ORIGINAL RESEARCH ARTICLE

Intimate partner violence and contraceptive discontinuation in Kenya

DOI: 10.29063/ajrh2021/v25i2.2

Kerry LD MacQuarrie^{1,3}*, Lindsay Mallick^{2,3}

The Demographic and Health Surveys Program, USA¹; Department of Family Science, School of Public Health, University of Maryland, USA²; Avenir Health, USA³

*For Correspondence: Email: kerry.macquarrie@icf.com; Phone: +301.572.0282

Abstract

Intimate partner violence (IPV) may interfere with women's contraceptive use. This study analyzed IPV and discontinuation while still in need (DWSIN) using detailed contraceptive calendar data from the 2014 Kenya Demographic and Health Survey and measures of IPV experience in the same 12-month observation period. Using multivariable regression analysis, it examined three forms of violence separately—emotional, physical, and sexual violence—and any IPV combined among 1,437 married women age 15-49 who were using a contraceptive method twelve months prior to the interview. DWSIN varied with the form of violence assessed. Emotional violence (odds ratio (OR) = 2.13, p<0.01) and any IPV (OR=1.88, p<0.05) were strongly, positively associated with higher odds of DWSIN. Sexual violence was weakly associated with higher odds of DWSIN, while there was no detected association with physical violence. Integrating IPV screening into family planning counseling may reduce DWSIN and support women to achieve their reproductive aspirations. (Afr J Reprod Health 2021; 25[2]: 17-27).

Keywords: Contraception, discontinuation, intimate partner violence, Kenya

Résumé

La violence exercée par les partenaires intimes (VPI) peut interférer avec l'utilisation de la contraception par les femmes. Cette étude a analysé la VPI et l'interruption de la contraception parmi les besoins non satisfaits en matière de planification familiale (DWSIN) à l'aide des données détaillées du calendrier contraceptif de l'enquête démographique et de santé au Kenya de 2014 et des mesures de l'expérience de la VPI au cours de la même période d'observation de 12 mois. À l'aide d'une analyse de régression multivariée, elle a examiné trois formes de violence séparément—violence émotionnelle, physique, et sexuelle—et toutes VPIs combinées parmi 1 437 femmes mariées âgées de 15 à 49 ans qui utilisaient une méthode contraceptive douze mois avant l'entrevue. Le DWSIN variait selon la forme de violence évaluée. La violence émotionnelle (rapport de cotes (OR) = 2,13, p <0,01) et toutes VPI (OR = 1,88, p <0,05) étaient fortement et positivement associées à des chances plus élevées de DWSIN. La violence sexuelle était faiblement associée à une chance plus élevée de DWSIN, alors qu'il n'y avait aucune association détectée avec la violence physique. L'intégration de l'évaluation pour VPI dans les conseils autour de la planification familiale peut réduire le DWSIN et aider les femmes à réaliser leurs aspirations reproductives. (Afr J Reprod Health 2021; 25[2]: 17-27).

Mots-clés: Contraception, arrêt, violence entre partenaires intimes, Kenya

Introduction

Intimate partner violence (IPV) presents a substantial public health concern and violation of women's human rights. Appropriately, a substantial and growing body of literature documents the prevalence and patterns of such violence¹⁻⁶. In addition, IPV is also associated with a number of adverse sexual and reproductive health outcomes. Research has identified a relationship between IPV and higher parity, unmet need for family planning^{7,8}, adolescent pregnancy or unintended,

mistimed, or unwanted pregnancy^{2,9-11}. These findings indicate that women who experience IPV may have greater difficulty controlling their reproduction in ways that align with their fertility aspirations.

One way by which women who experience IPV may be less able to use contraception consistently may be reproductive coercion—which contraception sabotage, pregnancy coercion, sexual and pregnancy pressure, and attempts to control the outcome of a pregnancy by a male partner¹²⁻¹⁶.

The empirical evidence on the relationship between IPV and contraceptive use is inconclusive. Without accounting for temporality, numerous studies based on cross-sectional data find that women who experienced IPV are more likely to contraception^{17,18}, with some researchers positing that women who experience IPV may be more motivated to avoid pregnancy, particularly if they can access discreet methods of contraception that can be used covertly.

Other cross-sectional research finds that women who experienced IPV are less likely to use contraception^{19,20}. Yet other research finds no association with IPV and contraceptive use^{21,22}. A multicountry study using Demographic and Health Surveys (DHS) data finds that women who have ever in their lifetime experienced IPV are more likely to have ever used modern contraception at some point in their lives than those who have not reported IPV, but among women in most of the ten developing countries studied, there was no significant association between IPV and current contraceptive use²³.

Several studies attempt to isolate the timing of violence in relation to specific contraceptive behavior. Wilson-Williams et al. suggest that contraception can lead to violence if a woman is discovered using contraception without her partner's consent²⁴. A recent systematic review and meta-analysis²⁵ reviewed longitudinal studies in which IPV preceded contraceptive use. With the exception of one study²⁶, the review found that IPV negatively associated with contraception, particularly condom use, although that association varied by whether the form of IPV was physical or sexual²⁷. Few studies examine the reverse temporal order when contraceptive use precedes IPV.

