

# Spousal violence and potentially preventable single and recurrent spontaneous fetal loss in an African setting: cross-sectional study

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## Summary

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**Background** Spousal violence is a global issue, with ramifications for the reproductive health of women. We aimed to investigate the effect of physical, sexual, and emotional violence on potentially preventable single and recurrent spontaneous fetal loss.

**Methods** We analysed data from the Cameroon Demographic Health Survey. In the violence module of this survey, women were questioned about their experience of physical, emotional, and sexual violence inflicted by their spouses. Respondents were also asked about any stillbirths and spontaneous abortions. We measured risk for single and recurrent fetal loss with odds ratios, with adjustment for intracluster correlations as appropriate. We also estimated the proportion of preventable excess fetal loss at various levels of violence reduction.

**Findings** 2562 women responded to the violence module. Those exposed to spousal violence (n=1307) were 50% more likely to experience at least one episode of fetal loss compared with women not exposed to abuse (odds ratio 1.5; 95% CI 1.3–1.8). Recurrent fetal mortality was associated with all forms of spousal violence, but emotional violence had the strongest association (1.7; 1.2–2.3). If the prevalence of spousal abuse could be reduced to 50%, 25%, or entirely eliminated, preventable excess recurrent fetal demise would be 17%, 25%, and 33%, respectively.

**Interpretation** Spousal violence increases the likelihood of single and repeated fetal loss. A large proportion of risk for recurrent fetal mortality is attributable to spousal violence and, therefore, is potentially preventable. Our findings support the idea of routine prenatal screening for spousal violence in the African setting, a region with the highest rate of fetal death in the world.

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## Introduction

Intimate partner violence in sub-Saharan Africa is increasingly recognised as an important public-health issue,<sup>1,2</sup> with about half of African women reporting abuse by their partners.<sup>3</sup> The effects of spousal violence on women's health have been studied, with research showing a link between domestic violence and adverse birth outcomes.<sup>4,5</sup> Findings of a few studies have noted a positive association between exposure to domestic violence and risk of fetal demise.<sup>6</sup> However, very little is known about the effect of spousal violence on fetal loss in sub-Saharan Africa, where the rate of fetal death is the highest in the world.<sup>7</sup>

Building on existing research findings,<sup>4,5</sup> we sought to assess the relation between women's self-report of physical, emotional, and sexual violence at the hand of their spouse and risk for single and repeated spontaneous fetal loss. As far as we know, no study has been done to investigate the effect of spousal violence on recurrent fetal mortality in any country or region of the world. Assessment of this association is important because first occurrence of stillbirth or spontaneous abortion could provide an opportunity to prevent subsequent losses once spousal abuse has been identified as a risk factor.

## Methods

### Data collection

We obtained and analysed data from the 2004 Cameroon Demographic Health Survey (DHS). Although this survey was undertaken in other countries of sub-Saharan Africa, only the 2004 Cameroon DHS differentiated between voluntary (abortions or voluntary terminations of pregnancies) and involuntary (miscarriage and stillbirth) fetal deaths. Hence, our research question (the association between spousal violence and spontaneous fetal loss) could only be addressed by this dataset.

The Cameroon DHS selected a nationally representative population sample in every region of the country and used a two-stage sampling design on the basis of national 2003 census data.<sup>8</sup> Regions were stratified in the DHS by urban or rural status, with sampling probability proportional to the population of the region; then, a fixed number of households were randomly selected for every region. Women of childbearing age (15–49 years) were eligible for interview. Respondents were asked about reproductive and sexual history, knowledge and use of contraception methods, HIV/AIDS knowledge and attitudes, nutritional status, attitudes towards family violence, and birth history.

A total of 11656 women were interviewed for the DHS, of which a cohort was selected alternately for participation in the violence module of the survey. In this module, respondents were asked about their experiences of emotional, physical, and sexual violence. A pre-test was done of the questionnaire to identify errors, lack of clarity within translations, and information gaps. Based on these data, a final version of the violence module questionnaire was prepared, instructions and training for interviewees were revised, and translations into local languages were finalised.

