Senegal

The setting of this study, Senegal, ranks as having high levels of gender inequality (139 out of 166 countries on the Gender Development Index) (United Nations 2021). Senegal's 1999 revision of the Penal Code includes a clause criminalizing acts of domestic violence, defined as "wounding, striking or physical abuse against partners," punishable with up to 5 years in prison (and 20 years for domestic homicide) (OECD 2014). However, the law does not recognize marital rape, or other forms of sexual or emotional IPV, and few women seek formal legal action, possibly in part because police and other actors in the justice system are perceived to be lenient on perpetrators. Analysis of nationally representative data shows that approximately half of women in Senegal have attitudes justifying physical IPV; however, this percentage is higher at 64 percent in rural areas (Zegeye et al. 2021). Another analysis of a rural demographic surveillance site (Niakhar) shows similar levels of IPV acceptability among men and women at 61 percent—with highest levels for scenarios when a women refuses sex, goes out without telling her husband, or neglects children (Sandberg et al. 2021). Despite the high acceptance of IPV, official levels of IPV in Senegal are well below regional averages in West Africa. A global review using data from 366 studies across 161 countries estimates lifetime rates of sexual and/or physical IPV in West Africa at 27 percent (uncertainty levels: 22–33 percent) and past-year estimates at 15 percent (uncertainty levels: 12–19 percent) (Sardinha et al. 2022). However, the most recent Senegalese Demographic and Health Survey (DHS), collected in 2019, estimates these same figures to be approximately 13 and 6 percent for lifetime and past-year, respectively (ANSD and ICF 2020). Thus, official IPV prevalence for Senegal can be considered low for the region, raising questions as to whether Senegal is truly an outlier or if IPV is substantially underreported in official statistics.

Qualitative Evidence on Acceptability and Disclosure of VAWG in Study Sample

The study took place across two regions of Senegal—Kaolack in central Senegal, and Kolda in the south. These regions are both geographically and culturally distinct, with Kaolack composed mainly of Wolof ethnicity, and Kolda composed mainly of Fulakunda ethnicity (belonging to the Pular ethnic group). Qualitative narratives among women and community health volunteers in study communities collected as part of a process evaluation, show that acceptability VAWG varies widely across the study sample.[2] VAWG, particularly physical violence, was viewed as unacceptable in some communities and warranted intervention by both community leadership (or elders) and bystanders. In other communities it was normalized, despite community members being aware of violence, dominant narratives promoted silence to avoid "meddling in family affairs." These two quotes are characteristic of the range of contexts:

> These days, if you hurt your wife in the home and someone knows about it, people can file a complaint—and they will see how to find a solution so that it will stop … The community will never sit back "fold their arms" on cases of violence happening in this village. —Focus group married women, Kaolack

2 Data comes from 10 focus group discussions among women, 8 individual in-depth-interviews, and 4 key informant interviews with community health volunteers (who are often the first point of contact for women experiencing violence), stratified by region. Additional information regarding methodology and protocols related to the qualitative data collection can be found in Le Port et al. 2022.

> Abuse a woman, the community says nothing … The elders of this village, they won't say anything, because not everyone interferes with the lives of others. Of course, your parents might come to you to talk about it, but otherwise, you'll stay in this marriage until the end of your days. —Focus group married women, Kolda

Despite this variation, most women interviewed as part of the qualitative data collection believed some form of IPV was normal in partnerships, as well as violence from in-laws or originating from extended family structures. Most women also mentioned disclosing violence to confidants and soliciting support or advice (including mothers, uncles, aunts, brothers, or in-laws). Community health volunteers reported similar views, indicating that violence was a normal part of life in most villages. In addition, community health volunteers explained that few options existed for women in rural areas for support or assistance—several mentioning that they explicitly advise women *not* to take action if they experience violence:

> What I advise them to do is as I did: be patient, pray for a long life, and know that sooner or later things will get better … here you can't come and tell someone to go to the police, file a complaint, as there's no follow-up … there are no social services, you cannot even talk to a social worker! —Community Health Volunteer, Kaolack

> As is the case for all couples, there may be problems—but, as they say: "dirty laundry is washed at home"—so their intimate problems, they can settle internally. They won't need to tell me. —Community Health Volunteer, Kolda

However, some community health volunteers mentioned they acted to counsel families and spoke with men about violence to resolve it and keep it from escalating to more serious (and fatal) outcomes. Taken together, qualitative data suggests that although VAWG is common in study communities, there are a few formal support services or resources for women outside their network. While qualitative data are illustrative only, this study hypothesizes that the tendency for violence to be viewed as a family issue in the target population motivates the consideration of methodologies to increase disclosure within household survey efforts. In addition, wide variation in acceptability and community response to VAWG may drive variability in disclosure—thus motivating the analysis of correlates included in the current study.

