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Rahul Shidhaye, Vikram Patel

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**Association of socio-economic, gender and health factors  
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3 **Association of socio-economic, gender and health factors with common mental**  
4 **disorders in women: a population-based study of 5703 married rural women in**  
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12 Rahul Shidhaye and Vikram Patel  
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18 Rahul Shidhaye, MD (Psych), MHS: Lecturer, Public Health Foundation of India (India).  
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23 Vikram Patel, MRCPsych, PhD, FMedSci: Professor of International Mental Health and  
24 Wellcome Trust Senior Clinical Research Fellowship in Tropical Medicine, London  
25 School of Hygiene & Tropical Medicine (UK) and Sangath (India).  
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## Abstract

**Background** There are few population based studies from low and middle income countries which have described the association of socio-economic, gender, and health factors with common mental disorders in rural women.

**Methods** Population-based study of currently-married rural women aged 15-39 years. The baseline data is from the National Family Health Survey-II conducted in 1998. A follow-up study was conducted four years later in 2002-03. The outcome of common mental disorders (CMD) was assessed using the 12 item General Health Questionnaire (GHQ-12). Due to the hierarchical nature and complex survey design, data were analyzed using mixed effect logistic regression with random intercept model.

**Results** 5703 women (representing 83.5% of eligible women) completed follow-up. The outcome of CMD was observed in 609 women (10.7%, CI 9.8-11.6%). The following factors were independently associated with the outcome of CMD in the final multivariable model: higher age, low education, low Standard of Living, recent Intimate Partner Violence (IPV), husband's unsatisfactory reaction to dowry, husband's alcohol use and women's own tobacco use.

**Conclusions** Socio-economic and gender disadvantage factors are independently associated with common mental disorders in this population of women. Strategies which address structural determinants, for example to promote women's education and reduce their exposure to IPV, may reduce the burden of CMD in women.

## INTRODUCTION

Common mental disorders (CMD) are a term coined by Goldberg and Huxley (1) to describe disorders which are commonly encountered in community settings, and whose occurrence signals a breakdown in normal functioning. These disorders are typically encountered in community and primary care settings (1). Specific psychiatric syndromes included in the concept of CMD include depressive and anxiety disorders (2). Unipolar depression is one of the leading causes of Global Burden of Disease, DALYs in developed as well as low and middle income countries (3, 4) and is projected to be the leading cause of burden of disease in women in India, where the study described in this paper was carried out.

There is a growing evidence base pointing to the role of multiple determinants influencing the risk for CMD. The first, most consistent, factor is female gender (5). Women are one and half to two times more likely to suffer from CMD as compared to men (6-10). Gender plays major role in determining socio-economic position, access to resources and social status which in turn influences mental health (8, 11). Gender disadvantage and exposure to intimate partner violence (IPV) are commonly described correlates of CMD in women (12). IPV is the commonest type of inter-personal violence. In population-based surveys, between 10 to 69% of women reported being physically assaulted by an intimate male partner at some point in their lives (13). A 10 country WHO study found that women who experienced partner violence at least once in their life reported significantly more emotional distress, suicidal thoughts and attempts than non-abused women (14). In India the practice of giving a dowry to the groom's family at marriage is widespread, and is frequently a source of dissatisfaction directed towards the bride, if there is a perceived shortfall in promised dowry. Lower dowry levels are associated with increased risk of domestic violence (15, 16).

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There is a robust and long-standing evidence base showing that Individuals belonging to lower socio-economic classes, in both developed and less developed countries, have greater exposure to more stressful life experiences which contributes to a greater risk for CMD (17-20). A cohort study in Pakistan, for example, showed that women in the low SES category are three times as likely to have postnatal depression at 12-month follow-up as women in a higher SES category (21). In low-middle income countries, low education, food insecurity, poor housing, and financial stress exhibit a relatively consistent and strong association with the risk for CMD, while the association between other variables such as income, employment and consumption with CMD is less robust (17). Tobacco and alcohol misuse (22), chronic physical health problems (23) and reproductive and sexual complaints (12) are other risk factors which have been shown to be associated with CMD.