The Cameroon DHS was undertaken with the consent and participation of the Cameroonian Government, local social science specialists, and statisticians, who formed a committee to oversee proper administration of the questionnaire. Trained interviewers speaking the same language as the respondent obtained verbal individual consent; participants understood the objectives of the research, were informed that they did not have to respond to any question they did not feel comfortable answering and that they could stop taking part at any time, and were assured of anonymity because their names were not recorded.<sup>8</sup>

Because of the sensitive nature of the questions, the interview for the domestic violence module was undertaken only when privacy was achieved and maintained throughout the process. Interviewers were trained to build trust with the women and to remain aware of the possibility of future violent acts towards the respondent should privacy be breached during the interview.

Complete descriptions of the Cameroon DHS sampling, questionnaire validation, data collection methods, and data validation procedures are published elsewhere.<sup>8</sup> Our study was approved by the Office of the Institutional Review Board at the University of South Florida.

### Procedures

Respondents were initially asked whether they had ever experienced any violence from their spouse. From detailed questions, violence was categorised into subtypes: (1) physical violence, including instances of pushing or shoving, throwing objects, slapping, arm twisting, punching, hitting with an object, kicking, dragging, attempting to strangle or burn, threatening with a weapon, and attacking with a weapon; (2) emotional violence, referring to verbal or physical public humiliation and verbal threat to the woman or her family; and (3) sexual violence, incorporating being forced to have sex or to undertake sexual acts. In our study, we included all women who responded to the violence module questions by referring to their “husband” or “spouse”.

On the questionnaire, women were asked whether they had ever had a spontaneous abortion (early fetal loss) or a stillbirth (late fetal death) and how many of these pregnancy outcomes they had experienced. Explanations of these terms were provided via the interviewers and

	Women reporting violence (n=1307)	Women not reporting violence (n=1255)	p for trend
Woman's age (years)			0.003
15–19	107 (8%)	159 (13%)	
20–24	289 (22%)	276 (22%)	
25–29	281 (21%)	255 (20%)	
≥30	630 (48%)	565 (45%)	
Woman's education			<0.0001
None	249 (19%)	409 (33%)	
Primary	599 (46%)	478 (38%)	
Secondary and higher	459 (35%)	368 (29%)	
Liveborn parity			<0.0001
0	112 (9%)	204 (16%)	
<5	889 (68%)	780 (62%)	
≥5	306 (23%)	271 (22%)	
Residence			0.3
Urban	594 (45%)	544 (43%)	
Rural	713 (55%)	711 (57%)	
Husband has more than one wife	251 (19%)	253 (20%)	0.09
Husband's age* (years)			0.4
15–19	3 (<1%)	8 (1%)	
20–24	78 (6%)	70 (6%)	
25–29	201 (15%)	202 (16%)	
≥30	910 (70%)	881 (70%)	
Unknown	115 (9%)	94 (7%)	
Husband's education*			<0.0001
None	191 (15%)	337 (27%)	
Primary	475 (36%)	373 (30%)	
Secondary and higher	583 (45%)	479 (38%)	
Unknown	58 (4%)	66 (5%)	
Wealth index			0.03
Poorest	268 (21%)	288 (23%)	
Poorer	243 (19%)	257 (20%)	
Average	287 (22%)	258 (21%)	
Richer	285 (22%)	217 (17%)	
Richest	224 (17%)	235 (19%)	
Religion			<0.0001
Catholic	526 (40%)	414 (33%)	
Protestant	451 (35%)	379 (30%)	
Muslim	176 (13%)	328 (26%)	
Other	154 (12%)	134 (11%)	

Data are number of women (%). \*Husband's age and education level reported by their wives.

**Table 1: Sociodemographic characteristics of study participants**

translators; however, the exact gestational week when the event happened was not shown in the dataset.