The IPV literature has seldom delved beyond current contraceptive status into the dynamics of contraceptive behavior, such as consistent use, switching, or discontinuation. One exception are studies linking IPV with inconsistent condom use¹⁹, although this literature is often framed in terms of sexually risky behaviors related to disease prevention, rather than reproductive aspirations. Meanwhile an established demographic literature on contraceptive dynamics fails to **IPV** possible examine as a reason for discontinuation, instead looking to side

effects/health concerns, cost, or availability as explanations²⁸⁻³².

This study seeks to fill a void left by the intersection of the demographic and IPV literatures on women's contraceptive behavior by examining data from women in Kenya, where nearly half of all married women have experienced some form of IPV³³. While the modern contraceptive prevalence rate among currently married women age 15-49 is 53%, nearly three quarters of women who discontinue contraceptive use within 12 months, do so for reasons other than wanting to become pregnant³³. Such discontinuation may contribute to unmet need for family planning, which stands at 18% of currently married women.

We explore whether and to what degree women in Kenya who experience IPV have greater difficulty using contraception with continuity until a pregnancy is desired than women who do not experience various types of IPV. Specifically, this study analyzes contraceptive discontinuation while still in need of contraception (DWSIN) by experience of multiple forms of IPV (emotional, physical, sexual, or any IPV). We use time-bound measures of IPV experience and contraceptive behavior to collocate these experiences in the same 12-month window. We hypothesize that Kenyan women who experience IPV will be more prone to discontinuation while still in need of contraception and that this effect will be most pronounced among women who use short-term, non-LARC methods of contraception.

Methods

Data

This study uses data from the 2014 Kenya DHS. This survey, like all DHS surveys, is a nationally representative, population-based household survey that employs standardized questionnaires and modules and multistage, clustered area sampling techniques³³. This survey includes both the contraceptive calendar and the domestic violence module with a full complement of items assessing emotional, physical, and sexual violence. The 2014 Kenya DHS has a 96.6% overall eligible woman response rate and a violence module response rate of 99.7%. We base our analysis of DWSIN on data obtained through the contraceptive calendar. The contraceptive calendar records month-by-month,

information retrospective episodes of on contraceptive use or non-use, live births, pregnancies, and terminations for the five completed years preceding the survey. The contraceptive calendar has become the primary data source for estimating contraceptive discontinuation rates and other contraceptive dynamics^{28,30,34-36}. We convert calendar data contained in the standard women's recode file into an events data file, in which each episode of contraceptive use is one observation in the dataset.

We define our observation period as the 12 months preceding the interview. We limit analysis to episodes in which women were using modern, temporary contraception at the start of our period of observation. We do so because women who adopt contraception beyond this point would have shortened contraceptive episodes (right censored) and could not be observed for a full 12 months, possibly underestimating DWSIN in this sample. Further, by limiting our analysis to women who were using contraception at the start of 12-month period, we reduce violations of temporality whereby the exposure (IPV at any time in the last 12 months) precedes the outcome (DWSIN). Each woman contributes a single episode. For ease of interpretation, therefore, this study refers to women or contraceptive users rather than episodes of contraceptive use as the unit of analysis.

Fourteen thousand, seven hundred and forty 1 (14,741) women interviewed with the contraceptive calendar, of whom 5,547 were administered the violence module. We further restrict to currently married women (n=3,352) and then to the 43% of currently married women who were using a modern, temporary method of contraception 12 months before the interview. These methods include pills, intrauterine device (IUD), injectables, implants, condoms, lactational amenorrhea method (LAM), emergency contraception, and standard days method. We exclude women who/whose husbands sterilized at the start of the observation period because these women are not at risk of discontinuation. Our final analytic sample comprises 1,437 women.

Measures

Our outcome measure, contraceptive discontinuation, is defined as the interruption of

contraceptive use for one month or longer. DWSIN refers to discontinuing for reasons other than wanting to become pregnant or no longer at risk of pregnancy. These include: health concerns/side effects, method inconvenient to use, wanted a more effective method, costs too much, lack of access/too far, or other reasons, such as husband opposition to contraception. We operationalize our outcome as a dichotomous variable, coded 1 for women who were using contraception 12 months prior to the survey, but who DWSIN before the completion of the observation period and coded 0 otherwise. Those in the 0 category include women who discontinued due to no further need (e.g. wanted to become pregnant, infrequent sex/husband away, marital dissolution/separation, difficult to get pregnant/menopausal) and those who did not discontinue.

Our independent variables of interest come from the domestic violence module, which is administered to just one randomly selected eligible respondent in each selected household, in accordance with the WHO guidelines on the ethical conduct of domestic violence research^{37,38}. This module includes measures of multiple, distinct forms of violence: emotional violence (3 items), physical violence (7 items), sexual violence (3 items), and marital control (both suspicion (3 items) and isolating controlling behaviors (3 items))^{5,39}. Prior factor analyses confirm that each of the items load robustly onto their respective form of violence (MacQuarrie, Winter, and Kishor 2013, 2014). Emotional, physical, and sexual forms of violence is captured through the use of an abbreviated version of the conflict tactics scales (CTS)⁴⁰⁻⁴², which refer to specific behavioral acts, regardless of whether they are understood to constitute violence in a given cultural setting⁴. For each of these items, ever-married women report whether they have ever experienced that item, whether and how frequently they have experienced it in the past 12 months.

