


## RESEARCH ARTICLE

# Utilization of maternal healthcare services in women experiencing spousal violence in Pakistan: A comparative analysis of 2012-13 and 2017-18 Pakistan Demographic Health Surveys

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## Abstract

### Background

Pakistan and other developing countries need to address disparities in maternal health care and factors associated with it. This justifies tracking the progress on two important indicators 'spousal violence' and 'maternal health care utilization' to improve maternal health and achieve Sustainable Development Goals (SDGs) for these nations.

### Objective

The objective of this study is to compare the data from the latest two Demographic Health Surveys of Pakistan to identify trends in prevalence of various forms of spousal violence and maternal healthcare utilization and to determine the predictive role of spousal violence in poor maternal health.

### Methods

We conducted a retrospective analysis of nationally representative data from the 2012–13 and 2017–18 PDHS. The data used in this analysis is from the domestic violence module and core women's questionnaire. Spousal violence and sociodemographic background were predictor variables. Terminated pregnancy, number of pregnancy losses, number of antenatal visits for last birth and institutional delivery for last birth were taken as indicators of maternal health. Logistic regression analysis was conducted to test for association between maternal health indicators and various forms of spousal violence after controlling for socio-demographic variables.

## OPEN ACCESS

**Citation:** Hassan S-u-N, Memon E, Shahab M, Mumtaz S (2020) Utilization of maternal healthcare services in women experiencing spousal violence in Pakistan: A comparative analysis of 2012-13 and 2017-18 Pakistan Demographic Health Surveys. PLoS ONE 15(9): e0239722. <https://doi.org/10.1371/journal.pone.0239722>

**Editor:** Yong-hui Dang, Xi'an Jiaotong University School of Medicine, CHINA

**Received:** January 21, 2020

**Accepted:** September 12, 2020

**Published:** September 25, 2020

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**Data Availability Statement:** All relevant data are available from: (<https://dhsprogram.com>).

**Funding:** This research did not receive any funding.

**Competing interests:** The authors declared that there is no competing interest.

## Results

Almost one quarter of women experienced physical and emotional violence as revealed by both surveys. Binary analysis revealed that all forms of spousal violence significantly associate with maternal health variables in both surveys. The comparison of results on logistic regression analysis showed that odd ratios were relatively higher for 2012–13 as compared to 2017–18 PDHS. Logistic regression analysis from 2017–18 data showed that experience of less severe physical violence (OR = 1.26; 95% CI, 1.08–1.47), severe physical violence (OR = 1.41; 95% CI, 1.09–1.83), sexual violence (OR = 1.39; 95% CI, 1.02–1.89), physical violence during pregnancy (OR = 1.37; 95% CI, 1.07–1.76) augment the risk of terminated pregnancy. Emotional violence decreases the likelihood for institutional delivery (OR = 0.64; 95% CI, 0.45–0.93) and above than four antenatal visits (OR = 0.54; 95% CI, 0.37–0.79).

## Conclusions

Strategies to prevent spousal violence should be at the core of maternal health programs because health sector provides a platform to challenge social norms and promote attitudes that disapprove spousal violence which are essential for promoting gender equality, women empowerment (SDG 3) and improve maternal health (SDG 5).

## Introduction

Maternal health is a well-recognized aspect of women's health. Women in developing countries more commonly suffer from pregnancy related complications, premature delivery of children and maternal death. This gap is as high as up to 33 percent between developed and developing countries [1]. Pakistan still lags behind on maternal health indicators from many other countries of the world [2]. Some of the risk factors are malnutrition, limited access to good quality healthcare services, preference for traditional methods of treatment rather than seeking medical aid at time of delivery, short birth intervals, poor knowledge about available services and late antenatal booking [3, 4]. Literature reported that 78% of maternal death are due to direct causes such as hemorrhage, sepsis, eclampsia, rupture of the uterus, and abortions [5]. Other than medical complications, it is important to investigate predictive role of other factors such as experience of spousal violence in intimate relations on women gynecological health [6].

Women in both developed and developing countries face various forms of violence among which spousal violence has emerged as a significant social nuisance and public health problem. World Health Organization (WHO) [7], defined spousal violence as “a behavior within an intimate relationship that causes physical, sexual or psychological harm, including acts of physical aggression, sexual coercion, psychological abuse and controlling behaviors”. The global prevalence of spousal violence is reported through multi-country study lie in range of 23–30% [8]. Review of statistics on prevalence of spousal violence from Pakistan [9] and other developing countries [10, 11] have shown that even larger percentage (34–43%) of women experienced physical, psychological and sexual forms of violence in their everyday lives.

In this context, it is imperative to recognize that spousal violence is a major human rights issue but also a significant determinant of women's physical, reproductive, maternal and emotional health [12]. The impacts of spousal violence on women's acute and chronic health conditions are reported in literature [13]. Findings revealed that women are presented with

diverse nature of medical complications due to spousal violence that range from minor to major physical injuries [14], poor sexual, reproductive and maternal health [15] as well as psychological conditions such as depression, anxiety and post-traumatic stress disorder (PTSD) [16]. The negative impacts of spousal violence are not limited to women's health but children in these families are also vulnerable to bear physical and mental health consequences of such adverse experiences [17].

Women in developing countries frequently experience emotional violence, economic control as well as physical and sexual violence from their male partners. According to global and regional estimates on prevalence of Intimate Partner Violence (IPV), 30 percent of ever-partnered women at some point in their lives have experienced physical and/or sexual violence by an intimate partner and at least 10 percent of them faced IPV during their pregnancy [18]. Women in developing countries have little control over their reproductive lives [19]. They are given less choice to use contraceptive methods which impacts women's reproductive health [20]. Previous studies have shown that in Pakistan 18% of the pregnant women are more likely to have anxiety and/or depression, linked with physical or sexual and verbal abuse during pregnancy [21].