3. Study Design

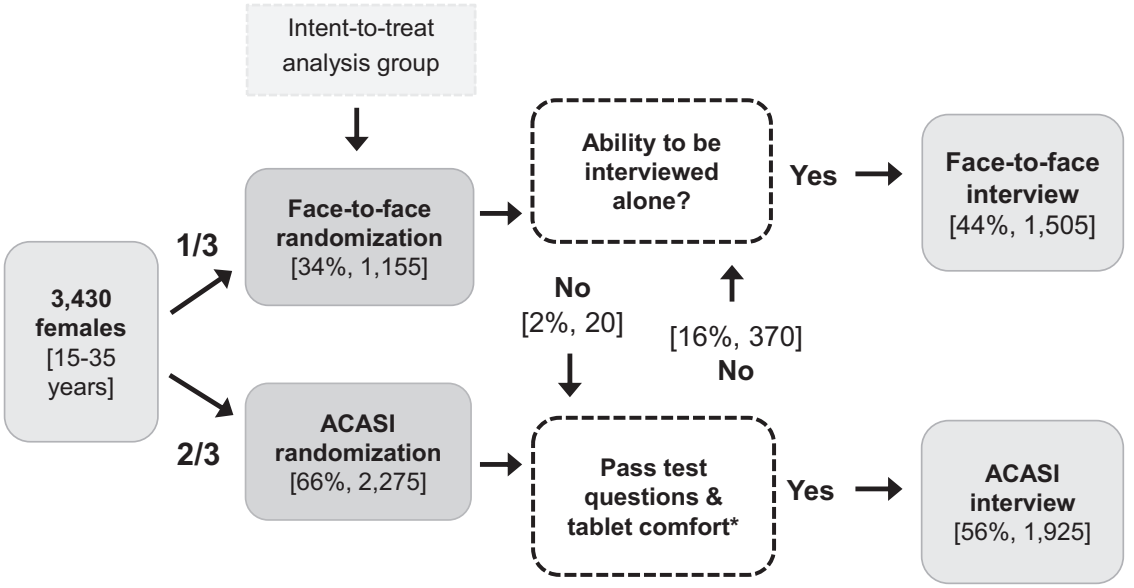
Data Collection and the Measurement Experiment

This study experimentally tests the role of survey administration within the endline survey of an edutainment evaluation designed as a cluster randomized control trial (cRCT) in 117 rural villages across Kaolack and Kolda (fig. S1.1in the supplementary online appendix).[3] The study targeted adolescent and young adult women aged 14 to 34 at baseline, fluent in the dominant local language, and living up to two-kilometer radius to the village primary school. The endline survey took place from December 2020 to January 2021 led by the International Food Policy Research Institute (IFPRI) Dakar and ASSMOR consulting. At endline, women were approximately 15 to 35 years old. Of the 3,968 adolescent and young adult women interviewed at baseline just over 12 months prior, 86 percent (or 3,430) were successfully interviewed at endline. A companion impact evaluation paper shows no evidence of differential or overall attrition from baseline to endline with respect to aggregate VAWG attitude or behavior outcomes (Dione et al. 2023).

The survey experiment was embedded in an enumerator administered survey, lasting on average 55 minutes and consisting of multitopic modules related to knowledge, attitudes, and behaviors on maternal and child health, sexual and reproductive health and VAWG. The surveys took place at or around the

3 Companion impact and process evaluation papers provide further information on the broader evaluation (Dione et al. 2023; Le Port et al. 2022). This includes information on the edutainment intervention which focused on health and gender themes. The current survey experiment was balanced across intervention arms (the percentages assigned to the edutainment intervention were 67 percent and 66 percent in the ACASI and face-to-face survey experiment arms, respectively; *p*-value from test of difference is 0.414) and there was no differential impact of the intervention across survey experiment arms.

Figure 1. Assignment of Survey Administration Mode (Face-to-Face versus Audio Computer-Assisted Self-Interviews, ACASI)



Source: Authors' representation based on experimental design of primary data collection in Senegal.
Note: Three test questions resulted in a pass rate of 94 percent to 98 percent per question—for example, "Is Macky Sall the present of Senegal?" (correct answer: Yes).

respondent's homes, or alternatively in a nearby location in the community. The last module of the survey was on VAWG experiences and included an individual-level randomized assignment to either face-to-face (one-third of the sample) or ACASI (two-thirds of the sample) administration (fig. 1). These probabilities were chosen due to the anticipated higher reported rates of violence from ACASI interviews, thus a larger ACASI proportion would increase the ability to detect effects on VAWG in the primary cRCT. However, if respondents failed to demonstrate they understood how to operate the tablet, or if they voiced preference for not using the tablet, they were reassigned to face-to-face interviews (16 percent of the ACASI group, or n = 370). Conversely, for face-to-face interviews, enumerators screened participants based on their ability to be interviewed in private, out of earshot from individuals over the age of two years old. If enumerators were unable to secure privacy, participants were reassigned to ACASI interviews (2 percent of the face-to-face group, or n = 20). The final modality distribution was 44 percent face-to-face and 56 percent ACASI interviews.

The entire survey, including the ACASI portion was coded using SurveyCTO, and the ACASI module was developed and tested based on an iterative process. First, experienced enumerators who had administered VAWG modules previously were selected to collaboratively develop local language scripts (in Wolof and Pular). Thereafter, all questions and scripts were recorded into audio clips and validated for sound quality as well as accuracy and fidelity to the original scripts in French. Audio recordings were then preloaded onto the SurveyCTO platform, coded alongside visual images representing answers to questions. A green circle indicated "Yes," a red square indicated "No," and an outline of a star indicated "Refusal or do not know" (fig. S1.2). ACASI scripts and functionality were further tested during enumerator training and piloting, including iterative cognitive interviews with approximately 40 participants selected during the piloting of the entire survey (undertaken once in urban Dakar and once in a rural area outside Dakar). Pilots showed that participants were able to respond to the ACASI module, understood the questions, and the vast majority preferred ACASI as compared to enumerator administered violence questions. Based on the pilots, small changes to audio recordings and to the tablet screening and

functionality were made to increase participants' understanding of the module before the primary data collection.