In our study, we defined our primary outcome as fetal loss, which encompassed spontaneous in-utero fetal demise irrespective of when it arose. We further subdivided fetal mortality into early (spontaneous abortion) and late (stillbirth). We defined recurrent fetal loss as more than one episode. With this definition, three types of recurrent loss are possible: (1) all stillbirths, (2) all spontaneous abortions, (3) or a combination.

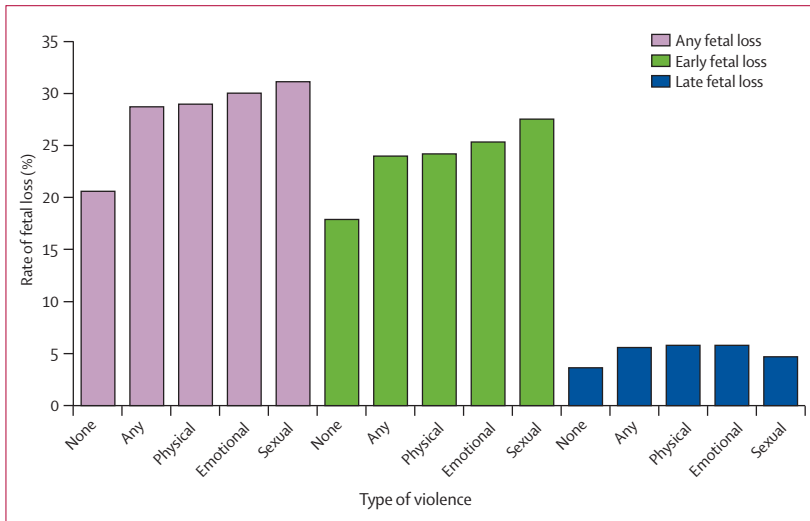


Figure: Experience of spousal violence and rates of early and late fetal loss

We compared women who were victims of spousal violence with those who reportedly were not. We based our comparison on several variables: (1) maternal age (measured in years and classified as 15–19, 20–24, 25–29, and ≥30); (2) liveborn parity, defined as number of children born alive (classified as none, 1–5, and ≥5); (3) age of spouse (measured in years and classified as 15–19, 20–24, 25–29, and ≥30); (4) marriage type (polygamy or monogamy); (5) socioeconomic status, using the wealth index (a composite socioeconomic score that assigns individuals into one of five categories: poorest, poorer, average, richer, and richest); (6) residence (urban or rural); (7) woman’s educational level (none, primary, secondary, and higher); (8) husband’s educational level, as reported by the wife (none, primary, secondary, higher, and unknown); and (9) religion (Catholic, Protestant, Muslim, and other).

**Statistical analysis**

We calculated the proportion of women with experience of fetal loss (early and late) and recurrence of this pregnancy outcome by dividing the total number of events by the total number of women interviewed, and

multiplying by 100. We used the  $\chi^2$  test to measure differences in maternal and paternal sociodemographic characteristics between the two groups (women who reported either violence or no violence). We applied  $\chi^2$  for trend to assess a dose-response relation between exposure and response variables.<sup>9</sup>

We used logistic regression models to generate adjusted odds ratios and 95% CIs. Women with no previous experience of domestic violence were the referent category. We used odds ratios to approximate relative risks.<sup>10,11</sup> Covariates included in our model were: maternal age, liveborn parity, maternal education, marital status, residence, existence of another wife, husband’s education, husband’s age, wealth index, and religion. Since information was obtained from the wife, age and educational level of the husband were missing in some cases.

We analysed data by two strategies. First, we deleted all cases with missing information from further multivariable analyses. Second, we did multiple imputation, in which missing values were replaced with plausible data that represented the uncertainty about the right values to impute.<sup>12,13</sup> Both approaches yielded similar results.

