Tropical Medicine and International Health doi:10.1111/j.1365-3156.2005.01531.x

VOLUME 11 NO 1 PP 90–101 JANUARY 2006

Domestic violence as risk factor for unwanted pregnancy and induced abortion in Mulago Hospital, Kampala, Uganda

Dan K. Kaye[1,3], Florence M. Mirembe[1], Grace Bantebya[2], Annika Johansson[3] and Anna Mia Ekstrom[3]

1 *Department of Obstetrics and Gynaecology, Makerere University Medical School, Kampala, Uganda*
2 *Department of Women and Gender Studies, Makerere University, Kampala, Uganda*
3 *Department of Public Health Sciences, Karolinska Institutet, Stockholm, Sweden*

Summary

OBJECTIVE To compare pregnancy intention and domestic violence among women with induced and spontaneous abortion.

METHOD Case-control study in Mulago Hospital, Uganda, from September 2003 to June 2004 of 942 women seeking post-abortion care. Direct inquiry, records review and clinical examination identified 333 with induced abortion (cases) and 609 with spontaneous abortion (controls), who were compared regarding socio-demographic characteristics, contraceptive use, domicile (rural or urban, nuclear or extended families), pregnancy intention, household decision-making and domestic violence. Data was analysed with EPI-INFO and STATA, using Student *t*-test and analysis of variance for continuous and chi-square for categorical variables. Stratified and multivariate logistic regression analyses were used to adjust for confounding and interaction at the 95% confidence level.

RESULTS Cases significantly differed from controls as they were younger or more often single; had lower parity and education, less household decision-making and fewer living children. They were similar to controls ($P > 0.05$) regarding employment, spouse's age, years spent in marital relationship and domicile. Cases more frequently ($P < 0.001$) had mistimed, unplanned or unwanted pregnancy at conception and presentation. Cases were more likely to have a recent history of domestic violence (physical, sexual or psychological) [OR: 18.7 (95%CI: 11.2–31.0)] after adjusting for age, pregnancy intention and marital status.

CONCLUSION Domestic violence is a risk factor for unwanted pregnancy and induced abortion among women seeking post-abortion care.

keywords domestic violence, post-abortion care, pregnancy intention, risk factors, induced abortion, Uganda

Introduction

Worldwide, 38% of pregnancies are unplanned and 22% end in abortion, making induced abortion a major cause of maternal morbidity and mortality, with 80 000 deaths annually (Alan Guttmacher Institute 2000). Due to unmet need for contraception globally, unwanted pregnancy is common, and about 150 000 unwanted pregnancies are terminated every day by induced abortion (WHO 1998). Twenty million abortions occur annually, 95% of these in developing countries (WHO 1998). The Uganda Demographic and Health Survey (UDHS) report (UDHS 2000/2001) shows that Uganda has a low contraceptive prevalence rate of 23% and many unwanted pregnancies; induced abortion contributes 15–30% of maternal deaths.

Domestic violence is defined as 'the range of sexually, psychologically and physically coercive acts used against adult and adolescent women by current or former male intimate partners' (WHO 1997). Women in abusive relationships may suffer sexual coercion and be unable to make contraceptive choices (Blanc *et al.* 1995; UDHS 2000/2001). Domestic violence is common in Uganda (Blanc *et al.* 1995; UDHS 2000/2001; Koenig *et al.* 2003,2004) and is associated with women's covert use or non-use of contraception and lack of power in the household (Blanc *et al.* 1995; UDHS 2000/2001). Pregnancies conceived after non-use of contraceptives (or resulting from sexual coercion) in abusive relationships may be wanted (though unintended, unplanned or mistimed) or unwanted (Blanc *et al.* 1995). Studies of domestic violence in the USA have shown that unwanted pregnancy may influence the decision to undergo

pregnancy termination and therefore induced abortion (Hillard 1985; ACOG 1995; Evins & Chescheir 1996; Glander *et al.* 1998; Dietz *et al.* 1999).

Though research has linked domestic violence and unintended pregnancy, little research has been conducted in developing countries in general, particularly in Africa on the role of domestic violence in unintended pregnancy, unwanted pregnancy and induced abortion. Studies that have linked domestic violence and induced abortion have been either qualitative or involved women seeking pregnancy termination with no reference group. Developed countries where research linking domestic violence and pregnancy termination has been conducted provide a markedly different context from that in many developing countries. In most industrialized countries abortion is legal, while it is illegal in most developing countries. In Africa it is illegal except in South Africa. Second, many developing countries have not reached the fertility transition. Third, since women's decision-making power in terms of sexuality and reproduction is often restricted and many contraceptive methods require either partner permission or compliance before use, fear of domestic violence may contribute to the low contraceptive coverage in Uganda (UDHS 2000/2001).

In a previous cross-sectional study of prevalence of domestic violence among women seeking post-abortion care services in Mulago Hospital, Uganda (Kaye 2001), 57.1% of the women reported violence (physical, sexual or psychological abuse). In this study, there were no attempts to distinguish between spontaneous and induced abortions, though most of the abortions were probably induced rather than spontaneous. Many women admitted with allegedly spontaneous abortion have induced it (Figa-Talamanca *et al.* 1986; Rasch *et al.* 2000). We hypothesized that domestic violence during pregnancy influences pregnancy intention and therefore likelihood of induced abortion, and that women with induced abortion are more likely to have unintended pregnancies and a history of domestic violence than women with spontaneous abortions. The objective of this study was to investigate whether domestic violence is a risk factor induced abortion among women seeking post-abortion care.