During actual implementation of the VAWG module, for the ACASI arm, enumerators keyed in the local language of choice, introduced the ACASI, and explained to participants how to listen to questions using headsets, how to repeat them if needed, and how to enter responses and advance the module. Participants then undertook three test questions with the enumerator watching. These test questions were structured such that all participants should both know the answer and either pick "Yes" or "No"—for example: *"Is Macky Sall the president of Senegal?"* (answer: Yes). Correct responses included both "Yes" and "No" answers, so that participants were not biased towards only one response option. At the end of the practice session, enumerators asked if participants were comfortable undertaking the module. Enumerators sat nearby while women completed ACASI in case there were any questions or need for intervention, for example, to explain to other household members that women and girls should be left alone to complete the survey if interruptions occurred. Table S1.2 gives details on the screening questions administered, showing that high levels of women answered the test questions correctly—in total 89 percent of the sample answering all three correctly.

Violence Against Women and Girls Measures

The study focuses on two primary groups of VAWG measures. The first set of questions were modeled after the Senegalese DHS to capture past-year and lifetime IPV using a modified conflict tactics scale following the WHO multicountry study on domestic violence (ANSD and ICF 2020; Garcia-Moreno et al. 2006). These questions were asked only to women and girls who were currently partnered or partnered in the previous 12 months, including noncohabiting and dating partners. Specific questions include those related to emotional IPV (5 questions, e.g., *partner said something to humiliate you in front of others*), physical IPV (7 questions, e.g., *partner tried to choke you or burn you on purpose*), and sexual IPV (3 questions, e.g., *partner physically forced you to have sexual intercourse with him when you did not want to*). The second set of questions combines validated instruments for nonpartner domestic violence, sexual harassment, and community violence, as no single common instrument is routinely used to cover a diverse set of perpetrators, locations, and types of violence. These questions also asked about lifetime and past-year experience related to emotional VAWG (6 questions, e.g., *spread false rumors about you or one of your children*), physical VAWG (4 questions, e.g., *forced you to work excessively against your will*), and sexual harassment and violence (8 questions, e.g., *made unwelcome attempts to establish a romantic or sexual relationship with you, despite your efforts to discourage it*). The second set of questions was asked to all participants, with the caveat that items pertained to all possible perpetrators (both male or female) except current or previous romantic partner. Table S1.3 gives detailed descriptions of questions and indicators used for violence outcomes, including the coding of missing observations across items used to construct aggregate scores.[4]

In addition to the main behavioral outcomes, auxiliary violence indicators are also analyzed: (1) if the respondent would hypothetically intervene in the case of a neighbor's physical IPV (full sample), (2) if she has told anyone about her own experience of IPV in the last 12 months (including friends, family, etc.), and (3) if she has tried to get help to stop IPV from happening to her in the last 12 months (latter two indicators for the ever-partnered sample only). The study hypothesizes that the same factors potentially driving under-reporting for experience measures would operate for these measures as well. For example, if

4 Due to the coding of "don't know/refuse" answers, the total sample sizes for each aggregate are slightly different. For example, for binary outcomes (such as any violence) the entire aggregate is coded as missing if at least one of the items is missing, and none of the other responses are affirmative (as this means the entire aggregate could be "Yes" or "No"), but as nonmissing if at least one item is coded as affirmative. This strategy ensures that the overall VAWG aggregate is not biased downward because of missing responses. For continuous outcomes, each act of violence that is nonmissing is summed and a standardized z-score is created of the sum in relation to the comparison group (face-to-face administration).

IPV is thought to be a "family" issue or accepted within spousal relationships, women are unlikely to view intervening to stop abuse as an acceptable action in the case of a neighbor's situation. In addition, there may be shame or stigma attached to discussing IPV outside the couple, or seeking help, as social norms may dictate that women should tolerate violence or keep discussion or disclosure of violence within the family.

Ethical Protocol

Ethics approval for the study was granted by the *Comité National d'Ethique pour la Recherche en Santé* in Senegal (#00000929 MSAS/DPRS/DR) and by IFPRI's Institutional Review Board (#00007490). These included amendments for implementing surveys during COVID-19 and ensuring safety and equipment protocols were in place for enumerators and participants. Standard protocols set out by the WHO were implemented to ensure the safety of participants and enumerators while collecting violence data (World Health Organization 2001). All interviews were carried out by female enumerators, matched by language group (Wolof, the dominant language in Kaolack, or Pular, the dominant language in Kolda), who underwent specialized training on interviewing for VAWG topics, with preference in recruitment given to enumerators who had experience collecting sensitive data. During interviews, written informed consent was obtained from all participants at the start of the survey. For minors, written assent was obtained, along with written informed consent from the legal guardian. The study followed best practice during interviews by ensuring privacy (except for children under the age of two), implementing graduated informed consent, allowing women to skip questions voluntarily and advertising the survey as related to health and wellbeing—rather than linked explicitly to VAWG. All participants, regardless of disclosure, were given a card with de-identified local referral sources (as well as a toll-free national hotline), unless they indicated they could not safely keep the card without others, including partners, discovering it. In this case, enumerators orally discussed referral options and provided hotline information. Enumerators also offered direct referrals, whereby regional service providers would seek out women and girls directly for acute cases or upon request of participants. Acute cases were monitored to ensure proper and timely response. Both de-identified and direct referrals were offered to women regardless of whether they responded to questions face-to-face or via ACASI. Enumerators were offered access to the same services and assistance as survey participants to cope with vicarious trauma or own experiences with violence.