Because the dataset contained women with successive fetal deaths, we estimated regression variables for these pregnancy outcomes by accounting for the presence of intracluster correlation with generalised estimating equations (GEE).<sup>14</sup> The GEE method considers two sources of variance in calculations of effect estimates: intracluster (individual fetal losses to the same mother) and intercluster (between mothers). The model applied was based on the following assumptions: (1) observations were independent between clusters and correlated within clusters; (2) the working correlation was fitted to yield an independent correlation matrix; and (3) robust estimates of SEs were generated with the method of White.<sup>15</sup> We used the GENMOD procedure in SAS version 9.1 (SAS Institute, Cary, NC, USA) to do the GEE analysis.

Since fetal loss recurrence was judged a composite or a single outcome, traditional logistic regression modelling only was applied to generate adjusted estimates. We developed regression models and assessed their goodness-of-fit with the –2 log likelihood ratio test. We estimated significance of main effects with the Wald test and assessed dose-response with  $\chi^2$  test for linear trend.<sup>9</sup> All hypothesis tests were two-tailed with a type 1 error rate fixed at 5%. We used SAS version 9.1 for all analyses.

An important objective was to obtain estimates of potentially preventable single and recurrent fetal losses, assuming a cause-effect relation between spousal violence and fetal demise and supposing availability and application of an intervention that could prevent spousal violence. Three scenarios were assessed for this intervention: (1) it is 100% effective (violence is eliminated); (2) it reduces the level of spousal violence down to 25% of its current rate; and (3) it halves the current level of spousal violence.

	Any fetal loss	Early fetal loss	Late fetal loss
No violence (n=260)	1.0	1.0	1.0
Any type of violence (n=376)	1.5 (1.3–1.8)	1.4 (1.2–1.7)	1.5 (1.1–2.2)
Physical violence (n=287)	1.5 (1.2–1.6)	1.4 (1.1–1.7)	1.5 (1.1–2.3)
Emotional violence (n=237)	1.6 (1.3–2.0)	1.5 (1.2–1.9)	1.5 (1.0–2.3)
Sexual violence (n=119)	1.7 (1.3–2.2)	1.6 (1.2–2.2)	1.3 (0.7–2.3)
One type of violence only (n=170)	1.4 (1.1–1.7)	1.3 (1.0–1.6)	1.4 (0.9–2.2)
Two or more types of violence (n=206)	1.7 (1.4–2.1)	1.6 (1.3–2.0)	1.6 (1.0–2.4)

Data are adjusted odds ratio (95% CI).

**Table 2: Association of spousal violence with early and late fetal loss**

We used the formula  $PF = \frac{OR - 1}{OR} \times 100$ , where PF is preventive fraction and OR is adjusted odds ratio, to derive the preventive fraction.<sup>16,17</sup> This measure provides an estimate of the size of the preventive effect associated with reduction or elimination of a harmful exposure, assuming an effective intervention exists to reduce the exposure. An odds ratio greater than 1 denotes an association between the exposure (in this case, spousal violence) and the harmful effect (fetal loss). An odds ratio of less than 1 denotes a negative association between the exposure and the harm—ie, presence of the exposure is beneficial; in such cases, the inverse of the odds ratio is used to calculate the preventive fraction.<sup>18,19</sup> The adjusted odds ratio used for calculation of the preventive fraction was based on multivariable model estimates.

### Role of the funding source

No external funding was received for this study. APA had full access to all data in the study and had final responsibility for the decision to submit for publication.

### Results

A total of 2562 women completed the general and domestic violence portions of the questionnaire, providing first-hand accounts of pregnancy outcomes and prevalence of violence by their spouse. The response rate was 94.3%. 1307 (51%) women experienced at least one type of violence from their husband or spouse, most typically physical violence (39%), then emotional (31%) and sexual (15%).