Studies from other developing countries of South Asian region, such as in-depth analysis of data from 2005–2006 India's National Family Health Survey reported that almost 12% of women experienced severe physical violence and 14% of women had less severe injuries due to spousal violence [22]. An analysis of data from Bangladesh Demographic Health Survey showed that (53%) of mothers reported physical or sexual violence from spouse in the year prior to the survey [23]. In developing countries, factors such as less education, low socioeconomic status, living in rural areas, big family size, drinking or alcohol abuse by husband, jealousy, suspicion and husband's need to keep control increases the woman's risk for spousal violence [24]. Review of literature from Pakistan and other countries supported evidence about negative impacts of violence on women physical, mental, reproductive and sexual health [25, 26].

In developing countries, spousal violence is rooted in a wider context of gender inequality. Gender-based violence and discrimination are major contributing factors of slow progress towards sustainable developmental goals as indicated by the latest rankings on Gender inequality index for Pakistan, which is 148 out of 149 countries [27]. Despite such alarming statistics, there are limited evidence about predictive role spousal violence on maternal health indicators from this part of world. This gap is a major obstacle to devise appropriate public health policies, maternal health programs and social interventions in context of developing countries.

This study aims to address this gap by doing analysis from the last two Pakistan Demographic Health Surveys conducted in four major provinces and capital city completed in years 2012–13 and 2017–18.

## Objectives of the research

This study has three objectives.

1. To report the trends in prevalence of various forms of spousal violence and maternal health indicators.
2. To estimate the association between experience of various forms of spousal violence and maternal health.
3. To determine the predictive role of various forms of spousal violence with maternal health.

## Methods

### Data

This study draws on data from the last two Pakistan Demographic and Health Survey (PDHS) 2012–13 and 17–18 available at <https://dhsprogram.com>. Demographic Health Surveys (DHS) are the biggest household surveys conducted four times in Pakistan and contains rich information on demography and maternal health variables for ever-married women aged (15–49 years). For the main survey, a nationally representative sample was obtained with a two-stage, stratified random sampling design. We selected these two surveys because spousal violence was investigated first time on a sub-sample in 2012–13 PDHS survey. In previous surveys of DHS in Pakistan, experience of spousal violence was not included. The PDHS 2012–13 obtained data about physical and emotional forms of spousal violence only. PDHS 2017–18 included data on experience of (physical, emotional and sexual) forms of spousal violence. The main survey comprises of larger sample size (N = 13,558) in PDHS 12–13 survey [28] and (N = 14,161) in PDHS 17–18 survey [29]. Domestic violence module is administered on sub-sample of women and therefore, this study restricted its analysis to a sub-sample (N = 3,687) women from PDHS 2012–13 survey and (N = 4,085) from PDHS 2017–18 survey. In this analysis, variables on spousal violence included experience of less severe physical violence, severe physical violence, emotional violence sexual violence, physical violence during pregnancy. Data on maternal health variables included, terminated pregnancy, institutional delivery and number of antenatal visits for the most recent birth.

### Measures

**Predictor variables.** The predictor variable in this analysis is spousal violence, assessed through items on domestic violence module. In both demographic health surveys (PDHS 2012–13 and PDHS 2017–18) experience of spousal physical violence, emotional violence and physical violence during pregnancy were inquired from ever-married women. Intensity of physical spousal violence was coded as “Experience of any severe violence” and “Experience of any less severe violence”. The experience of sexual violence in spousal relationship was assessed for the first time in PDHS-2017-18 survey. On each indicator of spousal violence, variable is coded as “1” if yes and “0” if no experience of these forms of spousal violence.

**Control variables.** In the literature, numerous demographic and social variables have been shown to influence maternal health of women in developing countries [30–32]. The potential influence of confounding variables is controlled in regression analyses. These included women age, women education, work status, husband education, husband job status, place of residence and wealth index. The descriptive analysis on these variables are presented in [Table 1](#).

**Outcome variables.** *Institutional delivery* is defined as delivery in a healthcare facility including (government or private hospital, clinic, basic health unit, rural health center, community midwife set up) [28, 29]. This variable is coded as “1” if a woman has delivery in any of this institution for last childbirth and “0” if it was in ‘home’.

*Antenatal care* is defined as having a minimum of four antenatal visits to skilled health workers for last birth. This was the minimum requirement for maternal health care as per previous guidelines and as per recent recommendations by World Health Organization (WHO) there should be a minimum of eight contacts [33]. This variable is coded as “1” if a woman has at least four antenatal visits for last birth and “0” if less than four antenatal visits for last birth.

*Ever had terminated pregnancy* is defined as woman ever having a pregnancy that resulted in miscarriage, abortion, or stillbirth. This variable is coded as “1” if a woman has one or more terminated pregnancy under the definition and “0” if otherwise.

Table 1. Demographic characteristics of respondents who participated in PHDS 2012–13 and PDHS 2017–18.