This study focuses on emotional, physical, and sexual violence perpetrated by the current spouse. We exclude marital control (suspicion and isolation) from our analysis because these items are not time-bound. Because they do not refer specifically to the previous 12 months, we cannot place the experience of marital control within or outside of our period of observation. We create a separate dichotomous measure for each of the remaining three forms of violence. Women who

report experiencing any item of the respective form of violence in the 12 months prior to the survey are coded as 1; women who have not are coded as 0. A fourth variable, any IPV, is a composite variable in which women who have experienced one or more of emotional, physical, or sexual violence in the prior 12 months are coded as 1 and women who have not are coded as 0. By restricting our observation period to the 12 months prior to interview, we ensure that measures of IPV are colocated in the same 12-month window as observations of contraceptive discontinuation.

Analysis

Following descriptive analysis, we assess the bivariate and multivariable associations between DWSIN and the experience of IPV in separate logistic regression models corresponding to emotional, physical, and sexual violence and any IPV. Multivariable models control for the duration of contraceptive use prior to the start of the observation period, type of contraceptive method (LARC/non-LARC), age at the time of the survey, household wealth quintile, residence, religion, education, number of living children, and employment status (not employed, not employed for cash, and employed for cash). Type of contraceptive method is classified as long-acting, reversible contraceptive methods (LARCs) or non-LARC methods, i.e. shorter term methods. LARCs include IUDs and implants.

We apply sample weights (d005) that account for both sampling probability and non-response for the violence module and the complex survey commands (svy) in Stata to adjust for the clustered sampling design and estimate robust standard errors. We estimate robust standard errors and 95% confidence intervals and interpret p<0.05 to be statistically significant. Where p<0.10, we interpret the result to be borderline significant.

Results

Table 1 summarizes the background characteristics of the analytic sample. It indicates that 22.2% of the analytic sample was using a LARC and 77.8% was using a short-term, modern method at the start of the observation period. Injectables are the dominant method, used by 50.4% of the women in our sample, followed by implants (14.3%) and pills

(12.1%). Among the 1,437 contraceptive users, DWSIN was 8.8% while discontinuation due to no further need was 6.3%.

In general, most women in the sample are between 25-34 years of age (52.3%) and have at least a primary level of education (56.7%). A greater proportion of women are in the richer wealth quintiles compared with the poorer quintiles. This may reflect that contraceptive use is concentrated among wealthier quintiles in Kenya. The sample is roughly evenly divided between rural and urban areas and is predominantly Christian. Two-thirds of women are employed for cash, with equal proportions either not employed or employed but not earning cash. Very few women in the sample had no children at the time of interview, with most women having 1-2 children (48.4%), followed by 3-4 children (32.5%).

Experience of intimate partner violence

Figure 1 presents Euler-style area proportional Venn diagrams⁴³ indicating overall prevalence of each form of violence as well as their intersections. Approximately a third of the sample reports experiencing any IPV in the last 12 months. The proportion of women reporting emotional violence is 26.2%, physical violence is 23.7%, and 11.9% for sexual violence.

Associations between IPV and discontinuation while still in need

As shown in Table 2, each form of violence and any IPV demonstrates a tenuous relationship in bivariate analysis. Only the experience of emotional violence in the last 12 months approaches a significant association with DWSIN (unadjusted odds ratio (uOR) = 1.67, p<0.10). However, these associations strengthen in full models that control for other factors. After controlling for contraceptive experience and socio-demographic variables, women who have experienced emotional violence in the 12-month observation period before the survey have over two times the odds of DWSIN compared to women who did not experience this type of violence (adjusted odds ratio (aOR) = 2.13, p<0.01), while women who experience any IPV have 88% higher odds of DWSIN (aOR=1.88, p<0.05). Women who experience sexual violence also appear to face increased odds of DWSIN, but

Table 1: Background characteristics of the analytic sample: Currently married women age 15-49 using contraception 12 months prior to interview, 2014 Kenya DHS

Characteristic	Percent
Discontinuation in preceding 12 months	
Discontinuation while still in need	8.8
Discontinuation due to no further need	6.3
Method used 12 months prior to survey	
LARC	22.2
non-LARC	77.8
Duration of use before the observation	
period	
1-12 months	34.7
13-36 months	32.9
37+ months	32.4
Age	
15-19	0.9
20-24	14.9
25-29	28.8
30-34	23.5
35-39	16.2
40-44	10.8
45-49	4.9
Wealth quintile	
Poorest	7.4
Poorer	17.7
Middle	20.3
Richer	25.5
Richest	29.1
Place of residence	
Urban	47.5
Rural	52.5
Religion	
Muslim	2.6
Christian	96.5
Other	0.9
Education	
No education	2.2
Primary	56.7
Secondary	31.0
Higher	10.0
Employment	
Not employed	18.0
Employed for cash	66.6
Employed not for cash	15.4
Number of living children	
0	2.6
1-2	48.4
3-4	32.5
5+	16.5
Weighted n	1,437
N .	