Table 1 presents general demographic information. Mean age of respondents was 29.9 years (SD 9.0), and just over half were younger than 30 years. Prevalence of violence increased with age of the woman, but the husband's age had no bearing on whether the wife was exposed to abuse or not. Violence was more likely in educated women than in those with no education. Similarly, wives of men with some education were more likely to have experienced domestic violence than were those of uneducated men. Wealth had an effect on violence, with respondents in the poorer and poorest categories experiencing domestic violence less frequently than their richer counterparts. Of 961 women in the richer and richest groups, 509 (53%) were exposed to spousal violence compared with 511 of 1056 (48%) in the poorer and poorest groups. Differences were noted with respect to religious beliefs between the two groups. Violence did not differ by type of residence or presence of multiple wives.

A quarter (n=636) of respondents had at least one spontaneous abortion (early fetal demise) or a stillbirth (late fetal death), or both. Of these women, 26 had experienced both early and late fetal losses, yielding a total of 662 responses for any type of fetal mortality (541 [82%] early, 121 [18%] late).

The figure shows comparisons of frequency of fetal demise and type of violence. Overall, compared with women not experiencing abuse, those exposed to any

	Any fetal loss	Early fetal loss	Late fetal loss
Any type of violence	33%, 25%, 17%	29%, 22%, 15%	33%, 25%, 17%
Physical violence	33%, 25%, 17%	29%, 22%, 15%	33%, 25%, 17%
Emotional violence	38%, 29%, 19%	33%, 25%, 17%	33%, 25%, 17%
Sexual violence	47%, 35%, 24%	38%, 29%, 19%	23%, 17%, 12%
One type of violence only	29%, 22%, 15%	23%, 17%, 12%	29%, 22%, 15%
Two or more types of violence	47%, 35%, 24%	38%, 29%, 19%	38%, 29%, 19%

Proportions represent reductions in fetal loss at 100%, 75%, and 50% intervention effectiveness.

**Table 3: Preventive fractions at different levels of effectiveness of spousal abuse intervention**

domestic violence had a higher prevalence of any fetal loss (28.8% vs 20.7%;  $p < 0.0001$ ). The association between spousal abuse and fetal mortality remained significant when analysed by type of violence. Further, experience of at least one form of abuse correlated significantly with prevalence of both early ( $p = 0.0002$ ) and late ( $p = 0.02$ ) fetal demise. Women exposed to at least two types of violence had a higher frequency of fetal loss than did those who were victims of only one type of violence (31.5% vs 26.0%, respectively;  $p < 0.0001$ ).

Table 2 provides adjusted estimates for the association between spousal violence and fetal death. A woman could experience more than one specific violence subtype. 170, 145, and 61 women were exposed to one, two, and three types of abuse, respectively. Exposure to any type of spousal violence increased risk for any fetal loss by about 50%. Physical, emotional, and sexual abuse were each independently associated with any fetal death and spontaneous abortions (early fetal demise). Risk for stillbirths (late fetal loss) was also significantly raised after exposure to physical and emotional, but not sexual, spousal abuse.

Table 3 shows proportions of potentially preventable fetal mortality at different levels of intervention effectiveness. For any and early fetal losses, the intervention effect was strongest for women who experienced sexual abuse or at least two types of spousal violence. Those exposed to several violence subtypes also bore the heaviest burden of preventable excess late fetal demise.

	Recurrent fetal loss	Preventive fraction		
		100% effectiveness	75% effectiveness	50% effectiveness
Any type of violence (n=128)	1.5 (1.1-2.0)	33%	25%	17%
Physical violence (n=98)	1.5 (1.1-2.1)	33%	25%	17%
Emotional violence (n=86)	1.7 (1.2-2.3)	47%	35%	24%
Sexual violence (n=37)	1.5 (1.0-2.3)	33%	25%	17%
One type of violence only (n=56)	1.4 (0.9-1.9)	29%	22%	15%
Two or more types of violence (n=72)	1.6 (1.2-2.3)	38%	29%	19%

Data are adjusted odds ratio (95% CI).