Analysis

Two main analyses are presented. First, simple mean comparisons of VAWG outcomes among participants randomized to ACASI versus face-to-face interviews are reported. In addition, the coefficient of being assigned to ACASI are reported from unadjusted linear probability regressions with standard errors clustered at the village level. Standard errors are clustered at the village level due to the high intercluster correlation typically observed for VAWG measures; however, results are virtually unchanged using robust standard errors (without clustering). A variety of sensitivity analysis are also conducted, controlling for additional background characteristics of participants and their households, as well as enumerator fixed effects, which may influence the quality of the survey implementation. Background characteristics include age splines, levels of educational achievement, ethnicity indicators, household size, and an indicator of whether the participant has ever been partnered.[5] As not all participants ultimately completed the survey modality to which they were assigned, this analysis is akin to an intent-to-treat (ITT) analysis. Results are presented for lifetime VAWG measures; however, they replicate results for the 12-month measures as a robustness check. In addition, following evidence showing that conceptually using continuous measures capturing

5 A small number of observations are missing for both background characteristics (education level, household size) and for heterogenous effects (crowding and cohabitation with partner), totaling 2.8 percent of the sample. These missing observations are replaced with means and binary indicators for missing are included in regression analysis. However, because missing observations are few and balanced across the face-to-face and ACASI groups, this results in very little change to results. Results are also robust to imputing missings instead of mean replacement.

the number or frequency of distinct acts of VAWG is distinct from binary outcomes, and may result in different conclusions, summary counts are analyzed of different violent acts constructed as z-scores, for each type of VAWG category (Boyer et al. 2022; Peterman et al. 2022). Finally, results are estimated for actual administration of ACASI versus face-to-face using an instrumental variable approach (akin to treatment-on-the-treated or TOT analysis) using the indicator for randomization to ACASI as the instrument.

Second, heterogeneous effects are analyzed to explore possible factors that may explain differences in reporting, by adding indicators of interest to the regression and interacting them with the ACASI indicator. Two groups of indicators are explored: (1) logistical factors hypothesized to discourage disclosure and (2) attitudes and norms justifying VAWG. The first group of indicators includes (a) an indicator indicating if her spouse or partner is cohabiting (as partners migrate for work in this setting, set to 0 if the participant is not currently partnered), (b) an indicator of crowding (number of household members / number of sleeping rooms), and (c) an index of the number of times the interview had to be stopped due to an interruption (by a partner or other male adult) during the violence module. These logistical factors may make women less likely to disclose in face-to-face surveys due to fear of partners or other household members overhearing, especially if there is high interest or attention to the interview. The second group of factors are motivated by qualitative work in study locations and include 2 indices of individual attitudes and perceived community norms justifying IPV and sexual violence aggregating 17 questions answered on Likert scales (Perrin et al. 2019). The study hypothesizes that participants facing logistical constraints to disclosure will be both more likely to experience VAWG on average, and *more likely* to disclose when administered ACASI as compared to face-to-face modules (thus one would expect interaction terms to be positive). In addition, if VAWG is accepted and normalized, participants may be more likely to experience VAWG on average, but with less stigma attached to it, thus this sample is *less likely* to drive increased disclosure (thus one would expect interaction terms to be negative) (Humbert et al. 2021). For both sets of factors, indices are transformed into z-scores, standardized to the face-to-face group for ease of interpretation. Table S1.3 provides a more detailed description of these indicators and details on aggregation.[6]

Summary Statistics and Balance Tests

Table 1 shows balance by randomization to ACASI or face-to-face administration by background characteristics of participants. The sample is approximately 24 years old, with the largest age group among adolescents aged 15 to 19 (31 percent) and the remaining age groups with 21 to 24 percent of the sample. Approximately 45 percent of the sample has never attended school, and the majority ethnicity is Pular, followed by Wolof and Serer. The average household size is 11 members, and 85 percent of the sample is ever partnered (including both marital and nonmarital partners). Across the 20 variables representing background characteristics and factors affecting disclosure, only one indicator (age between 30–35 years) is marginally significant at the $p < 0.10$ level. Based on these results, the randomization to survey administration mode appears successful, and the experiment is likely to have high internal validity.