Notes:

LARCs include IUDs and implants. Non-LARCs include injections, pills, condoms, and LAM

these results are only borderline significant (aOR 2.01, p<0.10). There is no significant association detected between physical violence and DWSIN.

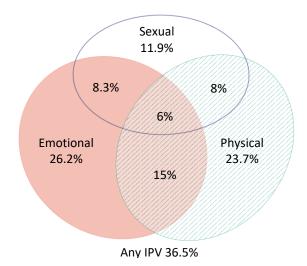


Figure 1: Proportion of currently married women age 15-49 in the analytic sample (n=1,437) experiencing each form of intimate partner violence in the 12 months prior to the survey, 2014 Kenya DHS

Among the other variables in the models, odds of DWSIN may be higher among Muslim women (compared to Christian women) and lower among women employed and earning cash, women in the richer and richest household wealth quintiles, and those with 3-4 living children. The type of contraceptive method, duration of use, place of residence, and education were not associated with DWSIN in any of the models.

Discussion

Research has shown that IPV can lead to less contraceptive use^{25,44} and reproductive coercion and controlling behaviors can interfere contraceptive practices, potentially contributing to unintended pregnancy¹⁴⁻¹⁶. Based on this literature, we hypothesized that women who experience intimate partner violence would be more likely to experience interruptions in their contraceptive use, namely, that they would be more likely to experience discontinuation while still in need. This study takes advantage of detailed data in the contraceptive calendars⁴⁵ and psychometrically tested measures of various forms of IPV^{5,38,40,42}. which we are able to co-locate in the same 12month observation period, to test this hypothesis. We examine three forms of violence separately emotional violence, physical violence, and sexual

Table 2: Unadjusted and adjusted odds of discontinuing while still in need in the 12 months prior to the survey among currently married women age 15-49: Results from separate logistic regressions by type of violence: emotional violence, physical violence, sexual violence, or any intimate partner violence, 2014 Kenya DHS

	Model 0:	Model 1: Emotional violence	Model 2: Physical violence	Model 3: Sexual violence	Model 4: Any IPV
	uOR	aOR	aOR	aOR	aOR
Experience of intimate partner violence (ref=no					
violence in last 12 months)					
Emotional violence	1.67^{\dagger}	2.13**			
Physical violence	1.16		1.48		
Sexual violence	1.78			2.01^{\dagger}	
Any IPV	1.44				1.88^{*}
Method used 12 months prior to survey (ref=LARC method)					
non-LARC	1.25	1.31	1.28	1.30	1.34
Duration of use before the observation period (ref=1-	1.23	1.51	1.20	1.50	1.54
12 months)					
13-36 months	0.72	0.94	0.95	0.96	0.93
37+ months	0.77	1.43	1.38	1.41	1.40
Age (ref=15-24)	0.77	1.13	1.50	1	1.10
25-29	0.67	0.90	0.87	0.87	0.88
30-34	0.50^{\dagger}	0.83	0.81	0.83	0.84
35-39	0.24***	0.38 [†]	0.40^{\dagger}	0.40^{\dagger}	0.39†
40-44	0.19**	0.34 [†]	0.36^{\dagger}	0.37 [†]	0.36^{\dagger}
45-49	0.47	0.98	0.96	0.96	0.98
Household wealth quintile (ref=poorest wealth					
quintile)					
Poorer	0.74	0.88	0.84	0.82	0.87
Middle	0.82	0.84	0.81	0.75	0.85
Richer	0.46^{\dagger}	0.38^{\dagger}	0.38*	0.36*	0.39*
Richest	0.57	0.39 [†]	0.36^{\dagger}	0.34*	0.37†
Place of residence (ref=urban)					
Rural	0.94	0.94	0.90	0.90	0.91
Religion (ref=Christian)					
Muslim	3.97**	3.65^{\dagger}	3.62^{*}	3.57†	3.73†
Other	0.18	0.31	0.28	0.29	0.28
Education (ref=primary education)					
None	0.55	0.37†	0.39	0.37	0.38
Secondary	0.92	0.99	0.97	0.99	0.98
Higher	1.28	1.76	1.78	1.74	1.86
Employment (ref=not employed)					
Employed for cash	0.47^{*}	0.52^{*}	0.54^{\dagger}	0.52^{*}	0.51^{*}
Employed not for cash	0.48^{*}	0.49^{\dagger}	0.49^{\dagger}	0.49^{\dagger}	0.49^{\dagger}
Number of living children (ref=1-2)					
0	1.71	1.32	1.38	1.30	1.32
3-4	0.34***	0.36***	0.36**	0.38**	0.36***
5+	0.46^{*}	0.51	0.53	0.53	0.51
Weighted n	1,437	1,437	1,437	1,437	1,437

Discontinuation while still in need is defined as discontinuing for reasons other than wanting to become pregnant or no longer at risk of becoming pregnant (e.g. health concerns/side effects, method inconvenience, wanted a more effective method, cost, lack of access, or husband opposition)

[†] p<0.10, * p<0.05, ** p<0.01, *** p<0.001

LARCs include IUDs and implants. Non-LARCs include injections, pills, condoms, and other modern methods.

