



Violence against women is strongly associated with suicide attempts: Evidence from the WHO multi-country study on women's health and domestic violence against women

Karen Devries^{a,*}, Charlotte Watts^a, Mieko Yoshihama^b, Ligia Kiss^a, Lilia Blima Schraiber^c, Negussie Deyessa^d, Lori Heise^a, Julia Durand^c, Jessie Mbwambo^e, Henrica Jansen^f, Yemane Berhane^d, Mary Ellsberg^g, Claudia Garcia-Moreno^f WHO Multi-Country Study Team

^a London School of Hygiene & Tropical Medicine (LSHTM), Public Health and Policy, 36 Gordon Square, London WC1H 0DP, United Kingdom

^b University of Michigan, School of Social Work, United States

^c University of Sao Paulo, Brazil

^d Addis Abbaba University, Ethiopia

^e Muhimbili University of Health and Allied Sciences, Tanzania

^f World Health Organisation, Switzerland

^g International Centre for Research on Women, United States

ARTICLE INFO

Article history:

Available online 26 May 2011

Keywords:

Intimate partner violence
Sexual violence
Childhood sexual abuse
Suicidal behaviour
Women
Gender
Developing countries

ABSTRACT

Suicidal behaviours are one of the most important contributors to the global burden of disease among women, but little is known about prevalence and modifiable risk factors in low and middle income countries. We use data from the WHO multi-country study on women's health and domestic violence against women to examine the prevalence of suicidal thoughts and attempts, and relationships between suicide attempts and mental health status, child sexual abuse, partner violence and other variables. Population representative cross-sectional household surveys were conducted from 2000–2003 in 13 provincial (more rural) and city (urban) sites in Brazil, Ethiopia, Japan, Namibia, Peru, Samoa, Serbia, Thailand and Tanzania. 20967 women aged 15–49 years participated. Prevalence of lifetime suicide attempts, lifetime suicidal thoughts, and suicidal thoughts in the past four weeks were calculated, and multivariate logistic regression models were fit to examine factors associated with suicide attempts in each site. Prevalence of lifetime suicide attempts ranged from 0.8% (Tanzania) to 12.0% (Peru city); lifetime thoughts of suicide from 7.2% (Tanzania province) to 29.0% (Peru province), and thoughts in the past four weeks from 1.9% (Serbia) to 13.6% (Peru province). 25–50% of women with suicidal thoughts in the past four weeks had also visited a health worker in that time. The most consistent risk factors for suicide attempts after adjusting for probable common mental health disorders were: intimate partner violence, non-partner physical violence, ever being divorced, separated or widowed, childhood sexual abuse and having a mother who had experienced intimate partner violence. Mental health policies and services must recognise the consistent relationship between violence and suicidality in women in low and middle income countries. Training health sector workers to recognize and respond to the consequences of violence may substantially reduce the health burden associated with suicidal behaviour.

© 2011 Elsevier Ltd. All rights reserved.

Introduction

Durkheim, the original suicide theorist, famously postulated in the 1800s that women were less prone to suicide because they were inclined to reside in the protective domestic sphere and did not trifle in worldly affairs (Kushner & Sterk, 2005). Although

subsequent research has challenged Durkheim's thesis (Canetto & Lester, 1998; Girard, 1993; Kushner & Sterk, 2005; Stark & Flitcraft, 1979,1995), suicidal behaviour among women has received relatively limited attention as a public health concern.

Globally, men are more likely to complete suicide than women, although there is substantial regional variation. In North America and Europe, approximately 3.9 men die from suicide for every one woman, whereas in Asia, sex ratios are more similar at about 1.1 men for every woman (World Health Organization, 2004). In China, women are more likely to complete suicide than men (Phillips, Li, &

* Corresponding author. Tel.: +44 2079588164.

E-mail address: karen.devries@lshtm.ac.uk (K. Devries).

Zhang, 2002). In contrast, in many settings non-fatal suicidal behaviours are more common among women than men (Beautrais, 2006; Bernal et al., 2007; Bertolote et al., 2005; Nock et al., 2008), but historically have received less attention than fatalities. Indeed, when both mortality and disability are taken into account, the extent of the health burden of suicidality among women becomes clear. Intentional self-inflicted injuries were the 4th leading cause of death and 7th leading cause of DALYS for women aged 15–44 globally in 2005, ranking higher than well-recognised public health issues such as road traffic crashes and hearing loss (Ribeiro, Jacobsen, Mathers, & Garcia-Moreno, 2008).

Despite this substantial health burden, little is known about the extent of suicidal behaviour and potentially modifiable risk factors in low and middle income settings (Vijayakumar, John, Pirkis, & Whiteford, 2005). Several recent international studies, including the world mental health surveys (Borges et al., 2007; Gureje, Kola, Uwakwe, Wakil, & Afolabi, 2007; Joe, Stein, Seedat, Herman, & Williams, 2008; Nock et al., 2008), WHO Suicide PREvention Multisite Intervention Study on Suicidal behaviours (SUPRE-MISS) (Bertolote et al., 2005; Tran Thi Thanh, Nam Tran, Jiang, Leenaars, & Wasserman, 2006), along with various in-country secondary school-based adolescent health surveys (Blum et al., 2003; Muula, Kazembe, Rudatsikira, & Siziya, 2007; Rudatsikira, Muula, & Siziya, 2007; Rudatsikira, Muula, Siziya, & Twa–Twa, 2007) and other studies (Agoub, Moussaoui, & Kadri, 2006; Alem, Kebede, Jacobsson, & Kullgren, 2007b; Kebede & Alem, 2007), have found the reported prevalence of attempted suicide among women and girls to be approximately 1–8%. Unfortunately, most of these studies report only on the role of socio-demographic characteristics and/or mental disorders as risk factors for suicidal behaviour (Bertolote et al., 2005; Nock et al., 2008). Although there is evidence from North America and Europe, and recently from India, confirming that adverse childhood experiences (Dube, Anda, Felitti, Chapman, Williamson, & Giles, 2001; Fergusson, Boden, & Horwood, 2008) and partner violence (Ellsberg, Jansen, Heise, Watts, & Garcia-Moreno, 2008) are associated with suicidal behaviour, only a limited number of studies from low and middle income countries have explored the role of these risk factors (Ahmed, van Ginneken, Razzaque, & Alam, 2004; Alem, Kebede et al., 2007b; Blum et al., 2003; Borges et al., 2008; Maselko &