Methods

Study setting

This study was undertaken in Mulago Hospital, Uganda (the largest public hospital in Kampala, the capital), from 1st September 2003 to June 2004, in the emergency gynaecological ward, which handles 12–20 cases of women seeking post-abortion care daily. All such patients are usually admitted irrespective of whether they present with abortion complications or not and provided with the post-abortion care package. This consists of emergency treatment of abortion complications (if any exist), post-abortion family planning counselling (and services), and linkage to other reproductive health service points (depending on identified needs). Since abortion is illegal in Uganda, and is only permitted in situations where continuation of pregnancy seriously endangers the life of the pregnant woman, care was taken to avoid intimidating or further traumatizing the women.

Study design

The design was unmatched case-control, where all women seeking post-abortion care (with or without abortion complications) were eligible and asked to join the study after having received emergency care. Those who consented were interviewed using a semi-structured questionnaire, by the first author assisted by three midwives who had training in post-abortion care and counselling, and who were unaware of the study hypotheses. Subjects were asked similar questions (irrespective of answers given to preceding questions) and had similar examination and records review regardless of abortion status. The data was collected by three research assistants using a semi-structured interviewer-administered questionnaire. To evaluate inter-interviewer consistence, the questionnaire was pre-tested in a pilot study with 80 subjects, which reached and inter-rater agreement (Cohen's Kappa) of 0.87. The test–retest agreement of this questionnaire was 0.93.

Sample size

The sample size was calculated using the STATCALC Calculator (EPI-INFO 6.04) for unmatched case-control design. The confidence level was set at 95%, power of 80%, and a ratio of cases (induced abortion) to controls (spontaneous abortion) of 1:2 (from clinic records). The expected frequency of the exposure (domestic violence) for women in the population was 40% (Blanc *et al.* 1995). Assuming a 10% higher prevalence of domestic violence (50%) in women with induced abortions (Kaye 2001), a sample size of 918 was calculated.

Subjects

A combination of criteria was used to determine the outcome measure (abortion status): direct inquiry in an empathetic setting as described by Rasch *et al.* (2000), which involves inquiry about circumstances leading to

abortion, in privacy and in a non-judgmental way during post-abortion care. Subjects were asked directly whether, what and why something was done to terminate the pregnancy, where this occurred and who was involved. The other two criteria were clinical examination for genital injuries or foreign bodies that may suggest interference with pregnancy, and review of the patients' records (to identify history or examination findings suggesting induced abortion).

Study variables

Subjects were interviewed about socio-demographic characteristics such as age, marital status (married versus single, separated or divorced), years in marriage, type of marriage (polygamous or monogamous), age of spouse, education level and domicile (urban versus rural, nuclear versus extended family). For household decision-making power, a Likert scale (with levels never, rarely, sometimes and always) was used to assess three domains: freedom of movement, healthcare seeking and making household purchases. Reproductive history (parity, number of living children and contraceptive ever use indicating what methods were used) was also assessed. For pregnancy intention, women's subjective feelings regarding the pregnancy from the time of conception to the time of evaluation (whether the woman wanted to be pregnant then, sooner, later or never) was assessed. In this way whether pregnancy was mistimed, unplanned or unwanted (at conception or at time of presentation) was assessed [questions adapted from Henshaw (1998)]. History of domestic violence (physical, sexual or psychological) during pregnancy, previous 1 year and in patients' lifetime was elicited, using questions adapted from the Abuse Assessment Screen (McFarlane *et al.* 1992). The severity of violence was assessed using the Severity of Violence Against Women Scale (Marshall 1992).

Data management

Data was analysed using EPI-INFO Version 2002 and STATA software. On univariate analysis, cases and controls were compared by pregnancy intention, reproductive history, socio-demographic characteristics and domestic violence (both frequency and nature of violence). Student's *t*-test and one-way analysis of variance (ANOVA) were used for continuous variables while Mantel-Haenszel (or Pearson) chi-square (and Fisher's test) were used for categorical variables. Stratified and multivariate stepwise logistic regression analysis was used to adjust for interaction and confounding (with socio-demographic, pregnancy intention, household decision-making power and contraceptive use variables) while evaluating association between domestic violence and abortion type. For regression analysis, all variables associated with induced abortion (with a $P = 0.2$ or less on bivariate analysis) were considered for the model, after excluding interaction. Domestic violence during pregnancy exhibited collinearity with other violence variables (type of violence, severity and assailant). All variables that exhibited collinearity with domestic violence were excluded from the final model. Abortion status was entered as Induced = 1, spontaneous = 0. Domestic violence was entered as any type present = 1, absent = 0. Marital status was entered as single versus ever married (single = 0, married = 1). Age and parity were entered as numerical variables. Pregnancy intention variables (pregnancy was planned, pregnancy was wanted at conception and pregnancy was wanted at presentation) were entered as Yes = 0, No = 1.

Ethical considerations

Ethical clearance was obtained from Mulago Hospital, the Department of Obstetrics and Gynaecology and Faculty of Medicine of Makerere University, the Uganda National Council of Science and Technology as well as from the Ethical Committee of Karolinska Institutet, Stockholm, Sweden. Counselling about domestic violence and post-abortion care including contraceptive services were provided to all the subjects.

Results

In the 10 months, 955 (91.8%) of 1040 women admitted with post-abortion complications consented to joining the study. The 85 non-participants (of whom 38 were not approached, 25 were missed because of heavy clinic schedule, and 22 did not consent) did not differ markedly from the participants regarding age, residence or complications. Using direct inquiry alone, 273 (28.9%) cases and 670 (71.1%) controls were identified.

Sixty women (6.3%) who were classified as controls on direct inquiry alone had either evidence of genital injury, foreign bodies or unexplained medication the in genital tract or had medical records with indication of having induced abortion. They were therefore re-classified as cases. With the combined criteria, subjects were classified into 333 cases [35.3% (95% CI: 32.3–38.5)] and 609 controls [64.7% (95% CI: 61.5–67.7)].