Discontinuation is defined as the interruption of contraceptive use for one month or longer.

violence—and the experience of any of these forms of violence with regard to their associations with DWSIN in the preceding 12 months.

Our findings are mixed and vary with the form of violence assessed. We find a positive association between DWSIN and both emotional violence and any IPV. However, the association between DWSIN and sexual violence is borderline and there is no association with physical violence.

There are several pathways by which IPV may lead to DWSIN. IPV is a mechanism of control and the experience of IPV is associated with a lack of agency and power^{7,9,14,46}. Women experiencing IPV may have difficulty obtaining permission, lack control over money, or face constraints on their mobility, which may be necessary to access contraceptive supplies on a timely basis and maintain consistent use. Women may DWSIN to avoid further incidents of abuse if her spouse opposes her contraceptive use, particularly if she had been using contraception covertly^{24,25}.

Additionally, women who experience IPV may also experience pregnancy coercion and pressure and discontinue contraception not because of her desire to become pregnant but at his insistence 12,14,16. Reproductive coercion also includes contraceptive sabotage, which could take the form of hiding, disposing of, or preventing the timely refilling/re-injection of pills or injectables 12,14,16.

This study's findings suggest that the form of violence matters. This should encourage us to measure the experience of multiple forms of violence in our data collection efforts data and to carefully consider when to examine them separately or in combination with one another. It also suggests fertile ground to develop and empirically test conceptual frameworks delineating the potential causal pathways between separate forms of violence and outcomes of interest⁴⁷.

The reasons that one form of violence should have greater influence than another form remain unexplained. It is possible that some forms of IPV—emotional and sexual violence, for example—are more likely to coincide with reproductive coercion than other forms such as physical violence. This study does not elaborate these or other specific pathways between IPV and DWSIN, in part because these data are not frequently available. For example, the Kenya DHS does not include any measures of reproductive

coercion. Nonetheless, this is a ripe area for further inquiry.

Our findings cannot be generalized to other countries, as associations between various forms of IPV and DWSIN may vary in different contexts. Contrary to the positive associations we detected in Kenya, a multicountry analysis revealed findings regarding emotional and sexual violence were inconsistent across countries⁴⁸. Such associations were sometimes negative and-more oftennonexistent. Our study found no association between women's discontinuation behavior and physical violence, consistent with other settings in the multicountry study. It is unclear why IPV and DWSIN would show such variation in direction and magnitude of the association. It could be that way IPV manifests and is used to exert control differs across settings. Alternately, it could be that any relationship between IPV and discontinuation is mediated by the methods used in these settings. While injectables are dominant in the method mix in Kenya, relationships may differ in places where method dominate the LARCs mix and discontinuation is more difficult.

Previous studies indicate that discontinuation rates vary across methods^{28,30,49,50}. Elsewhere, use of a non-LARC method was independently, positively associated with discontinuation, and the magnitude of the effect may exceed that of IPV experience⁴⁸. In contrast, the present study found no such association between use of a non-LARC method and DWSIN.

This study has several limitations to note. First, this study assessed multiple forms of violence but could not assess all forms of violence that may influence contraceptive discontinuation. Namely, we could not investigate forms of marital control (e.g. suspicion and isolation) because these measures do not permit us to place the timing of experiencing this form of violence within our 12month observation period and we could not investigate reproductive coercion because DHS survey instruments do not contain these measures. Second, although we co-locate our measures of violence and contraceptive discontinuation or continuation in the same 12-month observation period, we cannot be sure whether the experience of violence precedes any observed discontinuation. It is possible that some women who discontinue contraceptive use within the observation period may experience IPV following, rather than before,

DWSIN. Furthermore, we cannot ascertain whether women who experience IPV during the observation period also experienced IPV prior to observation, as IPV may be an ongoing experience for some women.

Finally, the DHS contraceptive calendar may be prone to underreporting of contraceptive use, particularly when that contraceptive use is of coital-dependent methods, of short duration, and in the earliest periods of the calendar⁵¹. It is unclear if such recall errors would result in under- or overestimation of discontinuation. Nonetheless, assessments indicate reporting improves in the most recent periods of the calendar⁵¹⁻⁵³. Because this study uses the most recent 12 months of the calendar, we anticipate any implications for our findings to be minimal.

The term "violence" often conjures to mind physical beatings, yet we found that other forms of violence, not physical violence, may influence contraceptive discontinuation. Given the greater importance of emotional or sexual violence for DWSIN, it is important that family planning workers in Kenya become sensitized about, and for screening tools to include probes for, these forms of violence in addition to physical violence. Probing for all forms of violence could lead to further conversations with clients about their sexual agency, repercussion of their contraceptive use, and desirable attributes in their contraceptive method, all of which may lead to more informed contraceptive choice and less likelihood of premature discontinuation. Such screening about women's IPV experience may form a part of a deliver high broader strategy to quality contraceptive services to all women to better support their ongoing use of contraception to achieve reproductive successfully their aspirations⁵⁴.

Ethical Approval

The Kenya DHS survey protocol, including the domestic violence module, was approved by the internal review board (IRB) at ICF and by the Ministry of Health and National AIDS Control Council in Kenya³³. This study is a secondary analysis of publicly available data from this survey (https://dhsprogram.com/Data/) and does not require separate ethical clearance.