4. Results

Figure 2 summarizes mean differences in reporting between face-to-face (dark grey bars) and ACASI (light grey bars) methods, showing means and 95 percent confidence intervals. Results indicate that in all cases ACASI disclosure of VAWG is significantly higher than face-to-face methods; these differences range from

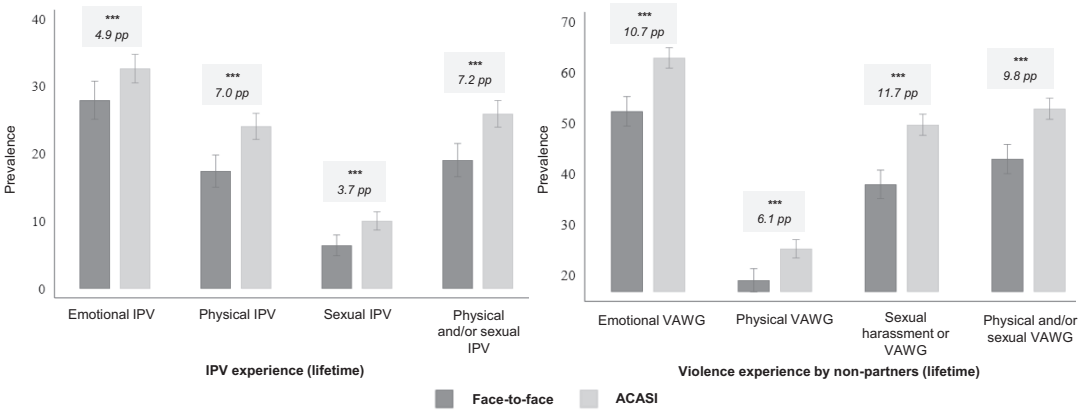
6 Ex-ante power calculations were not conducted for this survey experiment; however, the ex-post minimal detectable effect size for any physical and/or sexual IPV is 4.9 pp and for any physical and/or sexual VAWG is 5.5 pp. However, it is likely the study is underpowered to detect correlates of disclosure via interaction terms; thus this analysis should be interpreted with caveats.

Table 1. Balance in Background Variables and Predictors between ACASI and Face-to-Face Samples

	All	ACASI	Face-to-face	*p*-value from difference
Age splines	(1)	(2)	(3)	(2)-(3)
Age 15–19 years	0.309	0.313	0.302	0.512
Age 20–24 years	0.244	0.239	0.255	0.280
Age 25–29 years	0.211	0.205	0.223	0.258
Age 30–35 years	0.235	0.243	0.220	0.082
Education level				
Never attended school	0.445	0.444	0.446	0.918
Completed or some primary	0.279	0.281	0.275	0.763
Completed or some secondary	0.276	0.275	0.279	0.838
Ethnicity				
Wolof	0.306	0.301	0.316	0.343
Pular	0.451	0.450	0.454	0.823
Serer	0.153	0.154	0.151	0.760
Other	0.090	0.095	0.080	0.140
Demographics				
Currently or previously partnered	0.852	0.847	0.862	0.196
Household size	11.166	11.175	11.147	0.876
Factors affecting disclosure				
Logistical factors discouraging disclosure (z-score)	−0.033	−0.047	−0.004	0.202
Partner is currently cohabiting	0.571	0.571	0.573	0.880
Crowding (household size/rooms)	2.792	2.771	2.832	0.135
Interruptions due to partner or other adult male (0–4)	0.096	0.092	0.104	0.408
Attitudes and norms justifying VAWG (z−score)	0.033	0.049	0.002	0.210
Attitudes justifying VAWG	13.477	13.569	13.295	0.203
Norms justifying VAWG	14.658	14.738	14.500	0.403
Sample size	3,430	2,275	1,155	

Source: Authors' calculations based on primary data collection in Senegal.
Note: ACASI = Audio computer-assisted self-interviews; VAWG = Violence against women and girls; *p*-values are reported from Wald tests on the equality of means of randomization to either ACASI or face-to-face interviews for each variable. Standard errors are clustered at the village level. See table S1.3 for full descriptions of indicators.

Figure 2. Mean Differences in Reporting between ACASI and Face-to-Face Administered Violence Indicators



Source: Authors' calculations based on primary data collection in Senegal.
Note: ACASI = Audio computer-assisted self-interviews; IPV = intimate partner violence; VAWG = Violence against women and girls; bars are mean value with 95 percent confidence interval bars; differences are reported from regression analysis of randomization to ACASI for each outcome with clustered standard errors at the village level. * = p < 0.10, ** = p < 0.05, *** = p < 0.01. Standard errors are clustered at the village level. See table 2 for detailed statistics and table S1.3 for full descriptions of indicators.

3.7 pp (sexual) to 7.2 pp (physical and/or sexual) for IPV and from 6.1 pp (physical) to 11.7 (sexual harassment or violence) for VAWG measures. While categories are not directly comparable, in general prevalence is higher for VAWG measures than in relation to those for IPV, which reflects a broader set of perpetrators and environments where violence may occur. For the preferred measures of any physical and/or sexual violence, these differences equate to a 39 percent higher prevalence of IPV and a 23 percent higher in prevalence of nonpartner VAWG among participants using ACASI.

Table 2 gives details underlying these figures, showing that differences in disclosure between ACASI and face-to-face are highly statistically significant even when controlling for enumerator fixed effects and a broader set of control variables (columns 6a/6b). In most cases, differences decrease slightly when additional controls are added—indicating that these factors may explain some of the differences in disclosure between the two modalities. For example, differences are smaller for any IPV (5.6 pp versus 7.2 pp) and any VAWG (8.3 pp versus 9.8 pp) in the adjusted model. Across groups of measures, the differences in disclosure across the ACASI and face-to-face groups are largest among the least common type of violence. For example, ACASI disclosure is 18 percent higher than face-to-face for lifetime emotional IPV, but 58 percent higher for lifetime sexual IPV. This may be because women react to privacy and confidentiality of the ACASI method by disclosing more stigmatizing information, rather than simply responding at equally higher rates each survey question.