Univariate and bivariate analyses

Table 1 displays the socio-demographic characteristics. Cases were significantly younger than controls [mean age

Table 1 Socio-demographic characteristics and reproductive history of study subjects

Characteristic	Induced abortion ($n = 333$)	Spontaneous abortion ($n = 609$)	*P*-value
Age (years)†	22.80 ± 5.38	24.80 ± 5.80	<0.001
Number of years married ($n = 452$)	5.75 ± 4.28	5.56 ± 4.75	0.689
Age of spouse in years ($n = 532$)†	31.2 ± 6.5	31.7 ± 7.8	0.460
Parity ($n = 942$)	2.6 ± 1.9	3.2 ± 2.1	<0.001
Number of living children ($n = 804$)†	1.7 ± 1.6	2.2 ± 1.8	0.008
Time elapsed since last pregnancy (months) ($n = 684$)†	29.74 ± 20.3	33.92 ± 23.9	0.029
Employment			
Unemployed	209 (62.7)	391 (64.2)	0.855
Informal sector	96 (28.8)	177 (29.1)	
Skilled	28 (8.4)	41 (6.7)	
Income generating project*			
Yes	60 (18.3)	81 (13.3)	0.042
No	268 (71.7)	527 (86.7)	
Stays with co-wives ($n = 125$)**			
Yes	6 (13.3)	10 (13.0)	0.82
No	39 (86.7)	67 (87.0)	
Spouse employment			
Unemployed	13 (9.2)	28 (4.2)	0.106
Informal sector	88 (62.4)	281 (41.7)	
Skilled	40 (28.6)	113 (55.1)	
Education			
No formal	14 (4.2)	54 (8.8)	0.005
Primary	145 (43.5)	290 (47.6)	
Secondary	141 (42.3)	228 (37.4)	
Tertiary	33 (9.9)	37 (6.1)	
Marital status			
Single	198 (59.4)	187 (30.7)	<0.001
Married	126 (37.8)	415 (68.1)	
Divorced or separated	9 (2.7)	7 (1.1)	
Nature of marital relation***			
Polygamous	45 (34.3)	74 (17.6)	<0.001
Monogamous ($n = 551$)	86 (65.7)	346 (82.4)	

Figures with numbers in brackets indicate counts and their percentages.
Odds ratios reported only for dichotomous variables: *OR 1.46 (0.99–2.14), $P = 0.042$; ** OR 1.03 (0.34–3.05), $P = 0.95$; ***OR 2.44 (1.57–3.79), $P < 0.001$.
† Mean plus or minus standard deviation (*F* statistic and *T* value computed with ANOVA).

22.8 ± 5.4 *vs.* 24.8 ± 5.80; $P < 0.001$; (*P* value for Bartlett's test for homogeneity of variances 0.125)]. Of the single women, 198 (61.1%) were cases compared to 187 (31.1%) of controls [odds ratio (OR): 3.48 (95% CI: 2.63–4.62); $P < 0.001$). Cases were more likely to be in polygamous marital relationships than controls ($P < 0.001$) and were of lower parity [(2.6 ± 1.8 *vs.* 3.2 ± 2.1); $P < 0.05$]. Compared to controls, cases had a lower level of education, fewer living children (mean) and a shorter interval since the previous pregnancy (mean) ($P < 0.05$). However, there was no significant difference ($P > 0.05$) regarding employment status, spouse's age or number of years in marital relationship. On categorizing education level into primary or less *vs.* secondary or more, cases had lower education [OR: 0.71 (95% CI: 0.54–0.92); $P = 0.01$) compared to controls.

Table 2 shows the association between abortion status and decision-making, pregnancy intention or domicile. Cases and controls did not differ significantly ($P > 0.05$) with regard to domicile (whether rural or urban, whether the family was nuclear or extended, or whether the woman stayed with her in-laws). Cases however differed from controls in all domains of household decision making ($P < 0.05$) except ability to purchase large items (like furniture) without spouse' prior knowledge ($P = 0.087$). Regarding pregnancy intention, cases reported more

Table 2 Pregnancy intention, contraceptive use, decision making and domicile of study subjects in relation to abortion type

Characteristic	Induced abortion *n* (%)	Spontaneous abortion *n* (%)	*P*-value	OR
Place of domicile				
Rural	186 (55.5)	341 (55.9)	0.977	0.99 (0.75–1.3)
Peri-urban or urban	147 (44.5)	268 (44.0)		
Nature of domicile*				
Nuclear	187 (56.1)	345 (56.6)	0.883	0.981 (0.75–1.28)
Extended	146 (43.9)	264 (43.4)		
Stays with in-laws†				
Yes	50 (16.1)	67 (11.5)	0.064	1.48 (0.99–2.19)
No	261 (83.9)	518 (88.5)		
Freedom of movement‡				
Never or rarely	84 (25.2)	244 (40.1)	<0.001	0.05 (0.38–0.68)
Sometimes or always	249 (74.8)	365 (59.9)		
Freedom to attend local council (village) meetings‡				
Never or rarely	83 (58.9)	258 (61.6)	<0.001	0.45 (0.33–0.60)
Sometimes or always	250 (41.1)	351 (38.4)		
Buying small items like food in the home‡				
Never or rarely	33 (9.9)	142 (23.3)	<0.001	0.36 (0.24–0.54)
Sometimes or Always	300 (90.1)	467 (76.7)		
Purchasing large items‡				
Never or rarely	101 (30.3)	306 (50.2)	0.087	0.43 (0.32–0.57)
Sometimes or always	40 (69.7)	113 (49.8)		
Take sick child to hospital‡				
Never or rarely	22 (16.2)	88 (21.2)	<0.001	0.42 (0.25–0.68)
Sometimes or always	114 (83.8)	326 (78.7)		
Seek own care when unwell‡				
Never or rarely	22 (6.6)	88 (14.4)	0.005	0.42 (0.31–0.80)
Sometimes or always	311 (93.4)	521 (86.5)		
Pregnancy timing was right				
Yes	35 (18.9)	317 (68.6)	<0.001	0.11 (0.07–0.17)
No	150 (81.1)	145 (31.4)		
Pregnancy was planned				
Yes	55 (16.5)	416 (68.3)		
No	278 (83.5)	193 (31.7)	<0.001	0.09 (0.06–0.13)
Pregnancy unwanted at conception				
Yes	267 (80.4)	193 (31.7)	<0.001	8.85 (6.33–12.40)
No	65 (19.6)	416 (68.3)		
Ever use of modern contraceptives§	141 (42.3)	254 (41.7)	0.850	1.03 (0.77–1.36)
Ever used EC	17 (20.5)	10 (6.7)	0.002	3.58 (1.44–9.03)
Used modern contraceptives in period three prior to conception§	77 (36.1)	139 (47.6)	0.010	0.62 (0.43–0.89)
Covert contraceptives ever use§	87 (41.4)	154 (52.4)	0.015	0.64 (0.44–0.94)