Acknowledgments

The authors are grateful to Dr. Sunita Kishor, ICF, for contributing ideas that shaped the study design and Dr. Lauren Maxwell, Emory University, for discussions about the state of the evidence on causal direction between IPV and contraception. They and Dr. Rohini Pande provided useful feedback on earlier study outputs. The authors also extend their appreciation to Dr. Trevor Croft, ICF, for assistance preparing events data files and to the Kenya National Bureau of Statistics for implementing the 2014 Kenya Demographic and Health Survey. This study was supported in part by the U.S. Agency for International Development through The DHS Program (#AID-OAA-C-13-00095).

Contribution of authors

Dr. Kerry L.D. MacQuarrie conceptualized and designed the study. Lindsay Mallick contributed to the study design. MacQuarrie and Mallick jointly analyzed the data. MacQuarrie prepared the manuscript, with Mallick writing sections, revising, and editing the manuscript. Both authors approved the manuscript.

References

- Djamba YK and Kimuna SR. Gender-Based Violence: Perspectives from Africa, the Middle East, and India. New York, NY: Springer, 2015.
- Garcia-Moreno C, Jansen HA, Ellsberg M, Heise L and Watts CH. Prevalence of intimate partner violence: Findings from the WHO multi-country study on women's health and domestic violence. *The Lancet* 2006; 368: 1260-1269. https://doi.org/10.1016/S0140-6736(06)69523-8
- 3. Hindin MJ, Kishor S and Ansara DL. Intimate Partner Violence among Couples in 10 DHS Countries: Predictors and Health Outcomes. *DHS Analytical Studies No. 18*. Calverton, MD: Macro International, 2008.
- https://dhsprogram.com/pubs/pdf/AS18/AS18.pdf
 4. Kishor S and Bradley SEK. Women's and men's
 experience of spousal violence in two African
 countries: Does gender matter? *DHS Analytical Studies No. 27.* Calverton, MD: ICF International,
 2012.
- https://dhsprogram.com/pubs/pdf/AS27/AS27.pdf

 5. MacQuarrie KLD, Winter R and Kishor S. Spousal
 Violence in Sub-Saharan Africa: Structure, Forms,
 and Levels. *Population Association of America*.
 Boston, MA2014.
- 6. Yusuf RA, Dongarwar D, Yusuf ZI and Salihu HM.

- Association between Intimate Partner Violence, Knowledge and Use of Contraception in Africa: Comparative Analysis across Five African Regions. *Int J MCH AIDS* 2020; 9: 42-52. https://doi.org/10.21106/ijma.323
- 7. Kaneda T and Smith R. Intimate Partner Violence and Unmet Need for Family Planning: Findings among Women of Different Ages from Six Sub-Saharan African Countries. Washington, DC: Population Reference Bureau, 2015.
- Ogunjuyigbe P, Akinlo A and Oni G. Violence against Women as a Factor in Unmet Need for Contraception in Southwest Nigeria. *J Fam Viol* 2010; 25: 123-130. http://dx.doi.org/10.1007/s10896-009-9275-y
- Sarkar NN. The impact of intimate partner violence on women's reproductive health and pregnancy outcome. *Journal of Obstetrics and Gynaecology* 2008; 28: 266-271. https://doi.org/10.1080/01443610802042415
- Miller E, Tancredi DJ, Decker MR, McCauley HL, Jones KA, Anderson H, James L and Silverman JG. A family planning clinic-based intervention to address reproductive coercion: A cluster randomized controlled trial. *Contraception* 2016; 94: 58-67. http://www.sciencedirect.com/science/article/pii/S0 010782416000561
- Pallitto CC, García-Moreno C, Jansen HAFM, Heise L, Ellsberg M and Watts C. Intimate partner violence, abortion, and unintended pregnancy: Results from the WHO Multi-country Study on Women's Health and Domestic Violence. *International Journal of Gynecology & Obstetrics* 2013; 120: 3-9. http://www.sciencedirect.com/science/article/pii/S0 020729212003980
- American College of Obstetricians and Gynecologists.
 ACOG Committee opinion no. 554: Reproductive and sexual coercion. *Obstetrics and gynecology* 2013; 121: 411. https://doi.org/10.1097/01.aog.0000426427.79586.3
- Miller E, McCauley HL, Tancredi DJ, Decker MR,
 Anderson H and Silverman JG. Recent reproductive
 coercion and unintended pregnancy among female
 family planning clients. Contraception 2014; 89:
 122-128.
 http://www.ncbi.nlm.nih.gov/pmc/articles/PMC401
 8410/
- Moore AM, Frohwirth L and Miller E. Male reproductive control of women who have experienced intimate partner violence in the United States. Social Science & Medicine 2010; 70: 1737-1744. http://www.sciencedirect.com/science/article/pii/S0 277953610001681
- Park J, Nordstrom SK, Weber KM and Irwin T.
 Reproductive coercion: Uncloaking an imbalance of social power. American Journal of Obstetrics and Gynecology 2016; 214: 74-78.
 http://www.sciencedirect.com/science/article/pii/S0 002937815009278
- 16. Silverman JG, and Raj A. Intimate Partner Violence and