| Sociodemographic Characteristics         | PDHS 2012–13 (N = 3687) |       | PDHS 2017–18 (N = 4085) |      |
|--|-------------------------|-------|-------------------------|------|
|  | Frequency               | %     | Frequency               | %    |
| <b>Women age (years)</b>                 |                         |       |                         |      |
| 15–19                                    | 116                     | 3.1   | 146                     | 3.6  |
| 20–24                                    | 478                     | 13.0  | 555                     | 13.6 |
| 25–29                                    | 691                     | 18.7  | 797                     | 19.5 |
| 30–34                                    | 693                     | 18.8  | 816                     | 20.1 |
| 35–39                                    | 699                     | 19.0  | 797                     | 19.5 |
| 40–44                                    | 524                     | 14.2  | 512                     | 12.5 |
| 45–49                                    | 486                     | 13.2  | 462                     | 11.3 |
| <b>Education</b>                         |                         |       |                         |      |
| No education                             | 2051                    | 55.61 | 2087                    | 51   |
| Primary                                  | 530                     | 14.4  | 565                     | 13.8 |
| Secondary                                | 654                     | 17.7  | 818                     | 20.0 |
| Higher                                   | 452                     | 12.3  | 615                     | 15.1 |
| <b>Women Current employment status*</b>  |                         |       |                         |      |
| Unemployed                               | 2864                    | 77.7  | 3514                    | 86.0 |
| Employed                                 | 817                     | 22.2  | 571                     | 14.0 |
| <b>Husband Education*</b>                |                         |       |                         |      |
| No education                             | 1149                    | 31.2  | 1112                    | 27.2 |
| Primary                                  | 498                     | 13.5  | 538                     | 13.2 |
| Secondary                                | 1165                    | 31.6  | 1348                    | 33   |
| Higher                                   | 867                     | 23.5  | 964                     | 23.6 |
| <b>Husband Current employment status</b> |                         |       |                         |      |
| Unemployed                               | 115                     | 3.1   | 195                     | 4.8  |
| Employed                                 | 3572                    | 96.7  | 3890                    | 95.2 |
| <b>Wealth Index**</b>                    |                         |       |                         |      |
| Poorest                                  | 683                     | 18.5  | 794                     | 19.4 |
| Poorer                                   | 715                     | 19.4  | 943                     | 23.1 |
| Middle                                   | 684                     | 18.6  | 787                     | 19.3 |
| Richer                                   | 768                     | 20.8  | 747                     | 18.3 |
| Richest                                  | 837                     | 22.7  | 814                     | 19.9 |
| <b>Place of Residence</b>                |                         |       |                         |      |
| Urban                                    | 1734                    | 47.0  | 1978                    | 48.4 |
| Rural                                    | 1953                    | 53.0  | 2107                    | 51.6 |

\*The total sample size may vary because of missing values on some demographic variables.

\*\* Households are given scores based on the number and kinds of consumer goods they own, ranging from a television to a bicycle or car, and housing characteristics such as source of drinking water, toilet facilities, and flooring materials. These scores are derived using principal component analysis. National wealth quintiles are compiled by assigning the household score to each usual (de jure) household member, ranking each person in the household population by their score, and then dividing the distribution into five equal categories, each with 20% of the population

<https://doi.org/10.1371/journal.pone.0239722.t001>

*Number of pregnancy losses* is defined as number of times woman having a pregnancy that resulted in miscarriage, abortion, or stillbirth. This variable is coded as “0” if a woman has no terminated pregnancy, “1” if a woman has one terminated pregnancy and “2” for two terminated pregnancies and “3 & above” for three and more than three terminated pregnancies.

## Statistical analysis

Descriptive statistics are employed to describe characteristics on all variables. Associations between various forms of spousal violence and maternal health indicators were determined by using chi-square tests. We used a logistic regression model to assess the impact of various forms of spousal violence on maternal health of women by calculating adjusted odds ratios (ORs) with 95% confidence intervals (CIs) while controlling for confounding variables. The statistical analyses for this study were performed using SPSS IBM.

## Ethical approval

The study used open-access dataset of PDHS 2012–13 and 2017–18. The survey protocol was reviewed and approved by the National Bioethics Committee, Pakistan Health Research Council, and ICF Institutional Review Board [28, 29].

## Results

### Demographic characteristics and living conditions of participants

The PDHS 2012–13 and PDHS 2017–18 obtained data about experience of spousal violence on Domestic Violence Module from a sub-sample of 3,687 and 4,085 currently married women aged 15–49 years respectively. 51–56% of the women in this sub-sample had not obtained formal education and 27–31% of participants' husbands had not obtained formal education. 77–86% of the women were not involved any paid work and 3–4% of participant's husbands were unemployed. 47–48% of the participants were living in urban regions and 51–53% were living in rural regions. (Table 1). This presentation of demographic characteristics appropriately presents demographic profile of Pakistan population.

### Experience of spousal violence

Table 2 shows frequency and percentages of women's experiences of various forms of spousal violence. Substantial percentage of women reported experiencing spousal violence in both surveys, however, there is declining trend in terms of prevalence of less severe physical violence, which was 28.4% in 2012–13 survey and decreased to 24.4% in 2017–18 survey. There are no differences in rates of emotional violence in both surveys. The prevalence rate of sexual violence is 4.5% as per 2017–18 PDHS (Table 2).

### Association of various forms of spousal violence with maternal health

Findings based on comparison of PDHS 2012–13 and PDHS 2017–18 showed, there is little decline in rates of spousal violence and slight improvement on maternal health conditions of

**Table 2. Distribution of experience of various forms of spousal violence.**

| Women's Experience of Spousal Violence Variables | PDHS 2012–13 (N = 3687) |      | PDHS 2017–18 (N = 4085) |      |
|--|-------------------------|------|-------------------------|------|
|  | Frequency               | %    | Frequency               | %    |
| Experienced Less Severe Physical Violence        | 1033                    | 28.4 | 998                     | 24.4 |
| Experienced Severe Physical Violence             | 257                     | 7.0  | 280                     | 6.9  |
| Experienced Emotional Violence                   | 1154                    | 31.3 | 1243                    | 30.4 |
| Experienced Sexual Violence                      | *-                      | *-   | 184                     | 4.5  |
| Experienced physical violence during pregnancy   | 391                     | 10.6 | 291                     | 7.6  |

\*No data obtained about experience of sexual violence in 2012–13 survey

<https://doi.org/10.1371/journal.pone.0239722.t002>

Table 3. Distribution recent birth and ever had terminated pregnancy of less than 4 ANC visits for most recent birth, institutional delivery for most recent birth.