OR, odds ratio.
* Family structure of participant.
† Participant stays in same household with her in-laws.
‡ Only those married were considered ($n = 560$).
§ All subjects were included; EC, emergency contraceptives.

($P < 0.001$) mistimed, unplanned and unwanted pregnancy, both at time of conception and time of presentation for post-abortion care than controls. Induced abortion was therefore significantly associated with pregnancy intention. There was no significant difference ($P = 0.85$) in ever use of modern contraceptives, but cases reported higher ever use of emergency contraceptives than controls [OR: 3.6 (95% CI: 1.44–9.03); $P = 0.02$], less covert contraceptive

Table 3 The association between domestic violence variables (type, severity and assailant) and type of induced abortion

Characteristic	Type of abortion		OR (95% CI)
	Induced *n* (%)	Spontaneous *n* (%)	
Reported DV during pregnancy			
Yes	165 (49.5)	42 (6.9)	
No	168 (50.5)	567 (93.1)	13.3 (8.9–19.8)
Physical abuse	157 (47.1)	32 (5.3)	16.0 (10.0–24.5)
Sexual abuse	17 (5.1)	4 (0.7)	8.1 (2.8–28.3)
Psychological	103 (30.9)	28 (46.0)	9.3 (5.8–14.9)
Spouse was the perpetrator	102 (30.6)	22 (3.6)	11.7 (7.3–19.4)
Ex-spouse/boyfriend was the perpetrator	72 (21.6)	16 (2.6)	10.2 (5.6–18.7)
Abuse by relatives	15 (4.5)	9 (1.5)	3.1 (1.3–7.5)
Abuse by in-laws	11 (3.3)	14 (34.1)	1.7 (0.7–4.2)
DV events*			
Once	26 (16.1)	14 (34.1)	
2–4 times	68 (42.2)	19 (46.3)	
>4 times	67 (41.6)	8 (19.5)	
Severity of abuse**			
Symbolic or mild	72 (46.5)	20 (62.5)	
Moderate or severe	83 (53.5)	12 (37.5)	0.5 (0.2–1.2)
Weapon ever use			
Stick***	66 (76.7)	18 (90.0)	
Home implement	20 (23.2)	2 (10.0)	0.2 (0.0–1.4)
Reported abuse beyond previous year	133 (41.8)	16 (19.9)	2.9 (2.1–3.9)

DV, domestic violence, OR, odds ratio; CI, confidence interval.
*161 Cases and 41 controls, odds ration not computed (not 2 × 2 table); chi-square for trend 9.78; $P = 0.008$.
** Using Severity of Violence Against Women scale, $P = 0.037$ for trend when scales 1–7 are separately analysed for cases and controls; $P < 0.001$ for analysis of trend symbolic through mild and moderate to severe.
*** 86 cases and 20 controls, $P = 0.063$.

use and less use of modern contraceptives in the 3 months prior to conception.

Stratified analysis

Table 3 shows the association between domestic violence during pregnancy (stratified by type of domestic violence, severity of violence, relationship with assailant) and induced abortion. Cases reported more domestic violence in all domains (physical, sexual or psychological) than controls [OR: 13.3 (8.9–19.8); $P < 0.001$)]. Similar results were obtained using the case definition obtained by direct inquiry alone to diagnose induced abortion [OR: 9.1 (95% CI: 6.4–12.8); $P<001$)]. The perpetrator was more likely to be a spouse or a previously intimate partner (ex-boyfriend or ex-spouse). Compared to controls, cases reported more frequent and more severe violence (according to the Severity of Violence against Women Scale). They also reported more injuries on the abdomen, trunk and head rather than on the extremities ($P < 0.001$) and more lifetime prevalence of domestic violence (physical assault) [OR: 2.90 (95% CI: 2.12–3.97); $P < 0.001$)]. Subjects were asked whether they considered domestic violence a major factor in the woman's decision-making process to terminate pregnancy. Compared to controls, cases reported a higher likelihood of domestic violence influencing the decision [117 (65.3%) *vs.* 10 (2.6%), OR: 71.1 (95% CI: 33.7–154.2); $P < 0.001$].