- Reproductive Coercion: Global Barriers to Women's Reproductive Control. *PLoS Med* 2014; 11: e1001723.
- http://dx.doi.org/10.1371%2Fjournal.pmed.1001723
- 17. Alio AP, Daley EM, Nana PN, Duan J and Salihu HM. Intimate partner violence and contraception use among women in Sub-Saharan Africa. *International Journal of Gynecology & Obstetrics* 2009; 107: 35-38. https://doi.org/10.1016/j.ijgo.2009.05.002
- Okenwa L, Lawoko S and Jansson B. Contraception, reproductive health and pregnancy outcomes among women exposed to intimate partner violence in Nigeria. The European Journal of Contraception & Reproductive Health Care 2011; 16: 18-25. http://dx.doi.org/10.3109/13625187.2010.534515
- 19. Kacanek D, Bostrom A, Montgomery ET, Ramjee G, de Bruyn G, Blanchard K, Rock A, Mtetwa S, van der Straten A and MIRA Team. Intimate partner violence and condom and diaphragm nonadherence among women in an HIV prevention trial in southern Africa. *JAIDS Journal of Acquired Immune Deficiency Syndromes* 2013; 64: 400-408. https://doi.org/10.1097/QAI.0b013e3182a6b0be
- Scribano PV, Stevens J and Kaizar E. The Effects of Intimate Partner Violence Before, During, and After Pregnancy in Nurse Visited First Time Mothers. Maternal and Child Health Journal 2013; 17: 307-318. http://dx.doi.org/10.1007/s10995-012-0986-y
- Adjiwanou V and N'Bouke A. Exploring the Paradox of Intimate Partner Violence and Increased Contraceptive Use in Sub-Saharan Africa. Studies in Family Planning 2015; 46: 127-142. http://dx.doi.org/10.1111/j.1728-4465.2015.00020.x
- Oluwaseyi SD and Latifat I. Intimate Partner Violence and Contraceptive Behaviour: Evidence from Malawi and Zambia. Southern African Journal of Demography 2015; 16: 123-149. https://www.jstor.org/stable/soutafrijourdemo.16.1. 123
- Wilson-Williams L, Stephenson R, Juvekar S and Andes K. Domestic Violence and Contraceptive Use in a Rural Indian Village. *Violence Against Women* 2008; 14: 1181-1198. http://vaw.sagepub.com/content/14/10/1181.abstract
- Maxwell L, Devries K, Zionts D, Alhusen JL and Campbell J. Estimating the Effect of Intimate Partner Violence on Women's Use of Contraception: A Systematic Review and Meta-Analysis. PLoS ONE 2015; 10: e0118234. http://dx.doi.org/10.1371%2Fjournal.pone.0118234
- 26. Salazar M, Valladares E and Högberg U. Questions about intimate partner violence should be part of contraceptive counselling: Findings from a community-based longitudinal study in Nicaragua. *Journal of Family Planning and Reproductive Health Care* 2012; 38: 221-228. http://jfprhc.bmj.com/content/38/4/221.abstract
- 27. Stephenson R, Koenig MA, Acharya R and Roy TK.

- Domestic violence, contraceptive use, and unwanted pregnancy in rural India. *Studies in Family Planning* 2008; 39: 177. https://doi.org/10.1111/j.1728-4465.2008.165.x
- 28. Ali MM, Cleland JG and Shah IH. Causes and
 Consequences of Contracentive Discontinuation:
 - Consequences of Contraceptive Discontinuation: Evidence from 60 Demographic and Health Surveys. Geneva, Switzerland and Egypt: World Health Organization, 2012.
- Blanc AK, Tsui AO, Croft TN and Trevitt JL. Patterns and trends in adolescents' contraceptive use and discontinuation in developing countries and comparisons with adult women. *International Perspectives on Sexual and Reproductive Health* 2009; 35: 63-71.
- Bradley SEK, Schwandt HM and Khan S. Levels, trends, and reasons for contraceptive discontinuation. *DHS* Analytical Studies No. 20. Calverton, Maryland, USA: ICF Macro, 2009. http://dhsprogram.com/pubs/pdf/AS20/AS20.pdf
- 31. Castle S, and Askew I. Contraceptive discontinuation:
 Reasons challenges and solutions. 2016: FP 2020
 and Population Council, 2015.
- 32. Haddad L, Wall KM, Vwalika B, Htee Khu N, Brill I, Kilembe W, Stephenson R, Chomba E, Vwalika C, Tichacek A and Allen S. Contraceptive discontinuation and switching among couples receiving integrated HIV and family planning services in Lusaka, Zambia. AIDS (London, England) 2013; 27: S93-103. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC407 0372/
- Kenya National Bureau of Statistics, Ministry of Health/Kenya, National AIDS Control Council/Kenya, Kenya Medical Research Institute, Population NCf and Development/Kenya. Kenya Demographic and Health Survey 2014. Rockville, MD, USA, 2015.
- http://dhsprogram.com/pubs/pdf/FR308/FR308.pdf
- MacQuarrie KLD, Bradley SEK, Gemmill A and Staveteig S. Contraceptive dynamics following HIV testing. DHS Analytical Studies No. 47. Rockville, Maryland, USA: ICF International, 2014. http://dhsprogram.com/pubs/pdf/AS47/AS47.pdf
- 35. Staveteig S, Mallick L,and Winter R. Uptake and discontinuation of long-acting reversible contraceptives (LARCs) in low-income countries. *DHS Analytical Studies No. 54*. Rockville, Maryland, USA: ICF International, 2015. http://dhsprogram.com/pubs/pdf/AS54/AS54.pdf
- Winfrey W and Rakesh K. Use of family planning in the postpartum period. *DHS Comparative Reports No.* 36. Rockville, Maryland, USA: ICF International, 2014.
 - http://dhsprogram.com/pubs/pdf/CR36/CR36.pdf
- World Health Organization. Putting women first: Ethical and safety recommendations for research on domestic violence against women. Geneva, Switzerland: Department of Gender and Women's Health, 2001.
- 38. ICF International. Demographic and Health Surveys