Table S1.4 illustrates how the 15 individual questions aggregated to create the indicator of any physical and/or sexual IPV contribute to these disclosure differences. While most individual indicators are significant, this is not always the case, particularly when control variables are added. In addition to the study's primary questions, table 2 also reports auxiliary violence questions around help-seeking and bystander intervention. Similar to the main experience measures, the analysis shows significantly higher disclosure for all measures in the ACASI sample. Participants are more likely to indicate willingness to intervene in the case of a neighbor's physical IPV (73 percent versus 69 percent), have previously told someone else about their own IPV experiences (23 percent versus 12 percent), and have tried to get help for their own IPV experiences (17 percent versus 3 percent) when assigned to ACASI administration.

Table S1.5 in the supplementary online appendix replicates these results for continuous violence measures and table S1.6 for 12-month measures. Both tables show very similar patterns, whereby ACASI disclosure is significantly higher than face-to-face reporting. Table S1.5 shows that participants randomized to ACASI report anywhere from 0.150 to 0.275 standard deviation (SD) higher prevalence of violent acts as compared to face-to-face measures. The measure of combined physical and/or sexual IPV acts show differences of approximately 0.266 SDs in unadjusted models, and approximately 0.222 SDs in adjusted models, which are similar to magnitudes for physical and/or sexual VAWG. Figure S1.3 shows the distribution of combined acts for IPV and VAWG as cumulative distribution plots—showing that for each "count" of violent acts, the distribution of the ACASI sample shifted right in comparison to the face-to-face sample (signaling a higher cumulative distribution of acts). Table S1.6 shows that 12-month prevalence of violence is substantially lower than lifetime violence; however; the main results mirror those presented in table 2, except for emotional IPV (where differences in disclosure are not significant). Finally, table S1.7 shows TOT results, instrumenting actual completion of the ACASI module with the randomized assignment. Results show differences are slightly larger than those show in table 2: for any IPV (any VAWG), unadjusted differences are 8.9 pp (12.0 pp).

Table 3 reports results from analysis exploring factors hypothesized to be correlated with disclosure, focusing on lifetime measures of physical and/or sexual IPV and VAWG. For each group of factors, overall measures are reported (followed by disaggregated components), including both the coefficient of the variables alongside the coefficient of the interaction term with ACASI from separate regressions. While overall factors show significant correlations with lifetime violence outcomes (columns 1a and 2a), in no case are interaction terms significant (columns 1b and 2b). Although results confirm that participants facing logistical constraints and those who live in settings with attitudes and norms justifying VAWG are

Table 2. Differences in Disclosure of Lifetime VAWG in ACASI and Face-to-Face Samples

		Sample means			Regression analysis of differences (ACASI)			
	N	All	Face-to-face	ACASI	Coefficient [unadjusted]	*p*-value	Coefficient [adjusted]	p-value
Intimate partner violence (ever partnered sample)	(1)	(2)	(3)	(4)	(5a)	(5b)	(6a)	(6b)
Emotional IPV	2,892	0.312	0.279	0.328	0.049	*0.004*	0.042	*0.016*
Physical IPV	2,895	0.219	0.173	0.243	0.070	*0.000*	0.055	*0.001*
Sexual IPV	2,896	0.088	0.064	0.101	0.037	*0.001*	0.029	*0.014*
Physical and/or sexual IPV	2,891	0.237	0.189	0.262	0.072	*0.000*	0.056	*0.001*
Nonpartner violence against women (full sample)								
Emotional VAWG	3,393	0.594	0.523	0.630	0.107	*0.000*	0.086	*0.000*
Physical VAWG	3,405	0.229	0.189	0.250	0.061	*0.000*	0.050	*0.001*
Sexual harassment or VAWG	3,401	0.455	0.377	0.494	0.117	*0.000*	0.104	*0.000*
Physical and/or sexual VAWG	3,398	0.494	0.428	0.527	0.098	*0.000*	0.083	*0.000*
Auxiliary violence measures								
Would intervene in the case of neighbors' physical IPV	3,430	0.720	0.694	0.733	0.038	*0.030*	0.040	*0.017*
Told anyone about own IPV (12 months)	2,915	0.190	0.118	0.228	0.110	*0.000*	0.107	*0.000*
Tried to get help to stop own IPV (12 months)	2,915	0.122	0.032	0.169	0.137	*0.000*	0.131	*0.000*

Source: Authors' calculations based on primary data collection in Senegal.

Note: ACASI = Audio computer-assisted self-interviews; IPV = intimate partner violence; VAWG = Violence against women and girls; Reported coefficients and *p*-values are reported from separate regressions of violence outcomes on an indicator for being randomized to ACASI. Standard errors are clustered at the village level. Control variables used in columns (6a/6b) are age splines, education levels, ethnicity indicators, household size, and enumerator fixed effects. See table S1.3 for full descriptions of indicators.