There are few population-based, representative studies from low and middle income countries which have described the associations for CMD in women living in rural areas. The aim of this paper is to fill this gap in the evidence base, with the objective of describing the association of a range of socio-economic, gender and health factors with CMD in a representative dataset of women's health in rural India. We were particularly interested in testing the hypotheses that factors indicative of social and gender disadvantage, were independently associated with CMD in women.

## **MATERIAL AND METHODS**

The data source used for this study are the two linked data sets: the National Family Health Survey-II (NFHS-II) carried out in 1998–99, and a follow-up study for a subgroup of women in four states carried out in 2002–03 (24). NFHS-II (baseline study) is the

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3 Indian Demographic and Health Survey (DHS) designed to collect information related to  
4 demographic characteristics, health information and quality of public and private health  
5 services and perception of these services. The follow-up study was conducted to assess  
6 the quality of family planning services, to explore the relationship between service quality  
7 and contraceptive behavior and to investigate aspects of women's health and well-being  
8 with emphasis on domestic violence and mental health (25). Thus, the follow-up study  
9 was not planned *a priori* and the baseline assessments did not include measurement of  
10 CMD status.  
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### 20 21 22 **Sample selection**

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24 The National Family Health Survey-II sample covered 99% of India's population, residing  
25 in its 26 states, and ultimately included a total of 89,199 women residing in 91,196  
26 households (24). These were ever-married women in the age group 15–49 (24). A two-  
27 stage stratified systematic design was used for selection of the NFHS-II sample (24).  
28 The sample design adopted was uniform in all the states. Details regarding selection of  
29 sample are provided elsewhere (24).  
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40 The sample for the follow-up study was drawn from the original NFHS-II study sample.  
41 The follow-up survey was limited to the four states of Bihar, Jharkhand, Maharashtra and  
42 Tamil Nadu. These states were chosen to represent differing demographic, socio-  
43 economic, and service program contexts in India. There is a wide variation in socio-  
44 economic and women's status across these four states; Bihar and Jharkhand are north  
45 Indian states while Maharashtra and Tamil Nadu are situated in western and southern  
46 part of India respectively. Women in Bihar and Jharkhand fare considerably worse  
47 relative to women in Maharashtra and Tamil Nadu with respect to indicators of women's  
48 status such as age at marriage, literacy and ability to access child health services (26,  
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27). These, and other data, demonstrate the developmental, social and cultural divide that distinguishes these north Indian states from south and west Indian states (25). The follow-up study was further restricted to rural NFHS-II respondents, in light of the diverse and complex nature of family planning service delivery points in urban India. The main focus of the follow-up study was to describe the relationship between quality of care and subsequent contraceptive use and as most women complete their fertility by age 40 the sample for the follow-up study did not include women older than 39 at baseline (25).

In Maharashtra and Tamil Nadu women were explicitly asked if they would agree to be re-interviewed at the time of the baseline NFHS-II and those who did not agree were not approached for a re-interview. In Bihar/Jharkhand, where there were no plans originally for a follow-up study, consent for re-interview was not obtained at the time of the baseline (25). In all study sites, a detailed consent form was read and consent obtained from all respondents at the time of the follow-up survey. Ethical approval for the study and resulting analysis was provided by institutional review board at Johns Hopkins Bloomberg School of Public Health. Following WHO ethical recommendations that only one family member per household be interviewed for the IPV module (28), the youngest eligible woman in the household was selected when multiple respondents existed within the household, and interviews were expected to be carried out in private.

### Variables

Variables we use for testing associations with CMD were assessed at baseline (NFHS-II study) and at the follow-up (NFHS-II follow-up study). The NFHS-II included two questionnaires; a household questionnaire and a woman's questionnaire. The questionnaires for each state were bilingual, with questions in both the language of the state and in English (24). A similar questionnaire was used in NFHS-II follow-up study



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3 (25). The data collected from these two questionnaires were organized in the following  
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5 manner:  
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10 Socio-economic factors