**Table 4: Relation between violence, violence subtype, and recurrent fetal loss**

From the entire study sample, 209 (8%) women had recurrent fetal loss. Of these, 81 (39%) did not experience any violence whereas 128 (61%) were exposed to some type of abuse ( $p=0.002$ ). Of these 128 women, 56 (44%) were exposed to one violence subtype, 51 (40%) to two, and 21 (16%) to three. Of respondents not experiencing any violence, 81 (6.5%) had recurrent fetal mortality compared with 128 (9.8%) of those exposed to any type of violence ( $p=0.002$ ). Women who experienced emotional violence had the highest prevalence (11%) of recurrent fetal demise, whereas victims of physical (10%) and sexual (10%) violence had similar frequencies. The association between violence and recurrent fetal loss was significant irrespective of violence subtype ( $p=0.003$  for physical violence,  $p=0.0003$  for emotional abuse, and  $p=0.03$  for sexual violence). Women exposed to at least two types of violence had a higher rate of recurrence of fetal mortality than did their counterparts who experienced one type of violence only (11% vs 9%;  $p=0.002$ ).

Table 4 shows adjusted estimates for the association between violence subtypes and risk for fetal loss recurrence. The likelihood of repeated fetal demise was 50% greater for women who had experienced any type of spousal abuse, and this risk was similar across violence subtypes. Table 4 also provides estimates of the proportion of excess recurrent fetal deaths that are potentially preventable, assuming the current rate of spousal abuse could be eliminated (100% effectiveness) or reduced to 25% or 50% of its current level (75% or 50% effectiveness, respectively). Emotional abuse was associated with the heaviest burden of potentially preventable excess recurrent fetal loss.

## Discussion

Our findings show that Cameroonian women exposed to spousal violence are 50% more likely to experience single or repeated episodes of spontaneous fetal loss. About a third of reported fetal mortality in women exposed to spousal abuse in the studied population was associated with intimate partner violence within the household. To our knowledge, our report is the first to provide quantitatively the level of excess single and repeated episodes of fetal demise that could potentially be prevented, assuming effective interventions could be instituted to reduce the current level of spousal violence against women in this setting.

When we deemed a single episode of fetal loss to be the primary outcome, irrespective of when it arose during pregnancy, the strongest association with spousal violence was noted in victims of sexual abuse. This finding is in line with other research noting a strong association between traumatic sexual experience and negative pregnancy outcomes.<sup>5</sup> Further, sexual violence has a strong effect on fetal demise because of the immediate effect on the woman's psychological wellbeing, manifesting as withdrawal from participation in public

life.<sup>20</sup> This retreat might include not seeking prenatal care, thereby increasing a woman's risk for a negative birth outcome. Our findings have important public-health implications not only for Cameroon but also, potentially, for other African countries, in particular where sexual violence by an intimate partner is generally not judged an issue because of cultural beliefs that a woman belongs to her husband.<sup>21,22</sup>

By contrast, emotional abuse was the subtype of violence that showed the strongest association with repeated episodes of any fetal loss. Psychological factors have been suggested to be potential causes of recurrent miscarriage, but research to prove this idea is scarce.<sup>23</sup> Psychological, mental, or emotional intimate partner violence against women is more difficult to define across cultures since it can take different forms. In many African contexts, emotional abuse, or the belittling and disempowerment of women, is usually seen as a typical part of the culture.<sup>2</sup> Bowman says that "presence of some level of wife abuse as 'discipline' is still an accepted phenomenon in some African communities".<sup>2</sup> However a culture defines or accepts it, emotional violence has been proven to negatively affect the reproductive health of women across the globe.<sup>24</sup> The belief that emotional violence does not exist in the African context,<sup>2</sup> or that "sticks and stones can hurt you but words cannot",<sup>25</sup> indicates an erroneous idea across cultures, which tends to underestimate the invisible scars of emotional and psychological abuse on human beings, women in particular.<sup>25</sup> This notion might explain the chronic effects of emotional abuse and the repeated negative effect it has on women's reproductive health and their birth outcomes, including repeated fetal losses, as we have shown in our study.