We tested for effect modification between different exposure factors and domestic violence by analysing whether ORs differed significantly ($P < 0.05$) by stratum of domestic violence (absent or present), which indicates interaction. The null hypothesis for interaction testing is that ORs do not differ by stratum. Table 4 displays crude and adjusted ORs and *P* values for the tests for difference in ORs between pregnancy intention or contraceptive use and induced abortion in strata of any type of domestic violence. There was significant interaction between pregnancy timing, contraceptive use in the 3 months prior to conception or covert contraceptive use and domestic

Table 4 Stratified analyses of marital status, pregnancy intention, contraceptive use and domestic violence use in relation to abortion status

Characteristic	Induced abortion ($n = 333$)		Spontaneous abortion ($n = 609$)		Crude OR (95% CI)	Mantel-Haenszel adjusted OR (95% CI)	Chi-square (and *P*-values) or difference in ORs by stratum
	n (%)	(%) abused	*n* (%)	n (%) abused			
Pregnancy timing appropriate*							
Yes	35 (18.9)	22 (21.0)	317 (68.6)	18 (81.8)	0.11 (0.07–0.16)	0.08 (0.05–0.15)	0.42 (<0.001)
No	150 (81.1)	83 (79.0)	145 (31.4)	4 (18.2)			
Pregnancy planned							
Yes	55 (16.5)	30 (18.2)	416 (68.3)	37 (88.1)	0.09 (0.06–0.13)	0.07 (0.05–0.11)	3.48 (0.062)
No	278 (83.5)	135 (81.8)	193 (31.7)	5 (11.9)			
Pregnancy not wanted at time of conception							
Yes	267 (80.4)	132 (80.0)	193 (31.7)	11 (26.2)	8.85 (6.43–12.20)	9.35 (6.43–13.59)	0.26 (0.608)
No	65 (19.6)	33 (20.0)	416 (68.3)	31 (73.8)			
Pregnancy not wanted at time of presentation							
Yes	115 (34.5)	57 (34.5)	541 (88.8)	40 (95.2)	0.07 (0.05–0.09)	0.06 (0.04–0.09)	1.57 (0.209)
No	218 (65.5)	108 (65.5)	68 (11.2)	2 (4.8)			
Used modern contraceptives in period 3 months prior to conception*							
Yes	77 (36.2)	31 (27.0)	139 (47.6)	130(48.3)	0.62 (0.43–0.89)	0.51(0.34–0.77)	5.52 (0.019)
No	136 (63.8)	84 (73.0)	153 (52.4)	139(51.7)			
Ever use of modern contraceptives							
Yes	141 (42.3)	79 (47.9)	254 (41.7)	16 (38.1)	1.03 (0.78–1.35)	0.92 (0.67–1.26)	2.38 (0.120)
No	192 (57.7)	86 (52.1)	355 (58.3)	42 (61.9)			
History of covert contraceptive use*							
Yes	87 (41.4)	56 (57.7)	154 (52.4)	7 (29.2)	0.64 (0.45–0.92)	0.53 (0.35–0.79)	18.20 (<0.001)
No	123 (58.6)	41 (42.3)	140 (47.6)	17 (70.8)			
Marital status†							
Single	198 (61.1)	88 (56.1)	187 (31.1)	15 (35.7)	3.48 (2.63–4.63)	1.90 (1.63–2.22)	2.49 (0.115)
Married	126 (38.9)	69 (43.9)	415 (68.9)	27 (64.3)			

OR, odds ratio; CI, confidence interval.
* Interaction
† Married include separated and divorced; EC, emergency contraceptives.

violence. These variables were thereafter only considered as interaction terms in the multivariate logistic regression analyses.

Multivariate analysis

Table 5 shows the results of multivariate logistic regression analysis assessing association between different covariates and induced abortion obtained with STATA software. Pregnancy wantedness variables were correlated. A model with pregnancy wantedness at conception gave an OR for domestic violence of 18.4 [(95% CI: 11.4–30.5), $P < \chi^2 = 0.000$; log likelihood (LL): 0–361.77]. When pregnancy wantedness at presentation replaced pregnancy wantedness at conception in the model, the LL stabilized at about −334.98 ($P < \chi^2 = 0.000$); ORs for domestic violence were 18.65 (95% CI: 11.23–30.96). No significant changes occurred with addition of more covariates. This emerged as the best-fit model.

Interaction terms (for domestic violence and pregnancy timing, covert contraceptive use or use of contraception around time of conception) were assessed in a regression model whose LL was −107.7. The ORs for domestic violence as covariate was 42.7 (4.9–376.2) as compared to pregnancy timing OR 0.2 (0.1–0.9); covert contraceptive use 2.8 (95% CI: 0.4–17.9); Contraception within 3 months of conception 1.4 (0.2–9.1). When the interaction terms above were covariates with age, marital status and pregnancy intention in another model, the LL was 90.28. ORs for covariates were: domestic violence 16.59

Table 5 Risk factors for induced abortion in the final logistic regression model

Characteristic	OR	Standard error	95% CI	Z	*P* value (*P* > |z|)
Domestic violence during pregnancy					
Present	18.65	4.823	(11.23–30.96)	11.22	<0.001
Absent	1.00				
Age (years)	0.95	0.017	(0.92-0.98)	−2.88	0.004
Pregnancy was not planned					
Yes	0.17	0.040	(0.10–0.27)	−7.40	<0.001
No	1.00				
Pregnancy not wanted at presentation					
Yes	5.92	1.332	(3.81–9.20)	7.91	<0.001
No	1.00				
Marital status					
Single	1.00	0.115	(0.36–0.82)	−2.89	0.001
Married	0.54				

OR, odds ratio; CI, confidence interval.
LL = −334.98.
Number of obs = 942.
LR Chi (5) = 553.85.
$P < \chi^2 = 0.0000$.
Pseudo $r^2 = 0.4526$.

(1.36–202.56), age 0.95 (0.88–1.02), marital status 0.75 (0.32–1.75), pregnancy planning 0.57 (0.22–1.46) and pregnancy wantedness at presentation 8.77 (3.39–22.69). None of the OR for interaction terms was significant. Thus domestic violence was a risk factor for induced abortion after checking for interaction.