| (n) after including valid cases in analysis*          | Outcome variables                       |      |  |      |  |      |  |      |   |      |  |      |
|---|---|------|--|------|--|------|--|------|---|------|--|------|
|   | Less than 4 ANC visits for participants |      |  |      | Participant had No Institutional Delivery for the most recent childbirth |      |  |      | Participant Ever had terminated pregnancy |      |  |      |
|   | PDHS 2012–13 (n = 2038)                 |      | PDHS 2017–18 (N = 2255)                |      | PDHS 2012–13 (n = 2038)  |      | PDHS 2017–18 (N = 2261)                |      | PDHS 2012–13 (N = 3687)                   |      | PDHS 2017–18 (N = 4085)                |      |
|   | f                                       | %    | f                                      | %    | f  | %    | f                                      | %    | f   | %    | f                                      | %    |
| <b>Experienced Less Severe Violence*</b>              | $\chi^2 = 53.02$ ,<br>df = 1, p < .001  |      | $\chi^2 = 35.78$ ,<br>df = 1, p < .001 |      | $\chi^2 = 50.02$ ,<br>df = 1, p < .001                                   |      | $\chi^2 = 18.64$ ,<br>df = 1, p < .001 |      | $\chi^2 = 24.43$ ,<br>df = 1, p < .001    |      | $\chi^2 = 10.29$ ,<br>df = 1, p < .01. |      |
| No  | 777                                     | 54.9 | 771                                    | 47.4 | 579  | 40.9 | 499                                    | 30.6 | 889                                       | 33.5 | 951                                    | 30.8 |
| Yes   | 448                                     | 72.0 | 386                                    | 61.5 | 360  | 58.0 | 253                                    | 40.0 | 436                                       | 42.2 | 362                                    | 36.3 |
| <b>Experienced Severe Violence*</b>                   | $\chi^2 = 12.21$ ,<br>df = 1, p < .001  |      | $\chi^2 = 16.88$ ,<br>df = 1, p < .001 |      | $\chi^2 = 10.86$ ,<br>df = 1, p < .01                                    |      | $\chi^2 = 11.1$ ,<br>df = 1, p < .001  |      | $\chi^2 = 10.13$ ,<br>df = 1, p < .01     |      | $\chi^2 = 8.54$ , df = 1,<br>p < .01   |      |
| No  | 1114                                    | 59.0 | 1051                                   | 50.1 | 850  | 45.1 | 680                                    | 32.4 | 1209                                      | 35.3 | 1200                                   | 31.5 |
| Yes   | 111                                     | 73.5 | 106                                    | 67.1 | 89   | 58.9 | 72                                     | 45.3 | 116                                       | 45.1 | 113                                    | 40.0 |
| <b>Experienced Emotional Violence</b>                 | $\chi^2 = 40.11$ ,<br>df = 1, p < .001  |      | $\chi^2 = 19.39$ ,<br>df = 1, p < .001 |      | $\chi^2 = 52.94$ ,<br>df = 1, p < .001                                   |      | $\chi^2 = 10.73$ ,<br>df = 1, p < .001 |      | $\chi^2 = 16.80$ ,<br>df = 1, p < .001    |      | NS                                     |      |
| No  | 749                                     | 55.2 | 724                                    | 48.0 | 548  | 40.4 | 468                                    | 31.0 | 854                                       | 33.7 | 892                                    | 31.4 |
| Yes   | 476                                     | 69.8 | 433                                    | 57.9 | 391  | 57.1 | 284                                    | 37.9 | 471                                       | 40.7 | 421                                    | 33.9 |
| <b>Experienced Sexual Violence</b>                    | *-                                      |      | $\chi^2 = 3.98$ , df = 1,<br>p < .05   |      | *-   |      | NS                                     |      | *-  |      | $\chi^2 = 5.00$ , df = 1,<br>p < .05.  |      |
| No  | *-                                      | *-   | 1092                                   | 50.9 | *-   | *-   | 713                                    | 33.1 | *-  | *-   | 1240                                   | 31.8 |
| Yes   | *-                                      | *-   | 65                                     | 60.7 | *-   | *-   | 39                                     | 36.4 | *-  | *-   | 73                                     | 39.7 |
| <b>Experienced physical violence during pregnancy</b> | $\chi^2 = 34.15$ ,<br>df = 1, p < .001  |      | $\chi^2 = 9.20$ , df = 1,<br>p < .05   |      | $\chi^2 = 31.9$ ,<br>df = 1, p < .001                                    |      | NS                                     |      | $\chi^2 = 7.63$ , df = 1,<br>p < .01      |      | $\chi^2 = 6.19$ , df = 1,<br>p < .05.  |      |
| No  | 1031                                    | 57.7 | 1044                                   | 50.4 | 781  | 43.7 | 683                                    | 32.9 | 1149                                      | 37.5 | 1192                                   | 34.0 |
| Yes   | 194                                     | 77.0 | 113                                    | 62.1 | 158  | 62.7 | 69                                     | 37.6 | 176                                       | 44.8 | 121                                    | 41.2 |

\* refer to physical acts of violence; \*(ANC = antenatal care). NS = Non-significant

\* No data obtained about experience of sexual violence in 2012–13 survey

\*Valid cases refer to the total number of subjects whose data is complete on variables in analysis.