Patel, 2008; Naved & Akhtar, 2008; Pillai, Andrews, & Patel, 2008; Vizcarra et al., 2004). Early exposure to violence and/or trauma may increase subsequent feelings of depression and affect ability to cope with life stressors, and thus be related to suicidal outcomes (Brodsky & Stanley, 2008; Fergusson et al., 2008). Similarly, there is discussion in the literature about the role of having a dowry/bride price, control over choosing one's husband, and being childless in marriage in increasing suicide risk, but evidence only from a handful of studies, mainly in Asian settings (Ahmed et al., 2004; Kumar, 2003; Yusuf, Akhter, Rahman, Chowdhury, & Rochat, 2000). Each of these factors may result in poor mental health status directly, but also may be associated with restricted autonomy and loss of control, which can then in turn cause poor mental health status (Canetto & Lester, 1998). Having increased autonomy and social support available may buffer associations between poor mental health status with violence and gender norm variables by mitigating feelings of isolation and hopelessness (for example, De Silva, Huttly, Harpham & Kenward, 2007).

We hypothesized that early childhood and adult experiences of violence, more conservative gender norms and poor adult mental health status would predict increased levels of suicidal outcomes (Fig. 1). This paper uses data from the WHO multi-country study on women's health and domestic violence against women, which included 20967 women from 9 mainly low and middle income countries. We describe prevalence of suicide outcomes, and assess common and consistent predictors of reported suicide attempts across settings.

Methods

The study methods have been described in detail elsewhere (Garcia-Moreno, Jansen, Heise, & Watts, 2005). Briefly, representative population-based surveys of women aged 15–49 years (aged 18–49 in Japan) were conducted between 2000–2003. In four countries, study sites were more rural ('province') and urban ('city') locations: Zona da Mata de Pernambuco and Sao Paulo, Brazil; Cusco and Lima, Peru; Nakhonsawan and Bangkok, Thailand; Mbeya and Dar es Salaam, Tanzania. In five countries the survey was conducted in one site (Butajira, Ethiopia; Yokohama, Japan; Windhoek, Namibia; Belgrade, Serbia), and in Samoa the sample

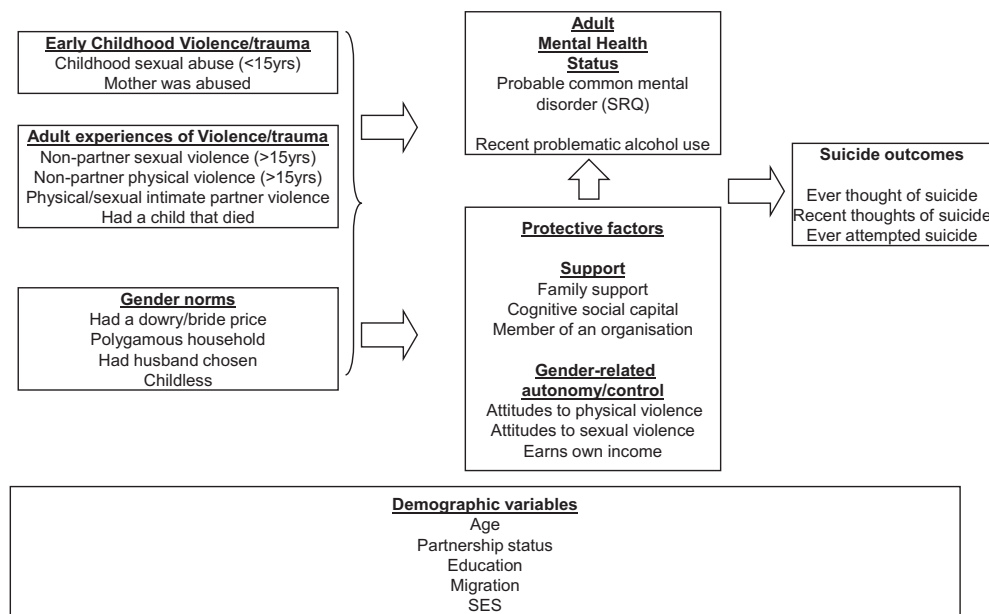


Fig. 1. Demographic variables. Age, partnership status, education, migration, SES.

was national. Individual response rates ranged from 60.2% in Japan to 99.7% in Samoa, with 10 of the 13 sites reporting response rates above 90%. In each setting, female interviewers received extensive training to ensure respondents' privacy and safety. Informed consent was obtained from all women prior to their participation, and a standardised questionnaire was used to ask women direct questions about their experiences of various forms of violence, suicidal thoughts and attempts, and other health and socio-demographic information. Ethical approvals were obtained from WHO's ethical review group, local institutions and national ethical review boards where necessary.

Three suicidal outcomes were included in this analysis: suicidal thoughts in the past four weeks, ever thinking about suicide, and ever attempting suicide (asked of those who had ever thought about it). In Ethiopia, data on lifetime thoughts and attempts were not available for analysis. Each was measured using a binary variable.

Fig. 1 shows a conceptual model for this analysis, outlining how a range of factors measured in the survey may be associated with suicidality among women. Table 1 outlines how these variables were measured. Physical and sexual intimate partner violence were not modelled as separate variables because they were moderately to highly correlated in most sites ($r = 0.4–0.6$). Psychological partner violence against women was not included here because it was also highly correlated with physical and sexual violence in our dataset, and because research on measuring this type of violence is at an early stage and methodological issues remain (Yoshihama, Horrocks, & Kamano, 2009).

The SRQ-20, developed by WHO as a screening tool to identify probable common mental disorders, assesses symptoms in the past four weeks and has been used in a wide variety of settings (Beusenberg & Orley, 1994). The scale contains an item on suicidal thoughts, which was removed for the purposes of this analysis and considered separately as an outcome. The Cronbach's alpha of the

Table 1
Measurement of exposure variables.