- *Domestic Violence Module*. Rockville, MD: ICF International, 2016.
- MacQuarrie KLD, Winter R and Kishor S. Spousal violence and HIV: Exploring the linkages in five sub-Saharan African countries. *DHS Analytical Studies No. 36*. Calverton, Maryland, USA: ICF International, 2013. http://dhsprogram.com/pubs/pdf/AS36/AS36.pdf
- Straus MA. Measuring intrafamily conflict and violence: the conflict tactics (CT) scales. *Journal of Marriage* and Family 1979; 41: 75-88. http://www.jstor.org/stable/351733
- 41. Straus MA. Measuring intrafamily conflict and violence; The conflict tactic (CT) scales. In: Straus MA, Gelles R, eds. *Physical violence in American* families: Risk factors and adaptations to violence in 8,145 families. New Brunswick: Transaction Publishers, 1990:29-47.
- 42. Straus MA, Hamby SL, Boney-McCoy S and Sugarman DB. The revised conflict tactics scales (CTS2) development and preliminary psychometric data. *Journal of family issues* 1996; 17: 283-316. https://doi.org/10.1177/019251396017003001
- 43. Micallef L and Rodgers P. eulerAPE: Drawing Area-Proportional 3-Venn Diagrams Using Ellipses. PLoS ONE 2014; 9: e101717. http://dx.doi.org/10.1371%2Fjournal.pone.0101717
- Stephenson R, Jadhav A and Hindin M. Physical domestic violence and subsequent contraceptive adoption among women in rural India. *Journal of* interpersonal violence 2012: 0886260512459379. https://doi.org/10.1177/0886260512459379
- Croft T, Bradley SEK and Allen C. DHS Contraceptive Calendar Tutorial Rockville, MD: ICF, 2018. https://dhsprogram.com/data/Calendar-Tutorial/index.cfm
- 46. MacQuarrie KLD. The Unfolding of Women's Empowerment over the Life Course in Madhya Pradesh, India: The Influence of Family Formation and Early Empowerment Resources. XXVI IUSSP International Population Conference. Marrakech, Morocco2009.
- 47. WHO and Human Reproduction Programme. Expert Meeting for Developing Consensus on Measuring Emotional/Psycological Intimate Partner Violence against Women. Morges, Switzerland: WHO, 2016.
- MacQuarrie KLD, Mallick L and Kishor S. Intimate partner violence and interruption to contraceptive use. *DHS Analytical Studies No. 57*. Rockville, Maryland, USA: ICF International, 2016. http://dhsprogram.com/pubs/pdf/AS57/AS57.pdf
- 49. Modey EJ, Aryeetey R and Adanu R. Contraceptive Discontinuation and Switching Among Ghanaian Women: Evidence from the Ghana Demographic and Health Survey, 2008. African Journal of Reproductive Health 2014; 18: 84-92. https://www.ajol.info/index.php/ajrh/article/view/10 2466
- Steele F and Curtis S. Appropriate Methods for Analyzing the Effect of Method Choice on Contraceptive Discontinuation. *Demography* 2003; 40: 1-22. http://www.jstor.org/stable/3180809

MacQuarrie and Mallick

- 51. Bradley SEK, Winfrey W and Croft TN. Contraceptive use and perinatal mortality in the DHS: an assessment of the quality and consistency of calendars and histories. *DHS Methodological Reports No. 17*. Rockville, Maryland, USA: ICF International, 2015. http://dhsprogram.com/pubs/pdf/MR17/MR17.pdf
- 52. MacQuarrie KLD, Winfrey W, Meijer-Irons J and Morse AR. Consistency of reporting of terminated pregnancies in DHS calendars. *DHS Methodological Reports No. 25*. Rockville,

Violence and discontinuation in Kenya

- Maryland, USA: ICF, 2018. http://dhsprogram.com/pubs/pdf/MR25/MR25.pdf
- 53. Pullum TW and Becker S. Evidence of omission and displacement in DHS birth histories. DHS Methodological Reports No. 11. Rockville, Maryland, USA: ICF International, 2014. http://dhsprogram.com/pubs/pdf/MR11/MR11.pdf
- 54. Jain AK, Obare F, RamaRao S and Askew I. Reducing unmet need by supporting women with met need.

 International perspectives on sexual and reproductive health 2013: 133-141.