<https://doi.org/10.1371/journal.pone.0239722.t003>

participants across the years between these two surveys. In 2012–13 PDHS survey 28% of women reported less severe physical violence where as in 2017–18 PDHS survey it was declined to 24% and in 2012–13 survey 10.6% of women reported physical violence during pregnancy which was declined to 7.6% in 2017–18 survey. In 2012–13 PDHS survey 60% of women reported less than four antenatal visits where as in 2017–18 PDHS survey it was declined to 51%. Similarly, 46% women reported no institutional delivery in 2012–13 survey which was 33% in 2017–18 survey. The rates of terminated pregnancy in 2012–13 survey was approximately 36%, which was lowered to 33% in 2017–18 survey. The dataset from both surveys showed that significantly higher proportions of women who experienced spousal violence had less than four antenatal visits, no institutional delivery and terminated pregnancy (Table 3). Findings based on analysis of PDHS 2012–13 dataset demonstrate that both physical and emotional violence significantly associate with poor antenatal care at ( $p < .001$ ), decreased likelihood of institutional delivery at ( $p < .001$ ) and high risk of terminated pregnancy at ( $p < .01$ ) (Table 3). The analysis of PDHS 2017–18 dataset demonstrated that the experience of sexual violence and violence during pregnancy significantly associate with less than four antenatal visits and terminated pregnancy at ( $p < .05$ ) (Table 3). Experience of physical and emotional

Table 4. Adjusted odd ratios (OR)s and 95% CIs for the impact of spousal violence on maternal health indicators.

|                                    | PDHS 2012–13                             |                                  |                    |   |                                      | PDHS 2017–18                             |                                  |                    |   |                                      |
|------------------------------------|--|----------------------------------|--------------------|---|--------------------------------------|--|----------------------------------|--------------------|---|--------------------------------------|
|                                    | (N = 3687)                               |                                  |                    |   |                                      | (N = 4085)                               |                                  |                    |   |                                      |
|                                    | OR (95%CI)                               |                                  |                    |   |                                      | OR (95%CI)                               |                                  |                    |   |                                      |
|                                    | Outcome Variables                        |                                  |                    |   | Outcome Variables                    |  |                                  |                    |   |                                      |
|                                    | Ever had terminated pregnancy No = (Ref) | No of pregnancy losses 0 = (Ref) |                    | Institutional Delivery for last birth Yes = (Ref) | Less than four ANC visits No = (Ref) | Ever had terminated pregnancy No = (Ref) | No of pregnancy losses 0 = (Ref) |                    | Institutional Delivery for last birth Yes = (Ref) | Less than four ANC Visits No = (Ref) |
|                                    |  | 1                                | 2 & above          |   |                                      |  | 1                                | 2 & above          |   |                                      |
| Less Severe Violence               | 1.44*** (1.24–1.68)                      | 1.43*** (1.19–1.72)              | 1.52** (1.19–1.95) | 0.61 (0.49–0.74)                                  | 0.60*** (0.47–0.76)                  | 1.26** (1.08–1.47)                       | 1.24* (1.03–1.49)                | 1.38* (1.06–1.79)  | 0.87 (0.71–0.97)                                  | 0.76* (0.61–0.94)                    |
| Severe violence                    | 1.49*** (1.15–1.94)                      | 1.39* (1.02–1.91)                | 1.58** (1.05–2.36) | 0.68* (0.47–0.99)                                 | 0.64* (0.42–0.98)                    | 1.41** (1.09–1.83)                       | 1.41* (1.04–1.91)                | 1.73** (1.15–2.59) | 0.64** (0.45–0.92)                                | 0.54** (0.37–0.79)                   |
| Emotional violence                 | 1.31*** (1.12–1.51)                      | 1.28** (1.07–1.53)               | 1.26* (0.99–1.61)  | 0.56** (0.45–0.69)                                | 0.63** (0.50–0.79)                   | 1.07 (0.93–1.24)                         | 1.12 (0.94–1.33)                 | 1.13 (0.88–1.46)   | 0.93* (0.76–0.98)                                 | 0.86 (0.70–1.06)                     |
| Sexual violence                    | –*                                       | –*                               | –*                 | –*  | –*–*                                 | 1.39* (1.02–1.89)                        | 1.54* (1.08–2.18)                | 1.07 (0.81–1.07)   | 0.93 (0.60–0.94)                                  | 0.71 (0.45–1.10)                     |
| Physical violence during pregnancy | 1.35* (1.08–1.67)                        | 1.16 (0.89–1.52)                 | 1.61** (1.16–2.24) | 0.58*** (0.43–0.78)                               | 0.54** (0.38–0.72)                   | 1.37* (1.07–1.76)                        | 1.41* (1.06–1.89)                | 1.39* (0.91–2.12)  | 0.99 (0.71–0.93)                                  | 0.75 (0.53–1.06)                     |

\* refer to physical acts of violence; (ANC = antenatal care).

–\* No data obtained about experience of sexual violence in 2012–13 survey

\*\*\*p < .001;

\*\*p < .01; \*p < .05 \*\* Adjusted odds ratios were simultaneously adjusted for all sociodemographic variables

<https://doi.org/10.1371/journal.pone.0239722.t004>

violence significantly associate with less than four antenatal visits and non-institutional delivery at (p < .001). (Table 3).

### Impact of spousal violence on maternal health

A summary of odd ratios [Exp(B)] with a 95% confidence interval are given in Table 4 after adjusting for demographic variables. Experiencing ‘severe violence’ emerged as the strongest predictor of ‘terminated pregnancy’. The odds of terminated pregnancy were 1.4 times higher (p < .01) for those women who experienced severe physical violence. Findings also demonstrate that experience of spousal violence increases the risk for more number of terminated pregnancy. The odds of 2 & above pregnancy losses is 1.7 times higher (p < .01) for those women who experienced severe physical violence. Both sexual violence and physical violence during pregnancy significantly (p < .05) predict terminated pregnancy and 2 & above pregnancy losses.

Table 4 demonstrate that data analysis of PDHS 2012–13 depicts all forms of spousal violence significantly decrease the likelihood of institutional delivery for the last birth. However, in PDHS 2017–18 dataset ‘severe physical violence’ and ‘emotional violence’ significantly decrease the likelihood of institutional delivery for the last birth with (OR = 0.64; 95% CI, 0.45–0.92) and (OR = 0.93; 95% CI, 0.76–0.98) respectively.