Variable	Measurement
Age	Continuous: Age, in years.
Partnership status	3 categories: Never-partnered; ever-partnered but never divorced, separated or widowed; ever divorced, separated or widowed (including separation from cohabiting relationships).
Educational attainment	3 categories: Incomplete primary; Complete primary but incomplete secondary, complete secondary.
Migration	5 categories: Lived in same place whole life, returned to place where grew up, migrated from a city to the country (or the country to the city), migrated from another urban (province) region.
Socio-economic status	3 categories: Scores on a wealth index derived using principal components analysis, divided into tertiles within each site (this SES measure not available for Japan, Samoa).
Mother experienced intimate partner violence	2 categories: Mother had experienced intimate partner violence; versus not.
Childhood sexual abuse	2 categories: When aged under 15 years, anyone had ever touched her sexually or made her do anything sexual that she did not want to do, or if her first sexual experience was under age 15 and was either forced or she had sex but did not want to; versus neither of the above.
Non-partner sexual violence	2 categories: When aged 15 years or over, ever being forced to perform a sexual act by someone other than an intimate partner; versus never.
Non-partner physical violence	2 categories: When aged 15 year or over, ever being beaten or physically mistreated by someone other than an intimate partner; versus never.
Intimate partner violence	2 categories: Ever experiencing physical and/or sexual violence by an intimate partner over the age of 15 years; versus never. Physical partner violence was measured with questions about specific acts (least severe being ever slapped, kicked punched; most severe, having a gun, knife or other weapon used on you), and sexual partner violence was defined as having to perform a sexual act that you did not want to because you were physically forced, because you were afraid of what he might do, or that you found humiliating or degrading.
Child died	2 categories: Ever had a child that was born alive but later died; versus never.
Had husband chosen	2 categories: Having your husband chosen for you either by your/his family or having him choose you; versus choosing your husband or jointly deciding.
Dowry/bride price	2 categories: Had a dowry/bride price paid, versus not (assessed only in Namibia, Thailand and Tanzania).
Polygamy	2 categories: Being in a polygamous marriage; versus not (assessed only in Namibia and Tanzania).
Childless	2 categories: Ever-partnered but never had a child; versus had a child.
Probable common mental disorder	2 categories: Probable common mental disorder (being above validated cut-point or in top 30% of score distribution in sites with no validated cut-point); versus not (being below validated cut-point or in bottom 70% of distribution).
Problematic alcohol use	2 categories: Having any of the following problems related to drinking in the past year: money problems, health problems, conflict with family or friends, problems with authorities, or any other problems; versus none of the problems listed.
Family support	2 categories: Could count on family members for support; versus not.
Member of organization	2 categories: Attends any group or organization; versus not.
Cognitive social capital	2 categories: Answered yes to all of: if people in the community: knew each other well, if there was a streetfight that someone would stop it, if people would contribute time, labour or money to a community project, that people would trust each other in matters of lending or borrowing things, that if someone in their family fell ill or had an accident, that neighbours would offer to help; versus not.
Attitudes to physical violence by partner	2 categories: Scored as 'accepting' if women endorsed any of 8 situations where physical intimate partner violence was acceptable; versus 'not accepting' if no situations were endorsed.
Attitudes to sexual refusal of sex in marriage	2 categories: Scored as 'cannot always refuse' if women endorsed any of 4 situations where they thought married women did not have the right to refuse sex with their husbands; versus 'can refuse' if no situations were endorsed.
Earning own income	2 categories: Woman earned own income; versus not.
Visiting health worker	2 categories: In the past four weeks, visiting a doctor, nurse, midwife, counsellor, pharmacist, traditional healer, traditional birth attendant or other person because you were sick; versus not.

measure minus the suicide question ranged from 0.76 to 0.84 across sites. The SRQ was modelled as a binary variable in each site, with site-specific cut-points (minus one because the suicide question was removed) used where they existed (6/7 in Brazil city, 4/5 in Brazil province, 6/7 in Peru) (Beusenberg & Orley, 1994; De Silva, Huttly, Harpham, & Kenward, 2007) to classify women as having a probable common mental disorder or not (this classified roughly 30% of women as having a probable common mental disorder across sites). In sites with no validated cut-point, women scoring in the top 30% of the distribution within that site were classified as having a probable common mental disorder.

All analyses were conducted separately by study site using STATA 10.0. Clustering of outcomes in each site was 'small' (Hox, 2002) (all intra-class correlation coefficients less than 0.06); hence we present results unadjusted for clustering. Percentage of the total population of women reporting each suicidal outcome was calculated, as well as the percentage of women who had attempted suicide of those who had ever thought about it, and the percentage of those who had suicidal thoughts in the past four weeks who had also seen a health worker during that time.

The distribution of each exposure variable in our conceptual model was examined, and unadjusted relationships with each suicide outcome were assessed using χ^2 or *t*-tests. Correlations between exposure variables were low to moderate. We selected variables that were related to suicide outcomes in most sites in unadjusted analyses for inclusion in our core multivariate model. We examined interactions between selected childhood and adult violence variables that we hypothesised might be relevant (for example, childhood sexual abuse and partner violence), but they were not significant. We then fit our core multivariate logistic regression model to predict suicide attempts for each site, except where numbers of reported suicide attempts were less than 50 women (Japan city, Serbia city, Tanzania province and city). We also conducted a mediation analysis to test if relationships between each block of variables supported our conceptual model. Data were missing from less than 5% of respondents for most variables, and women with missing data were excluded from analyses with that variable.

Results

A detailed description of the demographic characteristics of the women interviewed is published elsewhere (Ellsberg et al., 2008; Garcia-Moreno et al., 2005). The percentage of women who had ever been in an intimate partnership ranged from 68.5% in Thailand city to 93.9% in Japan city. The most common form of violence reported in most sites was intimate partner violence (70.9% in Ethiopia province to 15.4% in Japan city of ever-partnered women, with 9 of 13 sites above 40%). Non-partner sexual violence was the least common (less than 1% in Ethiopia province to 15.1% in Peru province, with five of 13 sites above 10%), while non-partner physical violence for most sites varied from 4.9% (Japan city) to 32.0% (Peru province), with nine of 13 sites above 10%. In Samoa, nearly twice as many women (62.0%) reported non-partner physical violence relative to the next highest site (Peru province). Childhood sexual abuse ranged from 1.6% in Serbia city to 19.5% in Peru city. The proportion of women classified as having a probable common mental disorder ranged from 30.4% in Tanzania city to 63.0% in Peru province.

The prevalence of reported lifetime suicide attempts ranged from 0.8% of women in Tanzania province and city sites to 12.0% in Peru city (Fig. 2). Exact prevalence and 95% confidence intervals are attached as a supplemental file (Appendix 1). The prevalence of lifetime suicidal thoughts ranged from 7.2% in Tanzania city to 29.0% in Peru province. The percentage of women who reported having suicidal thoughts in the past 4 weeks ranged from 2.1% in Japan city to 13.6% in Peru province. Among those who had ever thought about suicide, the percentage of those who had ever attempted suicide ranged from 9.4% in Tanzania province to 41.6% in Peru city. The percentage of women with suicidal thoughts in the past four weeks who had also seen a health care worker in the past four weeks ranged from 25.0% in Thailand city to 50.0% in Japan city.