11 A standard of living index (SLI) was computed on the basis of the household ownership  
12 of assets and possessions. The SLI was created by assigning scores to a range of 30  
13 household goods and assets, including the type of house and toilet facilities, fuel used  
14 for cooking, and ownership of durable goods (24). Based on the above score the  
15 standard of living index (SLI) had three levels; high, medium and low. Other socio-  
16 economic variables were age, education, employment status and place of residence.  
17  
18 The caste variable had three categories; scheduled caste/scheduled tribe, other  
19 backward caste, and neither scheduled caste/scheduled tribe and other backward caste.  
20 Scheduled castes and scheduled tribes are castes and tribes that the Government of  
21 India officially recognizes as socially and economically disadvantaged. In our analysis  
22 education was treated as a binary variable with 2 levels; less than middle school (below  
23 grade 7) and middle school or above (grade 7 or above). All socio-economic factors  
24 were measured at baseline.  
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42 Marital and Gender disadvantage factors

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44 Questions related to woman's marital status, husband's age, education, employment  
45 status and age at first marriage were included in the baseline questionnaire. Spousal  
46 inequality with respect to age was calculated by subtracting woman's age at baseline  
47 from husband's age at baseline. Intimate Partner Violence (IPV) was assessed at both  
48 baseline and follow-up. The baseline NFHS-II survey contained three questions about  
49 violence inflicted on the woman by her husband and by other family members. These  
50 questions were: "Since you completed 15 years of age, have you been beaten or  
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3 mistreated physically by any person?"; "Who has beaten or mistreated you physically?";  
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5 and " How often have you been beaten or mistreated physically in the last 12 months:  
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7 once, a few times, many times, or not at all?" The follow-up survey included several  
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9 questions on violence inflicted by the husband covering a range of physical, verbal and  
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11 sexual behaviors (25). The specific questions were: "Thinking about your own marriage,  
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13 has your husband ever: pushed you, pulled you, or held you down? hit you with his fist  
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15 or did something that could hurt you? kicked you or dragged you? tried to strangle or  
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17 burn you? threatened you with a knife, gun, or other weapon? attacked you with a knife,  
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19 gun, or other weapon? used verbal threats to force you to have sex when you did not  
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21 want to? used physical force to force you to have sex when you did not want to?" and  
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23 "Thinking about all of these actions, how many episodes of violence occurred to you  
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25 over the past 12 months?" Baseline and follow-up data were used to compute a  
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27 composite IPV variable with four rating values: no IPV; IPV only at baseline; IPV only at  
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29 follow-up; and IPV at both baseline and follow-up. Only responses to the question  
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31 related to IPV in the previous 12 months were taken into account during this  
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33 computation. Intergenerational exposure to violence was measured only at follow-up,  
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35 through two questions on whether the respondent had witnessed violence by her father  
36  
37 towards her mother. The question related to husband's reaction to dowry was: "How  
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39 would you describe the reaction of your husband's family to the cash, gifts, jewellery and  
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41 other items you brought at the time of your marriage: very satisfied, satisfied, did not  
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43 care, did not bring any, unsatisfied, very unsatisfied and unsure?" For our analyses, we  
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45 merged satisfied and very satisfied into one category ("satisfied"); merged very  
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47 unsatisfied and unsatisfied into "unsatisfied"; and merged the remaining three values into  
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49 "not applicable". Husband's alcohol intake was also assessed at follow-up.  
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*Physical and reproductive health factors*

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3 Information related to three risk behaviors—chewing *paan masala* or tobacco, drinking  
4 alcohol and smoking was elicited at baseline. Woman's smoking status and intake of  
5 tobacco/*paan masala* were combined into a single composite variable assessing any  
6 tobacco use. Haemoglobin levels were measured using portable equipment (the  
7 HemoCue) (24). Anaemia was defined as a categorical variable (absent if Hb>12 g/dl  
8 and present if Hb≤12 g/dl). Height and weight for each woman was measured and Body  
9 Mass Index (BMI) calculated. BMI values were categorized as 20 or less kg/m<sup>2</sup>, 20 to 25  
10 kg/m<sup>2</sup> and more than 25 kg/m<sup>2</sup>. Reproductive health variables were total number of  
11 children born (live births) and history of induced abortion. All physical and reproductive  
12 health factors were measured at baseline.  
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### 27 Outcome