Discussion

This study shows that domestic violence was strongly associated with induced abortion, a relationship which persisted after adjusting for age, marital status, pregnancy intention and contraceptive use. There is an association between severity of domestic violence (severity on the scale described by Marshall (1992), number of events, using weapons or bodily extent of assault) and induced abortion. This association was modified by pregnancy timing, covert contraceptive use and contraception around the time of pregnancy. The ORs obtained are an estimate of the relative risk. If other covariates remain constant, the relative risk for induced abortion decreases with increasing age, while it is lower for married as compared to single women.

Women in abusive relationships may have unintended (mistimed or unwanted) or unplanned pregnancy and may consider pregnancy termination (Fischer *et al.* 1999; Zabin *et al.* 2000). Stanford *et al.* (2000) identified five qualitative dimensions of pregnancy intention. These are pre-conception desire for pregnancy, fertility expectations, preparations for pregnancy, post-conception desire for pregnancy and adaptation to the pregnancy or newborn. Domestic violence increases likelihood that pregnancy is unintended by affecting pre-conception and post-conception desire for pregnancy, pregnancy preparations and adaptations to pregnancy. Poole *et al.* (2000) noted that pregnancy intention is not fixed in any given pregnancy, but may change in a positive or negative direction with progression of pregnancy. Ongoing abuse may shift the direction of pregnancy intention (in survivors) towards negative direction, thereby influencing decision for pregnancy termination.

In agreement with our results, prior research linked domestic violence and pregnancy termination. In a study of women seeking elective pregnancy termination using a single screening interview, Evins and Chescheir (1996) found 31.4% of 51 women had a lifetime history of physical abuse (21.6% in the preceding calendar year). Glander *et al.* (1998), in their study of 486 women seeking outpatient abortion services and using a self-administered questionnaire, found that 192 (39.5%) reported a history of physical abuse. Though abortion may be a direct consequence of physical trauma due to physical assault or an indirect consequence of stress in abusive relationships, women with unplanned or unintended pregnancies who are in abusive relationships may resort to pregnancy termination (Hillard 1985; Amaro *et al.* 1990; Stewart & Cecutti 1993).

The results of this study are in agreement with several others that showed domestic violence influencing pregnancy intention. Boyer and Fine (1992) found that two-thirds of 535 young American women who had an unintended pregnancy during adolescence had been sexually abused in childhood. Campbell *et al.* (1995), in a qualitative study in America, found a connection between relationship abuse and unintended pregnancy explained by partners' control behaviour. One means of this control was ensuring that the woman either does not use contraception or conceives. Gazmararian *et al.* (1995) found that women with unwanted pregnancies had 4.1 times the odds of experiencing physical violence by a spouse or intimate partner during the 12 months prior to delivery compared to women with intended pregnancies. Other researchers in America (Hillard 1985; Amaro *et al.* 1990; Stewart & Cecutti 1993) similarly found that violence in pregnancy was more common when the pregnancy was unplanned.

Qualitative studies on pregnancy intention have shown strong partner influence, both before and after conception (Stanford *et al.* 2000), in definition (Fischer *et al.* 1999) and actual pregnancy wantedness (Zabin *et al.* 2000). Spouses have a major influence on pregnancy intention and on whether an unplanned pregnancy is unwanted. Therefore spouses influence women's decision to keep such pregnancies or to abort (Fischer *et al.* 1999; Zabin *et al.* 2000). Domestic violence may lead to circumstances in which pregnancy is seen as unwanted and so increase likelihood that a given pregnancy is terminated.

Proxy indicators for unmet need for contraception are unintended pregnancy, high levels of knowledge about contraceptive methods with low use rates, induced abortion and covert contraceptive use by women (UDHS 2000/2001). Covert contraceptive use (and non-use of contraception in women who do not desire to conceive) is therefore a proxy indicator of unintended pregnancy if conception occurred. Such unintended pregnancy may be mistimed or unwanted. Domestic violence may exert its influence on pregnancy termination through affecting pregnancy intention before conception or at different stages of pregnancy. This has implications for induced abortion, where a survivor may resort to abortion due to increasing or worsening violence.

The validity of case-control studies depends on accurate definition of cases and controls and extent to which design or analysis controls for important biases, namely selection bias, information bias, confounding and interaction (Breslow & Day 1980). No foolproof criteria exist for abortion status diagnosis (Figa-Talamanca *et al.* 1986; WHO 1998; Alan Guttmacher Institute 2000). Mis-classification of abortion status adversely affects validity. The WHO protocol (Figa-Talamanca *et al.* 1986) attempted to classify abortions in hospitals into induced, probably induced, possibly induced and spontaneous, using pregnancy intention and clinical features of fever and sepsis. This protocol may misclassify some spontaneous abortions as induced. While women are unwilling to confess to induced abortion for fear of negative medical, social, legal or personal consequences (Figa-Talamanca *et al.* 1986; WHO 1998; Rasch *et al.* 2000), it is unlikely that women with spontaneous abortion would report that they induced the abortion (WHO 1998; Alan Guttmacher Institute 2000; Rasch *et al.* 2000).

Direct inquiry in an empathetic setting is reliable in diagnosis of induced abortion (Rasch *et al.* 2000), so it is most likely that all women who admitted to having induced abortion had actually terminated the pregnancy. There is possibility of false denial of having induced abortion leading to misclassification of induced abortion as spontaneous abortion (WHO 1998; Alan Guttmacher Institute 2000; Rasch *et al.* 2000). Using our criteria, it is unlikely that controls were misclassified as cases or *vice versa*, which might occur if clinical criterion alone is used. The most probable misclassification was induced abortion that was falsely diagnosed as spontaneous abortion. If it occurred, its effect would reduce the strength of the association between domestic violence and induced abortion. However, patients with spontaneous abortions who seek post-abortion care either with abortion complication or for other services may not be an ideal control group. This is because spontaneous abortion may follow a prior induced abortion (after injury to the genital tract), leading to a classification bias. Subjects were asked similar questions (irrespective of answers given to previous questions) and had similar examination and records review. Since the research assistants were unaware of the study hypotheses, and interviewed women gave consistent information as evidenced by the Kappa statistic for concordance, it is unlikely that information bias occurred.