Unadjusted analyses indicated that socio-economic status, migration, attitudes towards physical violence, attitudes towards sexual refusal, earning income, having a husband chosen, being childless in an intimate partnership and having a dowry/bride price were not consistently associated with increased likelihood of

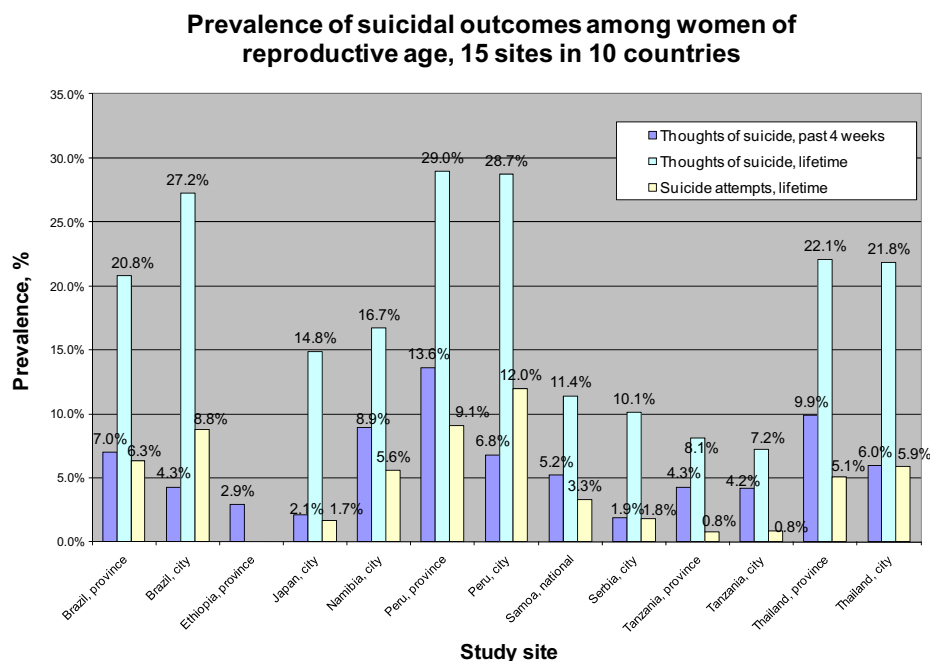


Fig. 2. Prevalence of suicidal outcomes among women of reproductive age, 15 sites in 10 countries.

suicide outcomes across sites (data not shown). These variables were excluded from multivariate modelling.

Adjusted models of relationships between exposure variables and suicide attempts are shown in Table 2. In most sites, lower educational attainment was not associated with increased odds of suicide attempts once other variables were taken into account, whereas younger age was still significant in about half of the sites. Ever being divorced/widowed/separated was related to increased likelihood of suicide attempts independent of other factors. Having a probable common mental disorder was significantly associated with suicide attempts in every site, as were experience of intimate partner violence and non-partner physical violence in nearly every site. Non-partner sexual violence was generally not associated with suicide attempts in adjusted models, although it was strongly predictive in unadjusted models. Childhood sexual abuse and having a mother who had experienced intimate partner violence also increased the odds of suicide attempts in several sites after other variables were accounted for. Being in a polygamous marriage, although generally significant in unadjusted analyses, was not in adjusted analyses. Protective factors, including family support, cognitive social capital, and being a member of a community organisation were not independently related to decreased odds of suicide attempts in most sites.

Our mediation analysis (data not shown) indicated that childhood and adult experiences of violence were associated with suicide attempts partially via mental health status and mainly independently of that. Interestingly, in several sites where there was a high prevalence of intimate partner violence, it appeared that women who were ever-partnered were more likely to report suicidality relative to never-partnered women. This association

disappeared once intimate partner violence was taken into account. Ever being divorced/separated/widowed was also independently related to suicide attempts, although this relationship tended to be partially attenuated with the addition of adult experiences of violence to models in each site.

Discussion

These findings provide new information on the prevalence of suicidality among women and demonstrate a strong association with experiences of violence. There was a 15-fold variation in the prevalence of suicide attempts across sites, 4-fold variation in lifetime suicidal thoughts and a 7-fold variation in recent suicidal thoughts. These findings are consistent with SUPRE-MISS, which documented a 10–14-fold variation in rates of suicidal ideations and attempts in men and women (Bertolote et al., 2005). Generally, there appeared to be lower prevalence in African sites and higher prevalence in South American sites we surveyed.

Strengths and limitations

This study made use of a standardized methodology, a larger sample of women relative to other multi-country surveys (Bertolote et al., 2005), and included reliable and valid self-reported measures of a range of violence and other exposures (Garcia-Moreno et al., 2005; Garcia-Moreno, Jansen, Ellsberg, Heise, & Watts, 2006). By surveying women directly with highly trained interviewers, the study was able to document exposures to hidden, sensitive issues that are unlikely to be detected in psychological autopsy studies. Questions about suicidal thoughts and attempts were asked prior to

Table 2
Relationship of selected exposures with suicidal attempts among women.