Spousal violence also negatively influences antenatal care. The findings from PDHS 2012–13 shows that all forms of spousal violence significantly decrease the likelihood of more than four antenatal visits for the last birth. In PDHS 2017–18 dataset, ‘less severe physical violence’



and 'severe physical violence' significantly decrease the likelihood of more than four antenatal visits for the last birth with (OR = 0.76; 95% CI, 0.61–0.94) and (OR = 0.54; 95% CI, 0.37–0.79) respectively (Table 4).

Tables 1 and 2 in (in the [S1 Appendix](#) online only) presents analysis to identify which women are more likely to experience spousal violence and maternal health problems. Women's lack education, husband's lack education, poor wealth status and living in rural regions associate with both spousal violence and less than four ANC visits for most recent birth, no institutional delivery for last birth and terminated pregnancy.

## Discussion

We examined the trends in prevalence of spousal violence and maternal health by using the data from the two most recent demographic health surveys 2012–13 (PDHS) and 2017–18 (PDHS). Besides, we conducted predictive analysis on these datasets to determine the impact of spousal violence on maternal health. Findings show that there is some decline (2% to 5%) in rates of spousal violence and slight improvement (5% to 7%) on maternal health indicators over the years between these two surveys. However, this is not a satisfactory progress towards achieving goals of sustainable development and a raise serious concern about disparities in women's access to maternal healthcare. 24% of women are still exposed to less severe physical violence; 51% of women had less than 4 ANC visits, 33% have not accessed institutional delivery and 32% had experienced terminated pregnancy. Current study findings consolidate the previous evidence that spousal violence significantly increases the risk of poor maternal health in women [34]. Findings of present analysis showed that women exposed to spousal violence are at increased risk for 'ever having terminated pregnancy' and having 'two or more pregnancy losses.' Findings from this analysis also showed that spousal violence significantly decreases the probability of antenatal visits during pregnancy. This finding aligns with previous research and has important implication in Pakistan's context because one in every 10 women face violence during their pregnancy in low-income and middle-income countries [35].

This situation implies the need for more appropriate community health programs to outreach women and need to adopt more efficient ways to mobilize existing healthcare networks. The ground reality is that healthcare professionals are usually less sensitive and not trained to deal with spousal violence cases. Findings from a qualitative study showed that health care professionals are reluctant to inquire or screen women for spousal violence [36]. They consider it does not come under the domain of healthcare and its increases their already huge work burden. There is a need that healthcare professionals be motivated by offering appropriate financial incentives and support system to facilitate women who seek maternal healthcare services and facing problem of spousal violence. Besides the guidelines published by World Health Organization (WHO) can be used to establish supportive network and health services within existing healthcare system to pay special attention to the needs of women facing spousal violence [37].

According to WHO's Focused Antenatal Care (FANC), there should be minimum of four antenatal visits for a pregnant woman without any complications (USAID, 2007). Current study findings are alarming, as 24% of women reported no antenatal visits. Current findings also suggest that women who face violence made less number of antenatal visits which aligns with previous literature [38]. Women who do not seek appropriate antenatal care become more vulnerable for poor pregnancy outcomes [39]. Screening and appropriate support services thus needs to be incorporated into community outreach health programs as well as maternal healthcare centers [40, 41]. Findings suggest that government should allocate funds

for community-based health programs and social interventions. Provision of good quality antenatal care and education about factors, which determine maternal health will improve the prospects of healthy lives for both mother and newborn.

Findings of present analysis showed that women exposed to spousal violence are less likely to seek institutional services for the delivery of last childbirth. Previous literature [42] though suggests that women, who experienced physical violence, were more at risk to be hospitalized due to pregnancy complications, pre-term labor, fetal distress and caesarean birth, however, association of emotional violence with maternal health outcomes has not been reported in existing literature [43]. Existing healthcare services should focus more on attending the greater need of intervention of women exposed to various forms of violence to prevent poorer maternal and neonatal outcomes.

### Strengths and limitations of study

The important strength of this research is that we used data from demographic health survey, which included nationally representative sample from both urban and rural areas of Pakistan and findings are generalizable to other developing countries of this region with similar health-care system.

Among limitations, the survey did not have data on other indicators of women health such as maternal morbidity and mortality and not included in analysis. Secondly, keeping in view the social and cultural environment of Pakistani society, spousal violence is likely to be under-reported by participants in current survey. A large number of women participants were living in combined family systems and chances are high that they are reluctant to talk about experience of spousal violence.

### Implications of study

The impacts of spousal violence on maternal health are preventable through appropriate interventions, such as training health services staff in screening and early intervention in existing reproductive healthcare setting. The occurrence of spousal abuse is associated with number of social and cultural factors e.g. lack of economic independence, stigma and negative attitudes of people towards women who report abuse or seek help. There is need of increased political support and funding to implement variety of social, economic and health interventions. More outreach programs can ensure provision of antenatal care to pregnant women in the community. Psycho-behavioral interventions on family violence need to include educating families and husbands about repercussions of physical and emotional violence on mother health and child life prospects. Collective interventions at macro, meso and micro level in context of Pakistan and other developing countries are required to prevent spousal violence and improve indicators of maternal health.

### Conclusions

This study provides additional evidence about impacts of spousal violence on maternal health outcomes such as terminated pregnancy, deficient antenatal care and decreased likelihood of intuitional delivery. There is slight decrease in rates of spousal violence and slight improvement on maternal health indicators as indicated by the comparative analysis of 2012–13 and 2017–18 surveys. Nonetheless, this improvement is not substantial enough to achieve targets for sustainable development goals. These findings emphasize upon need for more integrative community interventions that should focus both on reducing spousal violence as well improving access to maternal health services in vulnerable populations.