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29 Common mental disorders were assessed using the 12 item General Health  
30 Questionnaire (GHQ-12) at follow-up. Although not a diagnostic instrument, the GHQ is  
31 one of the most widely used and validated screening questionnaires for the  
32 measurement of CMD in primary care and community settings (29). The longer 60-item  
33 and shorter 12-item versions of the GHQ have both been field tested and validated as a  
34 screening measure for current CMD in India (30-32). The follow-up study utilized the 12-  
35 item version of the questionnaire. Each item was scored one or zero, thus a possible  
36 total score of twelve for each woman. The GHQ threshold score is partly determined by  
37 the prevalence of the disorders (33). In this study we have used the cut-off point of 5 to  
38 discriminate between presence or absence of a probable current CMD. This cut-off  
39 provided an optimal balance between sensitivity and specificity, when compared against  
40 a structured diagnostic interview for current depressive and anxiety disorders, confirming  
41 the criterion validity of the instrument (30).  
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## Data Analysis

Our analyses were guided by a conceptual framework constructed on the basis of previous literature (34) but constrained to the factors which had been measured at each round of data collection. We followed a stepped model of analyses based on the hierarchy of factors as shown in Figure 1 (35), an approach which has been widely used to explore hierarchical relationships in observational data (36-38). In our model, socio-economic factors were considered most distal factors (level one of hierarchy), followed by marital and gender disadvantage factors (level two) and physical and reproductive health factors (level three) were the most proximal.

The association of each factor with the outcome of CMD was first assessed using mixed effect simple logistic regression (univariable analysis). In Model 1 socio-economic factors whose association showed a level of statistical significance at  $p \leq 0.1$  in univariable analysis were included. The factors which showed an association at  $p \leq 0.1$  in this multivariable model were retained for inclusion in model 2. Woman's age was an *a priori* variable included in all models. Model 2 included the retained socio-economic factors and marital and gender disadvantage factors whose association showed a level of statistical significance at  $p \leq 0.1$  in univariable analysis; those whose associations remained at  $p \leq 0.1$  on adjustment, together with the socio-economic factors, were retained for inclusion in model 3. Similarly, model 3 included socio-economic, marital and gender disadvantage and physical and reproductive health factors. The variables retained in model 3 were used in final Model 4. Further retention of the variables in this model was based on backward selection and likelihood ratio test. Mixed effects simple and multiple logistic regression with random intercept was used for analyses. In multi-level modeling three levels were considered; individual, village (PSU) and strata. Thus while estimating standard errors we took into account design effects due to clustering of

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3 women at the level of the primary sampling unit and clustering of PSUs at the level of  
4 strata (39). Weights were applied to all the observations to account for over-sampling of  
5 certain categories of respondents in the study design. Svysset and gllamm (40)  
6 commands were used in STATA IC 10 for analyses (41).  
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## 13 RESULTS

### 14 Participants

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17 In the NFHS-II study, 11100 ever-married rural women in the age group of 15-49 years  
18 from Bihar, Maharashtra and Tamil Nadu (Bihar and Jharkhand were one state at the  
19 time of study) were interviewed. The overall response rates in the baseline study for  
20 sampled women respondents were very high (95.5%), and ranged from 94.1 to 99.7% in  
21 the states included in the follow-up study. As the follow-up study was restricted to  
22 currently-married rural women aged 15-39 years, the overall target sample reduced to  
23 7785 women (24). These were the women who were usual residents of the selected  
24 households at the time of the baseline NFHS-II survey. In the states of Bihar and  
25 Jharkhand, 82 women were not interviewed during the NFHS-II study; thus, the eligible  
26 sample of women for the follow-up study was 7703. In Maharashtra, 250 women and in  
27 Tamil Nadu, 30 women refused consent for re-interview during NFHS-II study. Follow-up  
28 interviews could not be completed in the case of 1013 women due to various reasons,  
29 for example that the households were not identified, the woman was unavailable or  
30 refused interview, and the woman had died or migrated. Thus, interviews were  
31 completed with 6437 women (83.6% of the eligible sample of 7703 women). After  
32 applying a priori exclusion criteria based on WHO ethical guidelines (28), interviews  
33 were completed for 5703 women.  
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The sample of women interviewed in the follow-up survey is generally representative of the original target sample (25). With the exception of lower levels of baseline contraceptive use and IPV prevalence in Bihar and Tamil Nadu, the re-interviewed and non-reinterviewed samples of women are generally similar in characteristics (25). In the sample of 5703 women, the outcome of CMD was observed in 609 women (10.7%, 95% CI, 9.8-11.6%).