	Brazil, province		Brazil, city		Namibia, city		Samoa, National	
	n = 1406		n = 1136		n = 1261		n = 1438	
	AOR	95%CI	AOR	95%CI	AOR	95%CI	AOR	95%CI
Never-partnered ^a	1.24	(0.51, 3.02)	0.80	(0.39, 1.64)	0.54	(0.14, 2.02)	0.40	(0.16, 1.02)
Ever divorced/separated/widowed ^a	1.80	(1.05, 3.09)	1.05	(0.60, 1.85)	1.96	(1.11, 3.48)	1.16	(0.49, 2.74)
Childhood sexual abuse/forced sex ^b	1.58	(0.86, 2.90)	1.72	(0.95, 3.10)	1.29	(0.54, 3.04)	2.79	(0.84, 9.29)
Mother abused by intimate partner ^c	1.53	(0.93, 2.54)	1.18	(0.72, 1.93)	2.14	(1.24, 3.70)	1.51	(0.81, 2.82)
Alcohol problems, past year ^d	2.55	(1.16, 5.59)	1.91	(0.87, 4.19)	1.68	(0.81, 3.49)	1.51	(0.18, 12.63)
Probable common mental disorder ^e	5.22	(2.78, 9.81)	2.67	(1.66, 4.29)	3.55	(2.05, 6.15)	2.29	(1.23, 4.26)
Non-partner sexual violence ^f	0.79	(0.34, 1.81)	1.34	(0.66, 2.69)	1.10	(0.48, 2.50)	1.61	(0.76, 3.42)
Non-partner physical violence ^g	1.81	(1.02, 3.23)	1.75	(1.08, 2.85)	2.07	(1.13, 3.77)	2.05	(0.96, 4.40)
Intimate partner violence ^h	2.22	(1.26, 3.90)	2.29	(1.37, 3.85)	1.57	(0.88, 2.80)	1.82	(0.88, 3.72)
Family support ⁱ	0.73	(0.42, 1.25)	0.45	(0.27, 0.76)	0.67	(0.35, 1.30)	0.76	(0.28, 2.06)
High cognitive social capital ^j	0.58	(0.35, 0.97)	1.10	(0.66, 1.82)	1.24	(0.72, 2.14)	0.67	(0.36, 1.23)
Member of a community organization ^k	0.93	(0.51, 1.70)	0.96	(0.56, 1.66)	0.32	(0.17, 0.60)	0.43	(0.23, 0.84)
Polygamous marriage ^l	not asked		not asked		1.51	(0.84, 2.70)	not asked	
	Peru, province		Peru, city		Thailand, province		Thailand, city	
	n = 1645		n = 1272		n = 1140		n = 1379	
	AOR	95%CI	AOR	95%CI	AOR	95%CI	AOR	95%CI
Never-partnered ^a	1.67	(0.80, 3.49)	1.53	(0.77, 3.05)	0.56	(0.16, 1.88)	0.24	(0.08, 0.77)
Ever divorced/separated/widowed ^a	2.36	(1.54, 3.60)	2.59	(1.64, 4.07)	2.90	(1.62, 5.21)	2.85	(1.61, 5.03)
Childhood sexual abuse/forced sex ^b	1.89	(1.21, 2.94)	2.16	(1.42, 3.27)	1.07	(0.40, 2.90)	1.82	(0.87, 3.82)
Mother abused by intimate partner ^c	1.47	(0.99, 2.18)	1.47	(0.98, 2.20)	1.18	(0.66, 2.09)	2.16	(1.28, 3.63)
Alcohol problems, past year ^d	2.04	(1.37, 3.05)	1.49	(0.88, 2.55)	1.70	(0.87, 3.34)	1.52	(0.69, 3.38)
Probable common mental disorder ^e	2.91	(1.77, 4.78)	3.79	(2.34, 6.12)	1.79	(1.00, 3.21)	2.56	(1.46, 4.50)
Non-partner sexual violence ^f	1.01	(0.65, 1.59)	1.00	(0.58, 1.70)	0.45	(0.10, 2.07)	0.95	(0.41, 2.18)
Non-partner physical violence ^g	1.50	(1.04, 2.17)	1.60	(1.06, 2.40)	1.06	(0.43, 2.58)	2.25	(1.11, 4.56)
Intimate partner violence ^h	2.59	(1.45, 4.62)	2.99	(1.77, 5.04)	2.16	(1.15, 4.06)	2.30	(1.29, 4.10)
Family support ⁱ	0.73	(0.49, 1.10)	0.68	(0.42, 1.09)	0.79	(0.30, 2.06)	0.65	(0.30, 1.40)
High cognitive social capital ^j	0.92	(0.62, 1.37)	0.85	(0.54, 1.34)	0.73	(0.41, 1.30)	1.09	(0.65, 1.83)
Member of a community organization ^k	0.79	(0.54, 1.17)	1.96	(1.31, 2.93)	0.88	(0.43, 1.83)	1.34	(0.60, 3.00)

AOR's are adjusted for all other variables in model, as well as age and educational level. Reference categories are represented by superscript alphabets.:^a one lifetime partner, ^b: never abused, ^c: mother never abused by intimate partner, ^d: no alcohol problems in past year, ^e: no probable common mental disorder, ^f: never experienced nonpartner sexual violence, ^g: never experienced non-partner physical violence, ^h: never experienced intimate partner violence, ⁱ: low family support, ^j: low cognitive social capital, ^k: not member of organization, ^l: not currently in polygamous marriage.

asking respondents about their experiences of abuse/violence. This question order helped ensure that answers to questions about suicide would not be influenced by disclosure of violence experiences. Obviously, those who have completed suicide are excluded, and it is possible that such women have different risk factors than those considered in our analysis. We may have underestimated the number of women who attempted suicide because questions on attempted suicide were asked only of those women who reported ever thinking about suicide. We could not control for potential confounders not measured in the survey (for example, more severe psychiatric diagnoses (Tidemalm, Langstrom, Lichtenstein, & Runeson, 2008), religious affiliation (Vijayakumar et al., 2005), and chronic physical illness (Maselko & Patel, 2008)), and cannot draw definitive conclusions about causality because of the cross-sectional nature of the data. Our own additional analyses suggest that relationship between exposures and suicidal thoughts in the past 4 weeks are similar to those with ever attempting suicide (data not shown). We also had limited statistical power to detect differences in some sites where case numbers were low. Our analytical approach was to fit a universal model across all sites, rather than to fit site-specific models. Further investigations which fit site-specific models and included culturally specific risk and protective factors would yield further insight into the factors which affect suicide risk in diverse contexts and would be useful to inform local adaptations to programming and policy.

Our findings in relation to other studies

Cultural meanings and acceptability of suicidal behaviour vary across settings, and suicidal behaviours are often highly stigmatized (Alem, Jacobsson, Kebede, & Kullgren, 2007a; Bertolote et al., 2005). Observed differences in prevalence may result in part from variations in women's willingness to disclose—in rural Ethiopia, a qualitative study showed residents felt that those who committed suicide were condemned sinners, should be feared, and were cruel (Alem, Jacobsson et al., 2007a). Differences in prevalence may also result from higher levels of premature mortality in some settings; for example, in Ethiopia, major depression (which independently predicts suicide attempts) is strongly associated with increased *all-cause* mortality (Mogga, Prince, Alem, Kebede, Stewart, Glozier et al., 2006). Our sample from rural Peru, which had the highest documented prevalences in our study, included a large number of indigenous women. Indigenous populations are at increased risk for suicidal behaviours and a variety of other ill-health outcomes, linked with historical and current experiences of colonialism and historical trauma (Walters & Simoni, 2002). There are also other macro-level factors that may influence the wide variation in suicidality seen across study sites. Pampel suggests that changes in women's roles and more female labour force participation may produce higher female suicide rates due to increased exposure to stressors from various sources (Pampel, 1998). Based on data from 18 high income countries, he postulates that 'individualist' countries where women's movements emphasise individual rights to equal opportunities may initially produce higher suicide rates for women, and that 'collectivist' countries where women's movements emphasise making family and work roles more compatible will have lower suicide levels (Pampel, 1998). In another analysis of data from 19 western countries, lower levels of religious beliefs at the country level were associated with higher female suicide rates (Neeleman, Halperin, Leon, & Lewis, 1997).