## Supporting information

**S1 Appendix.**  
(DOCX)

## Author Contributions

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## References

1. World Health Organization (WHO). Maternal and reproductive health. Maternal mortality: Levels and trends 2000 to 2017 <http://www.who.int/maternal-health/en>.
2. Iqbal S, Maqsood S, Zakar R, Zakar MZ, Fischer F. Continuum of care in maternal, newborn and child health in Pakistan: analysis of trends and determinants from 2006 to 2012. *BMC Health Services Research*. 2017; 17(1):189. <https://doi.org/10.1186/s12913-017-2111-9> PMID: 28279186
3. Girum T, Wasie A. Correlates of maternal mortality in developing countries: an ecological study in 82 countries. *Matern Health Neonatol Perinatol*. 2017; 3(1):19. <https://doi.org/10.1186/s40748-017-0059-8> PMID: 29142757
4. Amna A. Late Antenatal Booking, Its Barrier and Maternal Complications. *IMJ*. 2015; 7(1):38–40.
5. Khan A, Izhar V, Viqar MA. Maternal morbidity and mortality in Pakistan—An overview of major contributors. *PAFMJ*. 2017; 67(4): 635–40.
6. Alhusen JL, Ray E, Sharps P, Bullock L. Intimate partner violence during pregnancy: maternal and neonatal outcomes. *J Women's Health*. 2015; 24(1):100–6. <https://doi.org/10.1089/jwh.2014.4872> PMID: 25265285
7. World Health Organization/London School of Hygiene and Tropical Medicine. Preventing intimate partner and sexual violence against women: Taking action and generating evidence. Geneva, World Health Organization, 2010.
8. World Health Organization, Global and regional estimates of violence against women: prevalence and health effects of intimate partner violence and non-partner sexual violence. World Health Organization, 2013. <https://www.who.int/reproductivehealth/publications/violence/9789241564625/en/>
9. Ali PA, Naylor PB, Croot E, O'Cathain A. Intimate partner violence in Pakistan: A systematic review. *Trauma, Violence, & Abuse*. 2015 Jul; 16(3):299–315.
10. Naved R.T., Al Mamun M., Parvin K., Willan S., Gibbs A., Yu M. et al. 2018. Magnitude and correlates of intimate partner violence against female garment workers from selected factories in Bangladesh. *PLoS one*, 13(11), p.e0204725. <https://doi.org/10.1371/journal.pone.0204725> PMID: 30403674
11. Kalokhe A, del Rio C, Dunkle K, Stephenson R, Metheny N, Paranjape A, et al. Domestic violence against women in India: A systematic review of a decade of quantitative studies. *Global public health*. 2017 Apr 3; 12(4):498–513. <https://doi.org/10.1080/17441692.2015.1119293> PMID: 26886155

12. Dillon G., Hussain R., Loxton D. and Rahman S. Mental and physical health and intimate partner violence against women: A review of the literature. *International Journal of Family Medicine*, 2013. Available from: <https://doi.org/10.1155/2013/313909>. PMID: 23431441
13. Chowdhary N, Patel V. The effect of spousal violence on women's health: Findings from the Stree Arogya Shodh in Goa, India. *Journal of postgraduate medicine*. 2008 Oct 1; 54(4):306. <https://doi.org/10.4103/0022-3859.43514> PMID: 18953151
14. Coker AL, Smith PH, Bethea L, King MR, McKeown RE. Physical health consequences of physical and psychological intimate partner violence. *Archives of family medicine*. 2000 May 1; 9(5):451. <https://doi.org/10.1001/archfami.9.5.451> PMID: 10810951
15. Taft AJ, Powell RL, Watson LF. The impact of violence against women on reproductive health and child mortality in Timor-Leste. *Australian and New Zealand Journal of Public Health*. 2015 Apr; 39(2):177–81. <https://doi.org/10.1111/1753-6405.12339> PMID: 25715972
16. Poutiainen M, Holma J. Subjectively evaluated effects of domestic violence on well-being in clinical populations. *International Scholarly Research Notices*.;2013. <https://doi.org/10.1155/2013/347235>. PMID: 23476806
17. Devaney J. Research Review: The Impact of Domestic Violence on Children. *Irish Probation Journal*, 2015; 12: 79–94.
18. Abramsky T, Watts CH, Moreno GC, Devries K, Kiss L, Ellsberg M et al. What factors are associated with recent intimate partner violence? Findings from the WHO multi-country study on women's health and domestic violence. *BMC Public Health*. 2011; 11(1): 109.
19. Farid M, Saleem S, Karim MS, Hatcher J. Spousal abuse during pregnancy in Karachi, Pakistan. *Int J Gynaecol Obstet*. 2008; 101(2):141–5. <https://doi.org/10.1016/j.ijgo.2007.11.015> PMID: 18289536
20. Zakar R, Zakar MZ, Mikolajczyk R, Krämer A. Intimate partner violence and its association with women's reproductive health in Pakistan. *Int J Gynaecol Obstet*. 2012; 117(1):10–4. <https://doi.org/10.1016/j.ijgo.2011.10.032> PMID: 22257768
21. Karmaliani R, Asad N, Bann CM, Moss N, McClure EM, Pasha O, et al. Prevalence of anxiety, depression and associated factors among pregnant women of Hyderabad, Pakistan. *Int J Soc Psychiatry*. 2009; 55(5):414–24. <https://doi.org/10.1177/0020764008094645> PMID: 19592433
22. Sabri B, Renner LM, Stockman JK, Mittal M, Decker MR. Risk factors for severe intimate partner violence and violence-related injuries among women in India. *Women Health*. 2014; 19; 54(4):281–300. <https://doi.org/10.1080/03630242.2014.896445> PMID: 24617959
23. Rahman A, Surkan PJ, Cayetano CE, Rwagatare P, Dickson KE. Grand challenges: integrating maternal mental health into maternal and child health programmes. *PLoS Med*. 2013; 10(5):e1001442. <https://doi.org/10.1371/journal.pmed.1001442> PMID: 23667345
24. Santoveña EE, Lambert TL, Hamel J. Partner abuse worldwide. *Partner Abuse*. 2013; 4(1):6–75.
25. Niaz U, Hassan S, Tariq Q. Situational analysis of Intimate Partner Violence (IPV) interventions in South-Asian and Middle East Countries, *Partner Abuse*. 2017; 8(1):47–87. <https://doi.org/10.1891/1946-6560.8.1.47>
26. Fikree FF, Jafarey SN, Korejo R, Afshan A, Durocher JM. Intimate partner violence before and during pregnancy: experiences of postpartum women in Karachi. *J Pak Med Assoc*. 2006; 56(6): 252–7. PMID: 16827246
27. The Global gender gap report 2018. [http://www3.weforum.org/docs/WEF\\_GGGR\\_2018.pdf](http://www3.weforum.org/docs/WEF_GGGR_2018.pdf)
28. National Institute of Population Studies (NIPS) Pakistan, ICF International, and Calverton, Maryland, USA: Pakistan Demographic and Health Survey 2012–13. <http://nips.org.pk/>.
29. National Institute of Population Studies (NIPS) [Pakistan] and ICF. 2019. Pakistan Demographic and Health Survey 2017–18. Islamabad, Pakistan, and Rockville, Maryland, USA: NIPS and ICF. <http://nips.org.pk/>.
30. Sharma SR, Poudyal AK, Devkota BM, Singh S. Factors associated with place of delivery in rural Nepal. *BMC Public Health*. 2014; 14:306. Available from: <https://doi.org/10.1186/1471-2458-14-306> PMID: 24708511
31. Berhan Y, Berhan A. A meta-analysis of socio-demographic factors for perinatal mortality in developing countries: a subgroup analysis of the national surveys and small scale studies. *Ethiopian journal of health sciences*. 2014; 24:41–54. <https://doi.org/10.4314/ejhs.v24i0.5s> PMID: 25489182
32. Sahoo J, Singh SV, Gupta VK, Garg S, Kishore J. Do socio-demographic factors still predict the choice of place of delivery: A cross-sectional study in rural North India. *Journal of epidemiology and global health*. 2015 Dec 1; 5(4):S27–34. <https://doi.org/10.1016/j.jegh.2015.05.002> PMID: 26073573
33. World Health Organization. (WHO) recommendations on antenatal care for a positive pregnancy experience. Geneva, Switzerland: WHO; 2016