An important limitation of the study is our inability to establish a temporal relation between spousal violence and occurrence of fetal loss because of the cross-sectional nature of the data. Reverse causality—ie, fetal demise causing spousal abuse—could have taken place. However, the consistency of our results with those of previous studies on the threat of domestic violence on fetal survival makes reverse causality an unlikely alternative explanation.

Another shortcoming of our study is the paucity of information on actual cause of fetal loss, because documentation was based on maternal self-report. This absence could have masked the contribution of important medical or obstetric causes of isolated and recurrent fetal loss, which might have confounded our results. However, some causes of fetal death (eg, placental abruption, intrauterine growth restriction) might be the pathway by which women who are victims of spousal abuse could lose their fetus, in which case adjustments for these factors would be erroneous.

Other sociocultural confounders could exist that we did not control for and that might affect either intimate partner violence or fetal loss. These variables include absence of

prenatal care, limited access to health care, substance abuse, alcohol abuse, and other risky behaviours.

Findings of previous studies of the association between intimate partner violence and birth outcomes have emphasised the importance of other competing variables and the need to adjust for them to limit threats to validity of study findings.<sup>4,5</sup> A major step in our analysis is our ability to correct for several confounding factors, and a unique feature of this methodological approach is that we account for bias induced by intracluster correlations, for women who experienced more than one outcome (eg, repeated fetal loss).

Several findings of our study seem to contrast with research results on intimate partner violence in developed countries. We noted that experience of violence increased with age and education level of both the wife and the husband, whereas in the USA, abused women tend to be younger, less educated, and more economically disadvantaged.<sup>26,27</sup> These differences could suggest a connection between so-called patriarchal terrorism, characterised by male dominance over women,<sup>28</sup> and type of violence existing in many sub-Saharan African countries, where the husband is seen as the ultimate authority. Education could empower a woman to report her husband's abuse, whereas the less educated individual in this third-world context might not feel at liberty to identify the abuse as violence. The younger women might also be open to admitting to their husband's abuse compared with older women who could be traditional in their thinking. However, these speculations do not fully account for the differences recorded in this study, because the questions posed in the survey did not refer to the term violence but rather to specific acts, without judgment of whether respondents thought they were appropriate. Because of the strict adherence to privacy during interviews, women would have been free to disclose various acts of their spouses.

Although the DHS data files have been used extensively throughout the world to provide useful and informative results for policy purposes, the reported level of stillbirth could represent underestimates.<sup>29</sup> Interpretation of our findings should, therefore, keep this source of bias in mind.

We estimated the size of excess single and recurrent fetal loss that could be averted by reduction of current amounts of spousal violence, assuming various levels of intervention effectiveness. To our knowledge, no previous work has been done on this topic. This additional analysis has important policy implications for reduction of fetal mortality in a continent with a high prevalence of spousal violence<sup>30</sup> and the highest fetal death rate in the world,<sup>8,29</sup> and where screening by health-care workers for possible violence is not done during pregnancy.<sup>7</sup> In fact, demonstration of a significant association between violence against the Cameroonian woman and fetal loss, and the considerable proportion of fetal mortality that could be potentially averted by effective interventions,

provides a strong argument for routine prenatal screening for spousal abuse in Cameroon. Screening for possible violence is equally as important to avert recurrence in women who have experienced fetal demise, since a third of repeated fetal losses in victims of abuse could be potentially averted (assuming causality) by elimination of exposure to spousal violence.

Further research on the sociocultural issues surrounding spousal violence in sub-Saharan Africa is necessary to enlighten intervention and advocacy efforts aimed at empowerment of women and education of men about the negative outcomes of physical, emotional, and sexual violence against women. Observation of such disparities affirms the importance of region-specific research before prevention and screening programmes are planned and implemented in developing countries. Investigation of differences between our findings and those from developed countries is warranted.

#### Contributors

APA had the idea for and designed the study. PNN contributed to the idea for the study. APA and PNN wrote the report. HMS contributed to study design and undertook statistical analyses.

#### Conflict of interest statement

We declare that we have no conflict of interest.

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