In accordance with our hypotheses, our findings confirm the important and consistent relationship between women's suicide attempts and violence across a range of low and middle income countries. Longitudinal studies in high income settings have also found strong relationships between childhood sexual abuse and

subsequent suicidal behaviour in both men and women (Dube et al., 2001; Fergusson et al., 2008), and in the 2004 comparative risk assessment of the global burden of disease study, child sexual abuse was estimated to account for 11% of all suicide attempts in women (Andrews, Corry, Slade, Issakidis, & Swanston, 2004, chap. 23). Non-partner physical violence against adult women and its relationship with suicidality has not been widely discussed in the literature and is absent from reviews of suicide risk factors in developing countries (Khan, 2005; Vijayakumar et al., 2005), although there is some evidence on the role of physical abuse by family members in suicides in Asian settings (Ahmed et al., 2004; Kumar, 2003). This form of violence was perpetrated mainly by male family members in our study, and merits exploration in other settings. Physical, sexual and emotional partner violence were too highly correlated to model separately in our study—it would be interesting to examine the specific risk conferred by different forms of partner violence, and the severity of violence, in future research (Yoshihama et al., 2009). The work of Joiner (Joiner, Sachs-Ericsson, Wingate, Brown, Anestis, & Selby, 2007) suggests that physical violence and physically violent sexual assault may be more strongly associated with suicide than sexual molestation. He hypothesises that habituation to physical pain is a necessary precursor to future suicide attempts (Joiner et al., 2007). In our dataset, non-partner physical violence better predicted suicide attempts versus non-partner sexual violence in some sites (although physical and/or sexual intimate partner violence generally remains a stronger predictor).

Mental health variables were strongly predictive of suicide attempts, consistent with previous work (Nock et al., 2008) and with our hypotheses. Similar to Maselko and Patel's recent prospective study of married Indian women (Maselko & Patel, 2008), we noted that violence variables were significantly related to suicide attempts independently of mental health variables. Although being in a polygamous marriage, having one's husband chosen, being childless and having a dowry/bride price were significant in the unadjusted models in some sites, they were not generally significant in adjusted models, contrary to what we had hypothesised. The strong effects of violence may simply have overwhelmed effects of these other variables. Widowhood/divorce/separation was also an independent risk factor, which could be mediated via economic difficulties and social isolation and loneliness faced by many women in many areas of the world upon loss of a male partner (Kjøler & Helweg-Larsen, 2000; Pirkis, Burgess, & Dunt, 2000; Weissman, Bland, Canino, Greenwald, Hwu et al., 1999). Protective factors tested in our analyses were generally not associated with suicide attempts in multivariate models—further research is needed in this area.

In our study, 25–50% of women with suicidal thoughts in the past four weeks also saw a health care provider during that time period, and up to 43% of women who ever thought about suicide reported a suicide attempt. This represents a substantial opportunity for health sector intervention. But according to the WHO Mental Health Atlas, only 64% of countries (and only about half of our study countries) provide mental health training in primary care. Such training for primary care providers should involve sensitisation to women's experiences of violence and capacity building, so that: 1) suicidal women are identified, their experiences of violence are recognized as a potential explanatory factor and appropriate care is provided; and 2) women who have experienced violence are identified, and their mental health issues and other sequelae of violence are treated appropriately (Garcia-Moreno, 2002). At the very least, history and risk of further violence among suicidal women should be assessed by health workers before prescription of medications or sending women back into a potentially violent situation. Traditional models of care for

suicidal patients which can involve reliance on family members to preventing further suicidality and ensuring women's safety—if women are experiencing intimate partner violence or non-partner physical violence from someone in their family, this approach can be potentially harmful (Stark & Flitcraft, 1996). The WHO survey of integration of mental health into primary health care (World Health Organization & World Organization of Family Doctors, 2008) described a promising approach in a primary care clinic in Macul, Chile, which integrated child abuse and domestic violence into its mental health service provision and subsequently increased identification of violence cases. (World Health Organization & World Organization of Family Doctors, 2008) However, this was the only one of nine clinics surveyed which addressed violence, highlighting the need for violence against women to receive higher priority in mental health care.

Alternatives to health sector intervention are needed, especially in settings where health infrastructure may be limited (Saxena, Thornicroft, & Whiteford, 2007). Very little information exists about effective prevention interventions for suicidal behaviour outside higher income settings; systematic reviews emphasise the efficacy of improving physicians' ability to recognize depression and means restriction to reduce suicides (Khan, 2005; Mann et al., 2005). Our study and the work of Patel and colleagues (Maselko & Patel, 2008; Pillai et al., 2008) in India strongly suggest that primary prevention of childhood sexual abuse, intimate partner violence, and non-partner physical and sexual violence may result in a large reduction in women's suicidal behaviour. In our study, between 20.4% and 73.2% of women had experienced at least one of the four forms of violence we measured, with above 40% in nine of 15 sites. The efficacy of community-based violence prevention programs such as IMAGE (Pronyk et al., 2006) in South Africa (which reduced intimate partner violence by 55%) should be explored for reducing suicidal behaviours.

Conclusion

National suicide rates have been identified as key indicators of state progress on mental health, along with the existence of national mental health policies and adequate resource allocation (Lancet Global Mental Health Group, 2007). The high prevalence of suicidal thoughts and attempts in this study and the strong association with violence against women illustrates the necessity of prioritizing violence in suicide reduction strategies for women. The recognition of violence as a major risk factor for women's ill-health must be fully integrated into mental health policy. Resources must be allocated to preventing violence against women and mitigating its consequences in order for the mental health needs of women to be effectively addressed.

Acknowledgements

We gratefully acknowledge the participants in the WHO study, and anonymous reviewers for helpful comments.

Appendix. Supplementary material

Supplementary data associated with this article can be found, in the online version, at doi:10.1016/j.socscimed.2011.05.006.