Table 3. Factors Correlated with Increased Reporting of Lifetime VAWG Measures in ACASI

	Physical and/or sexual IPV		Physical and/or sexual VAWG	
	Coefficient control variable	Coefficient control × ACASI	Coefficient control variable	Coefficient control × ACASI
Factors affecting disclosure (z-scores)	(1a)	(1b)	(2a)	(2b)
Logistical factors discouraging disclosure	0.038	−0.016	−0.041	−0.003
	(0.012)***	(0.016)	(0.018)**	(0.021)
Partner is cohabiting	0.052	−0.023	−0.081	0.004
	(0.012)***	(0.016)	(0.015)***	(0.020)
Crowding index	0.006	−0.017	−0.018	0.014
	(0.012)	(0.014)	(0.015)	(0.019)
Interruptions during violence module	0.012	0.012	0.028	−0.014
	(0.013)	(0.018)	(0.015)*	(0.019)
Attitudes and norms (z-scores)				
Attitudes and norms justifying VAWG	0.077	0.014	0.096	−0.032
	(0.016)***	(0.017)	(0.018)***	(0.021)
Attitudes justifying VAWG	0.041	0.017	0.049	−0.021
	(0.016)***	(0.017)	(0.018)***	(0.019)
Norms justifying VAWG	0.084	0.006	0.101	−0.029
	(0.015)***	(0.016)	(0.018)***	(0.020)
N	2,891		3,398	

Source: Authors' calculations based on primary data collection in Senegal.

Note: ACASI = Audio computer–assisted self-interviews; VAWG = Violence against women and girls; * = $p < 0.10$, ** = $p < 0.05$, *** = $p < 0.01$; Coefficients are from separate estimates regressing violence outcomes on each control variable (group) and its interaction with ACASI. Standard errors are clustered at the village level. See table S1.3 for full descriptions of indicators.

generally more likely to disclose violence—they are equally likely to disclose regardless of mode of survey administration. Results are replicated for continuous measures of violent acts, as well as for attitude and norm measures aggregated to the village level; however, very similar results are found (thus the study does not report them). The analysis may lack sufficient power to detect heterogenous effects reported in table 3; however, note that in most cases coefficients are very small and thus are unlikely to contribute substantially to overall differences in disclosure.

5. Discussion and Conclusions

This study reports on a survey experiment in rural Senegal randomly varying whether women and adolescent girls complete a violence module administered by enumerators face-to-face or through ACASI. Respondents randomized to ACASI report higher lifetime IPV (ranging from 3.7 to 7.2 pps), as well as lifetime nonpartner VAWG (ranging from 6.1 to 11.7 pps). These same patterns are observed for auxiliary measures of IPV, including willingness to intervene and help seeking, as well as for scales of violent acts and 12-month measures of violence experience. These results add to existing evidence from the Africa region that find divergent results, with some studies showing higher prevalence among ACASI groups as compared to face-to-face measures, but not for all IPV measures or contexts (Cullen 2023; Park et al. 2022). In this study's population, patterns suggest higher prevalence in ACASI groups across outcomes, including nonpartner VAWG. Approximately a third of the sample are adolescent girls (aged 15–19 years), who are a key target group for both IPV prevention, as well as multi-faceted VAWG intervention programming. Historically, adolescent girls have been overlooked by violence sectors focusing on either children or adult women (Engel et al. 2022). However, adolescents are increasingly the target of primary prevention interventions, as a group facing high risk of violence and their unique situation in formative years, when

norms and relationship trajectories are determined (Yount, Krause, and Miedema 2017). Understanding how to best collect accurate measures of VAWG within the adolescent population is critical for future evaluation and prevention research.

Results show few significant correlates of higher disclosure via ACASI, adding to the limited and variable results from studies experimenting with modalities of survey administration. For example, in Rwanda women in communities with more unequal gender norms, higher vulnerability, and poorer relationship quality were more likely to report IPV in a list experiment, as compared to a face-to-face survey (Cullen 2023). However, these and other factors did not differ significantly between women who participated in ACASI versus face-to-face surveys in the same study. In addition, no differences in disclosure of forced sex among adolescents were found by background characteristics in a face-to-face versus sealed-envelope survey method, including by age and sex (Barr et al. 2017). The lack of identified correlates may indicate that the current study did not identify and test meaningful background characteristics for this setting, and that other unobservable or other unmeasured operational factors might be driving increased disclosure, or that the analysis is underpowered. For example, participants may be influenced by how fearful they are of adverse reactions by partners, how comfortable they feel with enumerators (including whether they feel enumerators are empathetic or open to their responses) or if they have previously discussed or disclosed violence to family members or friends.

Overall, this analysis suggests that similar surveys in Senegal that collect face-to-face measures may be at risk of low VAWG disclosure. For example, this study finds rates of lifetime physical and/or sexual IPV that are double the prevalence as compared to the most recent nationally representative data (23 percent versus 13 percent) (table S1.8) (ANSD and ICF 2020). Rates are consistently larger in this study when the comparison is a DHS sample of adolescent girls and women in rural areas, in the same regions as the current study and of the same age range.[7] If national data on VAWG is a lower bound of true prevalence, these statistics may lead to underinvestment in VAWG prevention. Moreover, they may lead to incorrect conclusions from impact evaluations if low disclosure weakens the power of studies to detect impacts or if disclosure is nonrandom. In cases where surveys aim to measure impacts of evaluations that might increase disclosure in the first instance (as is the case for social norms interventions), the cost of low disclosure may be high. In these cases, interventions may increase disclosure rates in treatment groups, leading to the inability to conclude if the intervention increased violent behavior—or just increased disclosure of violence more generally.