### **Univariable analysis of associations with CMD (Table 1)**

Woman's age, education and SLI were associated with CMD in univariable analysis, but no association was observed between caste and CMD. Higher SLI and higher level of women's education were inversely associated with CMD. Among marital and gender disadvantage factors, husband's alcohol intake, IPV and intergenerational exposure to violence were associated with CMD. Husband's unsatisfactory reaction to dowry was strongly associated with CMD (OR, 4.0; 95% CI, 2.7-6.0). No association was found between baseline IPV and CMD, but follow-up IPV was strongly associated with CMD (OR, 2.2; 95% CI, 1.7-2.9) as was IPV at both time points (OR, 2.7; 95% CI, 1.9-3.8). Husband's employment status, spousal inequality in age and woman's age at first marriage were not associated with CMD. Women's alcohol and tobacco intake were associated with CMD and higher BMI and higher haemoglobin levels were inversely associated with CMD.

[Table 1 here]

### **Multivariable analysis of associations with CMD (Table 2)**

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3 In model 1, all socio-economic factors (woman's age, woman's education and SLI)  
4 retained an independent association with CMD. The largest effects were observed for  
5 woman's education and SLI. In model 2, husband's reaction to dowry, husband's alcohol  
6 intake and IPV retained an independent association with CMD. In model 3, only  
7 woman's tobacco intake met the criteria for inclusion in the final multivariable model. In  
8 the final model (model 4), woman's education showed the strongest association with  
9 CMD; women who had been schooled up to or beyond middle school were 40% less  
10 likely to have a CMD (OR, 0.6; 95% CI, 0.4-0.8). Higher SLI was inversely associated  
11 with CMD. Husband's unsatisfactory reaction to dowry retained a strong association with  
12 CMD (OR, 3.1; 95% CI, 2.0-4.6) as did IPV at follow-up (OR, 2.0; 95% CI, 1.5-2.6).  
13 Husband's alcohol intake and woman's tobacco intake also retained independent  
14 associations with CMD.  
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## DISCUSSION