References

Agoub, M., Moussaoui, D., & Kadri, N. (2006). Assessment of suicidality in a Moroccan metropolitan area. *Journal of Affective Disorders*, 90, 223–226.

Ahmed, K., van Ginneken, J., Razzaque, A., & Alam, N. (2004). Violent deaths among women of reproductive age in rural Bangladesh. *Social Science & Medicine*, 59, 311–319.

Alem, A., Jacobsson, L., Kebede, D., & Kullgren, G. (2007a). Awareness and attitudes of a rural Ethiopian community towards suicidal behaviour: a key informant study in Butajira, Ethiopia. *Acta Psychiatrica Scandinavica*, 100(S397), 65–69.

Alem, A., Kebede, D., Jacobsson, L., & Kullgren, G. (2007b). Suicide attempts among adults in Butajira, Ethiopia. *Acta Psychiatrica Scandinavica*, 100(S397), 70–76.

Andrews, G., Corry, J., Slade, T., Issakidis, C., & Swanston, H. (2004). Child sexual abuse. In M. Ezzati (Ed.), *Comparative quantification of health risks: Global and regional burden of disease attributable to selected major risk factors*. Geneva: World Health Organization.

Beautrais, A. L. (2006). Women and suicidal behavior. *Crisis*, 27(4), 153–156.

Bernal, M., Haro, J. M., Bernert, S., Brugha, T., de Graaf, R., Bruffaerts, R., et al. (2007). Risk factors for suicidality in Europe: results from the ESEMED study. *Journal of Affective Disorders*, 101, 27–34.

Bertolote, J. M., Fleishmann, A., De Leo, D., Bolhari, J., Botega, N., De Silva, D., et al. (2005). Suicide attempts, plans, and ideation in culturally diverse sites: the WHO SUPRE-MISS community survey. *Psychological Medicine*, 35, 1–9.

Beusenbergh, M., & Orley, J. (1994). *A user's guide to the self-reporting questionnaire (SRQ)*. Geneva: Division of Mental Health, World Health Organization.

Blum, R. W., Halcon, L., Beuhring, T., Pate, E., Campell-Forrester, S., & Venema, A. (2003). Adolescent health in the Caribbean: risk and protective factors. *American Journal of Public Health*, 93(3), 456–460.

Borges, G., Benjet, C., Medina-Mora, M. E., Orozco, R., Molnar, B. E., & Nock, M. (2008). Traumatic events and suicide-related outcomes among Mexico City adolescents. *Journal of Child Psychology and Psychiatry*, 49(6), 654–666.

Borges, G., Nock, M. K., Medina-Mora, M. E., Benjet, C., Lara, C., Chiu, W. T., et al. (2007). The epidemiology of suicide-related outcomes in Mexico. *Suicide and Life-Threatening Behaviors*, 37(6), 627–640.

Brodsky, B., & Stanley, B. (2008). Adverse childhood experiences and suicidal behaviour. *Psychiatric Clinics of North America*, 31(2), 223–235.

Canetto, S. S., & Lester, D. (1998). Gender, culture and suicidal behavior. *Transcultural Psychiatry*, 35(2), 163–190.

De Silva, M. J., Huttly, S. R., Harpham, T., & Kenward, M. G. (2007). Social capital and mental health: a comparative analysis of four low income countries. *Social Science & Medicine*, 64, 5–20.

Dube, S. R., Anda, R. F., Felitti, V. J., Chapman, D. P., Williamson, D. F., & Giles, W. H. (2001). Childhood abuse, household dysfunction, and the risk of attempted suicide throughout the life span. Findings from the adverse childhood experiences study. *JAMA*, 286(24), 3089–3096.

Ellsberg, M., Jansen, H. A. F. M., Heise, L., Watts, C., & Garcia-Moreno, C. (2008). Intimate partner violence and women's physical and mental health in the WHO multi-country study on women's health and domestic violence: an observational study. *Lancet*, 371, 1165–1172.

Fergusson, D. M., Boden, J. M., & Horwood, L. J. (2008). Exposure to childhood sexual and physical abuse and adjustment in early adulthood. *Child Abuse & Neglect*, 32, 607–619.

Garcia-Moreno, C. (2002). Dilemmas and opportunities for an appropriate health-service response to violence against women. *Lancet*, 359(9316), 1509–1514.

Garcia-Moreno, C., Jansen, H., Heise, L., & Watts, C. (2005). *WHO multi-country study on women's health and domestic violence against women: Initial results on prevalence, health outcomes and women's responses*. Geneva: World Health Organization.

Garcia-Moreno, C., Jansen, H. A., Ellsberg, M., Heise, L., & Watts, C. H. (2006). Prevalence of intimate partner violence: findings from the WHO multi-country study on women's health and domestic violence. *Lancet*, 368, 1260–1269.

Girard, C. (1993). Age, gender, and suicide: a cross-national analysis. *American Sociological Review*, 58(4), 553–574.

Gureje, O., Kola, L., Uwakwe, O., Wakil, A., & Afolabi, E. (2007). The profile and risks of suicidal behaviours in the Nigerian survey of mental health and well-being. *Psychological Medicine*, 37(6), 821–830.

Hox, J. (2002). *Multilevel analysis: Techniques and applications*. New Jersey: Lawrence Erlbaum Associates.

Joe, S., Stein, D. J., Seedat, S., Herman, A., & Williams, D. (2008). Prevalence and correlates of non-fatal suicidal behaviour among South Africans. *British Journal of Psychiatry*, 192, 310–311.

Joiner, T., Sachs-Ericsson, N. J., Wingate, L. R., Brown, J. S., Anestis, M. D., & Selby, E. A. (2007). Childhood physical and sexual abuse and lifetime number of suicide attempts: a persistent and theoretically important relationship. *Behaviour Research and Therapy*, 45, 539–547.

Kebede, D., & Alem, A. (2007). Suicide attempts and ideation among adults in Addis Ababa, Ethiopia. *Acta Psychiatrica Scandinavica*, 100(S397), 35–39.

Khan, M. M. (2005). Suicide prevention and developing countries. *Journal of the Royal Society of Medicine*, 98, 459–463.

Kjølner, M., & Helweg-Larsen, M. (2000). Suicidal ideation and suicide attempts among adult Danes. *Scandinavian Journal of Public Health*, 28(1), 54–61.

Kumar, V. (2003). Burnt wives—a study of suicides. *Burns*, 29, 31–35.