This study shows the process through which ACASI is developed and how the manner in which survey logistics are handled will have implications for accuracy of data and success of self-interviewing techniques. For example, acknowledging that the current sample was rural and that a meaningful proportion of women and girls had never been to school, the practice (test) questions were built into the survey protocol and participants were allowed to "opt-out" of ACASI if they did not feel comfortable. These results are not fully reconcilable with concerns of mechanical misreporting due to lack of comprehension of the ACASI found in Malawi and Liberia; however, the allowance to opt out of ACASI in the current study partially mitigates this concern (Park et al. 2022). In practice, approximately 16 percent of the sample originally randomized to ACASI was redirected to face-to-face interviews, either because they were not able to complete test questions correctly, or because they preferred not to continue. Table S1.9 shows the women and girls who switch to face-to-face interviews are on average older, more likely to be partnered, have lower education levels, and vary on a number of other background characteristics. This indicates that planning and flexibility may be needed to accommodate cases in which respondents may not be

7 Senegalese DHS rates are consistently closer to this study's face-to-face prevalence as compared to ACASI prevalence, with the subsample corresponding to Kaolack and Kolda regions approaching comparability in any physical and/or sexual IPV (both at approximately 18–19 percent). Note that the DHS is not meant to be representative at these lower levels and there are small differences in the questions used in the DHS versus the current experiment. Thus, comparisons are illustrative only.

willing or able to accurately complete ACASI on their own. A process evaluation in Ethiopia and the Democratic Republic of Congo find similar results that indicate high acceptability and understanding of ACASI, yet still include a minority sample that had comprehension challenges (90 percent of girls in DRC and 75 percent of girls in Ethiopia stated ACASI was "easy to understand") (Falb et al. 2017). ACASI implementation also requires substantial up-front investment in terms of coding and additional supplies (headphones, cleaning agents for tablets if interviewing during COVID-19 etc.) (Falb et al. 2017). Finally, ACASI comes with a time cost—participants who completed the ACASI module (1 of 16 modules in the survey) spent on average 4 minutes longer than face-to-face interviews, an increase of 8 percent in the total survey time. These factors indicate that ACASI requires advanced planning and careful attention to survey implementation to ensure that modules are well suited for the target population.

There are also trade-offs between ACASI and face-to-face methods in terms of data completeness and detail of information that is collected. The current survey did not ask follow-up questions about the frequency of experiencing different acts (as is common in the DHS) or ask about type of perpetrator for nonpartner VAWG, as these were assessed to include too many complex response options to ensure accuracy. These limitations were weighed against the benefits of simpler measures in ACASI that could increase disclosure. The mode of data collection may also affect the occurrence of "don't know or refuse" responses. In the current study, overall rates were low (4 percent for VAWG measures); however, ACASI more than doubled these rates (significant at the $p < 0.01$ level). While suggestive, this could be because women and girls could more easily opt out of answers without pressure from enumerators. This option might be welcome for participants; however, it should be weighed against concerns around data completeness.

Although the majority of research examining the role of survey administration indicates that there is higher disclosure of violence via private methods, there is still little research validating accuracy of either method to understand trade-offs across methods, target groups, and locations. Additional analysis is warranted on what aspects of face-to-face interviews might reduce disclosure in the first instance—whether it is fear that responses will be overheard by others, concern that responses may have broader repercussions for women or perpetrators, or interview fatigue, among others.[8] Qualitative methods or survey experiments may be well suited to answer these questions. Finally, additional guidance around ethical protocols appropriate for ACASI survey administration is needed (Peterman et al. 2023). In this study, similar ethical protocols were followed for both face-to-face and ACASI, as survey work required preparation for both modalities. However, it is not clear if the mode of interviewing has implications for future uptake of services or negative (positive) emotional reactions that might be associated with surveys, or if studies would seek to streamline some aspects of ethics if no direct interaction with participants required asking about violence via interviewers.

While measurement of some types of violence, including IPV, has been established for decades—there is need for additional ethical experimentation to improve the accuracy of measurement. In addition to a tendency to under-report due to stigma and shame, survivors of severe violence may block out or fail to remember traumatic events, or the specific time period when such events occurred. Further, no standardized scales exist for some forms of violence, including economic coercion or sexual harassment and warrant further testing and validation (Ranganathan et al. 2021; Yount et al. 2022). Moreover, outcome measures still tend to be one-dimensional (binary prevalence measures), obscuring the understanding of changes in frequency, severity, and dynamism over time (Boyer et al. 2022). While indirect methods to solicit experience of violence have become more popular in recent years, including list randomization, there are still outstanding questions as to the accuracy and utility of these types of measures (Cullen 2023; Gilligan

8 Violence modules are often placed at the end of the survey, in order to increase rapport between interviewer and participant over the course of the interview and maximize potential for privacy. However, this may also lead to under-reporting if participants understand the interview time will shorten with fewer "yes" answers that lead to follow-up questions.

et al. 2024; Peterman 2021; Peterman et al. 2018). Ethical and survivor-centered experimentation can spur progress towards more accurate data collection of measures, and more effective policy and program action to reduce VAWG.

Data Availability Statement

The data underlying this article and analysis replication files are provided as online supplementary materials.

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