Since 85 potential subjects were not included in the analysis, a selection bias may have occurred. Though non-participants did not differ markedly from participants regarding age, residence and complications, no information is available on other study variables. Assuming the worst possible scenario and considering non-participants as cases or controls would not significantly affect the relationship regarding domestic violence or pregnancy intention. For instance, if all non-participants had induced abortion, the true likelihood of domestic violence among cases would be higher. If all were controls, the effect would reduce strength rather than nature of this association. The main limitation of the study is bias resulting from studying only women that sought hospital care, which excluded those who died before reaching hospital,

those with minor (or no) complications or those who sought care elsewhere. It is difficult to speculate how the effect of this on the results.

Conclusion and implications for practice

Among women seeking post-abortion care, domestic violence during pregnancy was significantly associated with induced abortion. Induced abortion is associated with more frequent and more severe domestic violence. Women seeking post-abortion care require screening and counselling for domestic violence. Many such women may be domestic violence survivors, and this may be the only chance to identify them. These women require emotional, psychological and often material support. Where severity of violence is assessed, severely abused women require more pregnancy support to reduce unwanted pregnancy. Survivors of domestic violence with physical abuse need more than treating physical injuries. During pregnancy, they need counselling, support (psychological, support and often material support) to enable them to cope with the violence and the emotional turmoil. They also need counselling regarding decision-making about healthcare or leaving the relationship.

Acknowledgements

Funding for this research came from SIDA/SAREC through Makerere University-Karolinska Institute Research Collaboration. We thank the research assistants (Sarah Kalule, Emilly Nakirijja and Josephine Nabasumba) who assisted in data collection; Michael Mubiru who assisted with data analysis and all the participants in the interviews.

References

American College of Obstetricians and Gynaecologists Technical Bulletin Number 209 (1995) *International Journal of Gynecology and Obstetrics* **51**, 161–170.

Alan Guttmacher Institute (2000) *Sharing Responsibility: Women, Society and Abortion Worldwide*. Alan Guttmacher Institute, New York.

Amaro H, Fried LE, Cabral H *et al.* (1990) Violence during pregnancy and substance abuse. *American Journal of Public Health* **80**, 575–579.

Blanc AK, Wolff B, Gage AJ, Ezeh AC, Neema S & Ssekamatte-Ssebuliba J (1995) *Negotiating Reproductive Outcomes in Uganda*. Macro International and Institute of Statistics and Applied Economics (ISAE), Makerere University, Uganda.

Boyer D & Fine D (1992) Sexual abuse as a factor in adolescent pregnancy and child maltreatment. *Family Planning Perspectives* **24**, 4–11.

Breslow NE & Day NE (1980) *Statistical Methods in Cancer Research*, Vol. 1. The analysis of case-control studies, International Agency for Cancer Research, Lyon.

Campbell JC, Pugh LC, Campbell D & Visscher M (1995) The influence of abuse on pregnancy intention. *Women's Health Issues* **5**, 214–224.

Dietz PM, Spitz AM, Anda RF, Williamson DI, MacMahon PM & Santeli JS (1999) Unintended pregnancy among adult women exposed to abuse or household dysfunction during childhood. *Journal of the American Medical Association* **282**, 1359–1364.

Evins G & Chescheir N (1996) Prevalence of domestic violence among women seeking abortion services. *Women Health Issues* **6**, 204–210.

Figa-Talamanca I, Sinnathuray TA, Yusof K *et al.* (1986) Illegal abortion: an attempt to assess its cost to the health services and its incidence in the community. *International Journal of Health Services* **16**, 375–389.

Fischer RC, Stanford JB, Jameson P & DeWitt MJ (1999) Exploring the concepts of intended, planned and wanted pregnancy. *Journal of Family Practice* **48**, 117–122.

Gazmararian JA, Adams MM, Saltzman LE *et al.* (1995) The relationship between pregnancy intendedness and physical violence in mothers of newborns. *Obstetrics and Gynecology* **85**, 1031–1038.

Glander SS, Moore ML, Micheulette R & Parsons LH (1998) The prevalence of domestic violence among women seeking abortion. *Obstetrics and Gynecology* **91**, 1002–1006.

Henshaw SK (1998) Unintended pregnancy in the United States. *Family Planning Perspectives* 24–30.

Hillard PJ (1985) Physical abuse in pregnancy. *Obstetrics and Gynecology* **66**, 185–190.

Kaye D (2001) Domestic violence among women seeking post-abortion care. *International Journal of Gynecology and Obstetrics* **75**, 523–525.

Koenig M, Lutalo T, Wabwire-Mangen *et al.* (2003) Domestic violence in Rakai, Uganda: evidence from a community based study. *Bulletin of the World Health Organization* **81**, 53–60.

Koenig MA, Lutalo T, Zhao F *et al.* (2004) Coercive sex in rural Uganda; prevalence and risk factors. *Social Science and Medicine* **58**, 787–798.

Marshall LL (1992) Development of Severity of Violence against Women Scale. *Journal of Family Violence* **7**, 103–121.

McFarlane J, Parker B, Soeken K & Bullock LF (1992) Brief report. Assessing for abuse during pregnancy. *Journal of the American Medical Association* **267**, 3176–3178.

Poole VL, Flowers JS, Goldenberg RL, Cliver SP & McNeal S (2000) Changes in intendedness during pregnancy in a high risk multiparous population. *Maternal and Child Health Journal* **4**, 179–182.

Rasch V, Muhammad H, Urassa E & Bergstrom S (2000) Self-reports of induced abortion: an empathetic setting can improve the quality of data. *American Journal of Public Health* **90**, 1141–1144.