34. Kita S, Yaeko K, Porter SE. Prevalence and risk factors of intimate partner violence among pregnant women in Japan. *Health Care Women Int.* 2014; 35(4): 442–57. <https://doi.org/10.1080/07399332.2013.857320> PMID: 24350998
35. Pallitto CC, García-Moreno C, Jansen HA, Heise L, Ellsberg M, Watts C. Intimate partner violence, abortion, and unintended pregnancy: Results from the WHO Multi-country Study on Women's Health and Domestic Violence. *Int J Gynaecol Obstet.* 2013; 120(1): 3–9. <https://doi.org/10.1016/j.ijgo.2012.07.003> PMID: 22959631
36. Zakar R, Zakar MZ, Kraemer A. Primary health care physicians' response to the victims of spousal violence against women in Pakistan. *Health Care Women Int.* 2011; 32(9): 811–32. <https://doi.org/10.1080/07399332.2011.569042> PMID: 21834720
37. World Health Organization (WHO) Guidelines: Maternal, reproductive and women's health. 2013. [who.int/publications/guidelines/reproductive-health/en/](http://www.who.int/publications/guidelines/reproductive-health/en/).
38. Hatcher AM, Romito P, Odero M, Bukusi EA, Onono M, Turan JM. Social context and drivers of intimate partner violence in rural Kenya: implications for the health of pregnant women. *Cult Health Sex.* 2013; 15(4): 404–19. <https://doi.org/10.1080/13691058.2012.760205> PMID: 23387300
39. Ononokpono DN, Azfredrick EC. Intimate partner violence and the utilization of maternal health care services in Nigeria. *Health Care Women Int.* 2014; 35(7–9): 973–89. <https://doi.org/10.1080/07399332.2014.924939> PMID: 24902004
40. Jejeebhoy SJ, Santhya KG, Acharya R. Violence against women in South Asia: the need for the active engagement of the health sector. *Global Public Health.* 2014; 9(6): 678–90. <https://doi.org/10.1080/17441692.2014.916736> PMID: 24842297
41. Colarossi LG, Breitbart V, Betancourt GS. Screening for intimate partner violence in reproductive health centers: An evaluation study. *Women Health.* 2010; 50(4): 313–26. <https://doi.org/10.1080/03630242.2010.498751> PMID: 20711946
42. Rachana C, Suraiya K, Hisham AS, Abdulaziz AM, Hai A. Prevalence and complications of physical violence during pregnancy. *Eur. J. Obstet. Gynecol. Reprod. Biol.* 2002; 103(1): 26–9. [https://doi.org/10.1016/s0301-2115\(02\)00022-2](https://doi.org/10.1016/s0301-2115(02)00022-2) PMID: 12039459
43. Schei B, Lukasse M, Ryding EL, Campbell J, Karro H, Kristjansdottir H, et al. A history of abuse and operative delivery—results from a European multi-country cohort study. *PLoS one.* 2014; 9(1): e87579. <https://doi.org/10.1371/journal.pone.0087579> PMID: 24498142