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37 We describe the findings of one of the largest population-based studies examining the  
38 association of socio-economic, gender disadvantage and health factors with women's  
39 mental health in rural settings in India. The prevalence of probable CMD among women  
40 in our study sample was 10.7%. The prevalence of CMD varies widely between  
41 populations, as has been shown in the World Mental Health surveys which used  
42 identical methods in more than two dozen settings (42). The rates of CMDs also vary  
43 greatly between populations in India, with a median rate of 10% in adult populations, a  
44 figure which closely approximates our estimate (43). We found that older age, lower  
45 education; lower SLI, exposure to IPV, husband's unsatisfactory reaction to dowry,  
46 husband's alcohol intake and tobacco consumption were independently associated with  
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3 CMD in rural, married women in the age group of 15 to 39 years. We did not find any  
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5 association between other physical and reproductive health factors with CMD.  
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10 Our study findings support the robust evidence regarding the role of socio-economic  
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12 position and education as factors associated with CMD. There is high level of inequity in  
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14 the distribution of CMD across socio-economic strata within societies, with significantly  
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16 increased rates of depression among lower socio-economic groups (17, 44, 45). Our  
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18 finding of independent associations between education and SLI with CMD, indicators of  
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20 social disadvantage in childhood and adulthood respectively, provides support to the  
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22 social causation theory. We also found an association between woman's age and CMD  
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24 as reported from other studies (12). The higher prevalence for depression in older  
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26 women may be associated with multiple stressors of income generation and child-  
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28 rearing (34). We did not find any association between caste and CMD even in  
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30 univariable analysis; this was a surprising finding given that our data confirmed strong  
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32 associations between caste and indicators of socio-economic disadvantage.  
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38 In most of the South Asian cultures there is a dominant patriarchal social matrix which  
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40 systematically disadvantages women's opportunities and status. Dowry is a long  
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42 standing (but illegal) practice which is prevalent in India; in our sample, about 80% of  
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44 women reported that dowry had been exchanged. Harassment by in-laws on issues  
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46 related to dowry is a major factor associated with poor mental health and suicides in  
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48 women (46, 47) and is also a determinant of IPV (15, 16, 48, 49). Notably, we found that  
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50 husband's unsatisfactory reaction to dowry was strongly associated with CMD, similar to  
51  
52 reports from another Indian study (46). We found a robust association between IPV and  
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54 CMD, a widely documented finding (14, 38, 46, 50-52). Our finding of no association  
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56 between remote IPV and CMD but a strong association between recent IPV and CMD is  
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3 also consistent with other studies (53, 54) and can be explained in two ways; first, the  
4 association with past violence is confounded by recent violence and second, the  
5 association with CMD subsides with time after exposure. The association of CMD with  
6 IPV can be explained by the fact that the experience of violence is likely to lead to  
7 insecurity, hopelessness, helplessness and low self-esteem (34). Our study also  
8 replicated the finding that husband's alcohol intake is an important factor associated with  
9 poor mental health in women (46). Husband's alcohol intake also has indirect impact on  
10 CMD by increasing the risk of IPV (48, 55). This constellation of factors, in addition to  
11 low education, comprises indicators of the structural disadvantages faced by women in  
12 India.  
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26 Our other findings indicate that tobacco use (which, in this sample was predominantly in  
27 the form of chewed tobacco) is associated with CMD. These findings replicate a growing  
28 literature from studies in developed countries (56, 57) and at least one other Indian  
29 study(53). The effects of tobacco are probably mediated through multiple pathways,  
30 including the pharmacological effects of nicotine on the central nervous system and the  
31 experience of tobacco-related illness (58) as well as common or correlated risk factors  
32 (57). We did not find an independent association between any other physical (BMI and  
33 anaemia) or reproductive health factors (total number of live births and history of induced  
34 abortion) with CMD. No association between anaemia and CMD is consistent with other  
35 Indian studies (12) (53). Thus, although CMD and anaemia are both relatively common  
36 and often co-morbid, the symptoms of CMD experienced by women with anaemia are  
37 not attributable to the anaemia.  
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53 A major limitation of our study is that the follow-up and baseline were not planned as a  
54 prospective study *a priori* and there are important differences in the measurements of  
55 exposures and outcomes. In particular, we did not have a measure of CMD at baseline  
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3 and are therefore unable to adjust for baseline mental health in our analyses. In addition,  
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5 the selection of baseline factors for analyses of association with CMD were constrained  
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7 to the variables measured. The outcome of CMD was measured using a screening  
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9 questionnaire rather than a lengthier diagnostic interview; however, this is a common  
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11 practice in the context of a large population-based study where multiple outcomes are  
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13 being assessed alongside mental health. Several population-based studies have  
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15 reported good construct validity for the GHQ-12 (59-61). Although the GHQ score does  
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17 not in itself represent a diagnosis of CMD, it shows very high discriminating ability  
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19 against ICD10 diagnostic criteria for CMD (30). As the study sample consisted only of  
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21 rural, married women in the age group of 15-39, our findings may not generalize to other  
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23 groups of women (for example, those who are separated from their husbands and older  
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25 women). During the follow-up, only one woman (the youngest) from each household  
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27 was selected, which makes the sample biased towards younger age group. The  
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29 estimates of IPV in the baseline and follow-up surveys are not strictly comparable as  
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31 there were only two questions in the baseline survey compared to a battery of questions  
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33 in the follow-up survey. This might have resulted in under-reporting of IPV at baseline.  
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40 The strength of this study is that it is based on one of the largest, nationally-  
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42 representative, datasets of women's mental health in a rural setting in the developing  
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44 world. We observed a high response rate despite the long follow-up period. Our study  
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46 confirms that both social disadvantage related to social class inequalities and gender  
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48 disadvantage, are independently associated with CMD in women. In order to reduce the  
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50 burden of women's mental health problems in India it is vital to strengthen interventions  
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52 which address structural determinants, notably woman's education, the practice of  
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54 dowry, spousal alcohol abuse and IPV.  
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Figure 1: Conceptual framework for the analysis