Kushner, H. I., & Sterk, C. E. (2005). The limits of social capital: durkheim, suicide, and social cohesion. *American Journal of Public Health*, 95(7), 1139–1143.

Lancet Global Mental Health Group. (2007). Global mental health 6: scale up services for mental disorders: a call for action. *Lancet*, 370, 1241–1252.

Mann, J. J., Apter, A., Bertolote, J. M., Beautrais, A. L., Currier, A., Haas, A., et al. (2005). Suicide prevention strategies. A systematic review. *JAMA*, 294(16), 2064–2074.

Maselko, J., & Patel, V. (2008). Why women attempt suicide: the role of mental illness and social disadvantage in a community cohort study in India. *Journal of Epidemiology and Community Health*, 62, 817–822.

- Mogga, S., Prince, M., Alem, A., Kebede, D., Stewart, R., Glozier, N., et al. (2006). Outcome of major depression in Ethiopia: population-based study. *The British Journal of Psychiatry*, 189, 241–246.
- Muula, A. S., Kazembe, L. N., Rudatsikira, E., & Siziya, S. (2007). Suicidal ideation and associated factors among in-school adolescents in Zambia. *Tanzania Health Research Bulletin*, 9(3), 202–206.
- Naved, R. T., & Akhtar, N. (2008). Spousal violence against women and suicidal ideation in Bangladesh. *Women's Health Issues*, 18(6), 1–11.
- Neeleman, J., Halperin, D., Leon, D., & Lewis, G. (1997). Tolerance of suicide, religion and suicide rates: an ecological and individual study in 19 Western countries. *Psychological Medicine*, 27, 1165–1171.
- Nock, M., Borges, G., Bromet, E. J., Alonso, J., Angermeyer, M., Beautrais, A. L., et al. (2008). Cross-national prevalence and risk factors for suicidal ideation, plans and attempts. *The British Journal of Psychiatry*, 192, 98–105.
- Pampel, F. C. (1998). National context, social change, and sex differences in suicide rates. *American Sociological Review*, 63(5), 744–758.
- Phillips, M., Li, X., & Zhang, Y. (2002). Suicide rates in China, 1995–1999. *Lancet*, 359, 835–840.
- Pillai, A., Andrews, T., & Patel, V. (2008). Violence, psychological distress and the risk of suicidal behaviour in young people in India. *International Journal of Epidemiology*, 37, 1–11.
- Pirkis, J., Burgess, P., & Dunt, D. (2000). Suicidal ideation and suicide attempts among Australian adults. *Crisis*, 21(1), 16–25.
- Pronyk, P. M., Hargreaves, J. R., Kim, J. C., Morison, L. A., Phetla, G., Watts, C., et al. (2006). Effect of a structural intervention for the prevention of intimate-partner violence and HIV in rural South Africa: a cluster randomised trial. *Lancet*, 368(9551), 1973–1983.
- Ribeiro, P. S., Jacobsen, K. H., Mathers, C. D., & Garcia-Moreno, C. (2008). Priorities for women's health from the global burden of disease study. *International Journal of Gynecology & Obstetrics*, 102(1), 82–90.
- Rudatsikira, E., Muula, A. S., & Siziya, S. (2007). Prevalence and associated factors of suicidal ideation among school-going adolescents in Guyana: results from a cross-sectional study. *Clinical Practice and Epidemiology in Mental Health*, 3, 13.
- Rudatsikira, E., Muula, A. S., Siziya, S., & Twa-Twa, J. (2007). Suicidal ideation and associated factors among school-going adolescents in rural Uganda. *BMC Psychiatry*, 7, 67.
- Saxena, S., Thornicroft, G., & Whiteford, H. (2007). Global Mental Health 2: resources for mental health: scarcity, inequity and inefficiency. *Lancet*, 370, 878–889.
- Stark, E., & Flitcraft, A. (1979). Medicine and patriarchal violence: the social construction of a "private" event. *International Journal of Health Services*, 9(3), 461–493.
- Stark, E., & Flitcraft, A. (1995). Killing the beast within: woman battering and female suicidality. *International Journal of Health Services*, 25(1), 43–64.
- Stark, E., & Flitcraft, A. (1996). *Women at risk: Domestic violence and women's health*. Thousand Oaks: Sage.
- Tidemalm, D., Langstrom, N., Lichtenstein, P., & Runeson, B. (2008). Risk of suicide after suicide attempt according to coexisting psychiatric disorder: Swedish cohort study with long term follow-up. *BMJ*, 337, a2205.
- Tran Thi Thanh, H., Nam Tran, T., Jiang, G.-X., Leenaars, A., & Wasserman, D. (2006). Life time suicidal thoughts in an urban community in Hanoi, Vietnam. *BMC Public Health*, 6, 76.
- Vijayakumar, L., John, S., Pirkis, J., & Whiteford, H. (2005). Suicide in developing countries (2) Risk Factors. *Crisis*, 26(3), 112–119.
- Vizcarra, B., Hassan, F., Hunter, W. M., Munoz, S. R., Ramiro, L., & De Paula, C. S. (2004). Partner violence as a risk factor for mental health among women from communities in the Philippines, Egypt, Chile and India. *Injury Control and Safety Promotion*, 11(2), 125–129.
- Walters, K. L., & Simoni, J. M. (2002). Reconceptualizing native women's health: an "indigenist" stress-coping model. *American Journal of Public Health*, 92(4), 520–524.
- Weissman, M. M., Bland, R. C., Canino, G. J., Greenwald, S., Hwu, H. G., et al. (1999). Prevalence of suicide ideation and suicide attempts in nine countries. *Psychological Medicine*, 29(1), 9–17.
- World Health Organization. (2004). *Estimates of numbers of deaths by sex, cause and WHO Region for 2002. Revised global burden of disease (GBD) 2002 Estimates*. Geneva: World Health Organization.
- World Health Organization, & World Organization of Family Doctors. (2008). *Integrating mental health into primary care: a global perspective*. Geneva: World Health Organization.
- Yoshihama, M., Horrocks, J., & Kamano, S. (2009). The role of emotional abuse in intimate partner violence and health among women in Yokohama, Japan. *American Journal of Public Health*, 99, 647–653.
- Yusuf, H. R., Akhter, H. H., Rahman, M. H., Chowdhury, M. K., & Roach, R. W. (2000). Injury-related deaths in women aged 10–50 years in Bangladesh, 1996–1997. *Lancet*, 355, 1220–1224.