Stanford JB, Hobbs R, Jameson P, DeWitt MJ & Fischer RC (2000) Defining dimensions of pregnancy intendedness. *Maternal and Child Health Journal* **4**, 183–189.

Stewart DE & Cecutti A (1993) Physical abuse in pregnancy. *Canadian Medical Association Journal* **149**, 1257–1263.

Uganda Demographic and Health Survey (UDHS) report (2000/2001) *Uganda Bureau of Statistics*. Macro International Inc., Calverton, MD.

WHO/WHD (1997) *Violence Against Women: A Priority Health Issue*. World Health Organization, WHO document WHO/FRH/WHD/97.6, Geneva.

World Health Organization (1998) *Unsafe Abortion: Global and Regional Estimates of Incidence and Mortality due to Unsafe Abortion with Listing of Available Country Data*. World Health Organization, Document WHO/RHT/MSM/97.16, Geneva.

Zabin LS, Huggins GR, Emerson MR & Cullins VE (2000) Partner effects on a woman's intention to conceive: 'not with this partner'. *Family Planning Perspectives* **32**, 39–45.

Corresponding author
Dan K. Kaye, Makerere University Medical School, P.O. Box 7072, Kampala, Uganda. Tel.: +256-41-533451/256-41-534361; Fax: +256-41-533451; E-mail: dankkaye@yahoo.com

La violence domestique comme facteur de risque de grossesse indésirée et avortement provoqué; une étude à l'hôpital de Mulago à Kampala, Ouganda

OBJECTIF Comparer l'intention de grossesse et la violence domestique parmi les femmes présentant un avortement provoqué ou spontané.

MÉTHODES Etude cas-contrôle à l'hôpital de Mulago en Ouganda, de septembre 2003 à juin 2004 sur 942 femmes se présentant pour des soins post-avortement. Entretien direct, analyse de données et examens cliniques identifièrent 333 avortements provoqués (les cas) et 609 avortements spontanés (les contrôles), qui ont été comparés en tenant compte des caractères socio-démographiques, de l'utilisation de contraceptifs, du domicile (rural, urbain, famille nucléaire ou étendue), de l'intention de grossesse, de la prise de décision familiale et de la violence domestique. Les données ont été analysées avec EPI-INFO et STATA, en utilisant le test *t* de Student et ANOVA pour variables continues et, Chi carré pour les variables catégorielles. Les analyses de régression logistique, stratifiées et multivariées, ont été utilisées pour ajuster pour les confusions et interactions avec un intervalle de confience (IC) de 95%.

RÉSULTATS Une différence significative a été trouvée entre les cas et les contrôles quand les cas étaient plus jeunes ou plus souvent célibataires, avaient une plus faible parité et niveau d'éducation, peu de prise de décision familiale et peu d'enfants en vie. Il n'y avait pas différence entre les cas et les contrôles ($P > 0.05$) pour ce qui est de l'emploi, de l'age de l'époux, de la durèe (en nombre d'années) de la relation matrimoniale et du type de domicile. Les cas avaient plus souvent ($P < 0.001$) eu une grossesse au mauvais moment, non-planifiée ou indésirée au moment de la conception et de la présentation. Les cas avaient plus probablement eu une histoire de violence domestique (physique, sexuelle ou psychologique [OR: 18.7 (IC 95%: 11.2–31.0)] après ajustement pour l'age, l'intention de grossesse et le statut marital.

CONCLUSION La violence domestique est un facteur de risque pour grossesse indésirée et pour avortement provoqué chez les femmes se présentant pour des soins post-avortement.

Mots clés violence domestique, soins post-avortement, facteur de risque, avortement provoqué, Ouganda.

La violencia doméstica como factor de riesgo de embarazos no deseados y abortos inducidos en el hospital Mulago, Kampala, Uganda

OBJETIVO Comparar la intención de embarazo y la presencia de violencia doméstica entre mujeres con aborto inducido y espontáneo.

MÉTODO Estudio de casos y controles con 942 mujeres que buscan cuidado post-aborto en el hospital Mulago, Uganda, entre septiembre del 2003 y junio de 2004. Mediante preguntas directas, revisión de registros y examen clínico se identificaron 333 con aborto inducido (casos) y 609 con aborto espontáneo (controles), que fueron comparados con respecto a características socio-demográficas, uso de anticonceptivos, domicilio (rural o urbano, familias nucleares o extendidas), intención de embarazo, poder de decisión en el hogar y violencia doméstica. Los datos fueron analizados con EPI-INFO y STATA, utilizando la prueba T de Student y análisis de varianza para variables continuas y la prueba de Chi-cuadrado para variables categóricas. Para ajustar por factores de confusión e interacciones, se utilizó el análisis estratificado y la regresión logística multivariable.

RESULTADOS Los casos se diferenciaban significativamente de los controles al ser más jóvenes y con mayor frecuencia solteras; tenían una menor paridad, menor educación, menor poder de decisión en el hogar y un menor número de hijos vivos. Fueron similares a los controles ($P > 0.05$) en lo que respecta al empleo, la edad del esposo, años de convivencia marital y domicilio. Los casos tenían más frecuentemente ($P < 0.001$) embarazos inoportunos, no planeados o no deseados en el momento de la concepción o de la presentación. Después de ajustar por edad, intención de embarazo y estado marital, los casos eran más susceptibles de tener una historia reciente de violencia doméstica (física, sexual o psicológica) [OR: 18.8 (95% CI: 11.2–31.0)].

CONCLUSIÓN La violencia doméstica es un factor de riesgo para embarazos no deseados y aborto inducido en mujeres que buscan cuidado post-aborto.

Palabras clave violencia doméstica, cuidado post-aborto, intención de embarazo, factores de riesgo, aborto inducido, Uganda