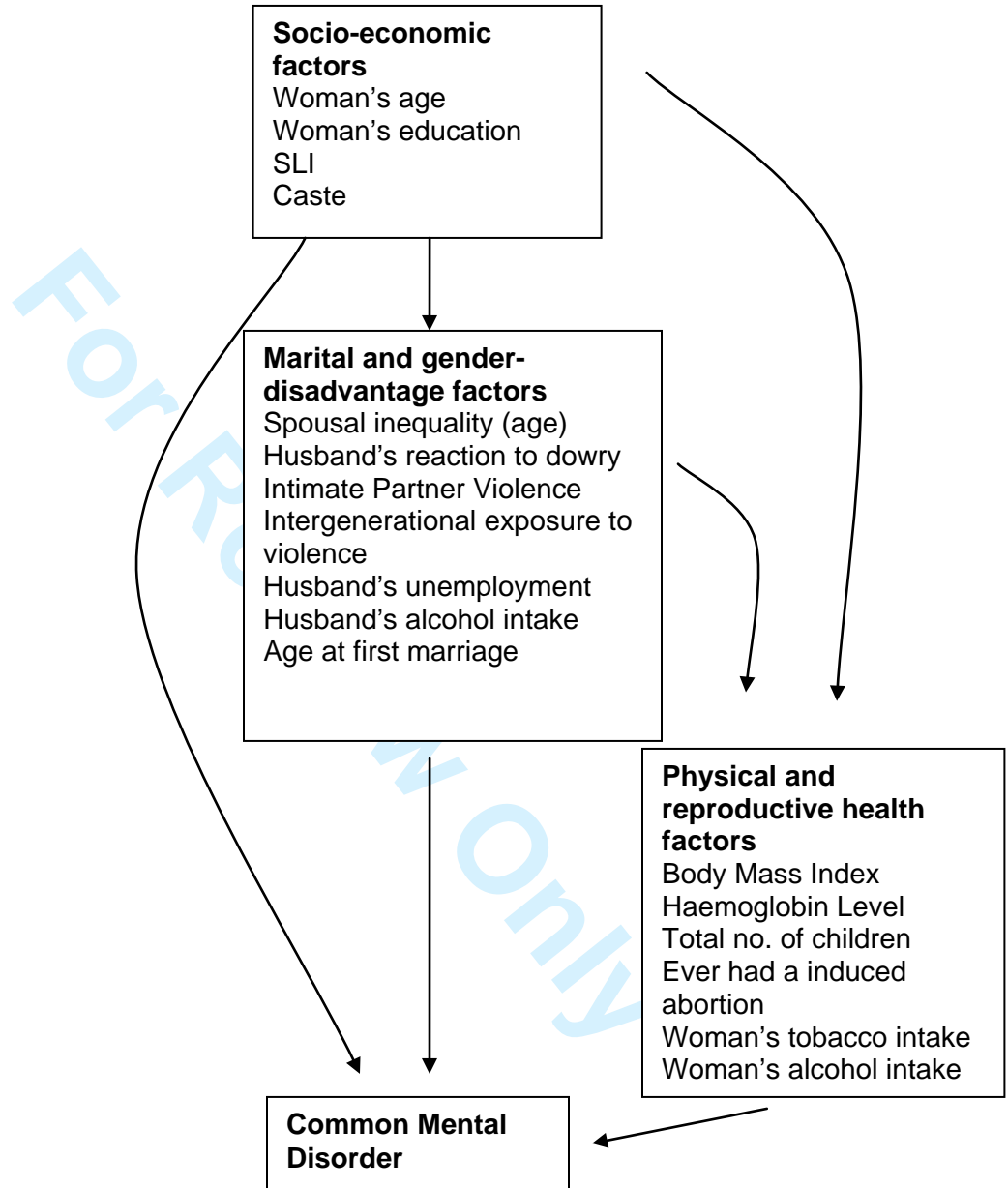
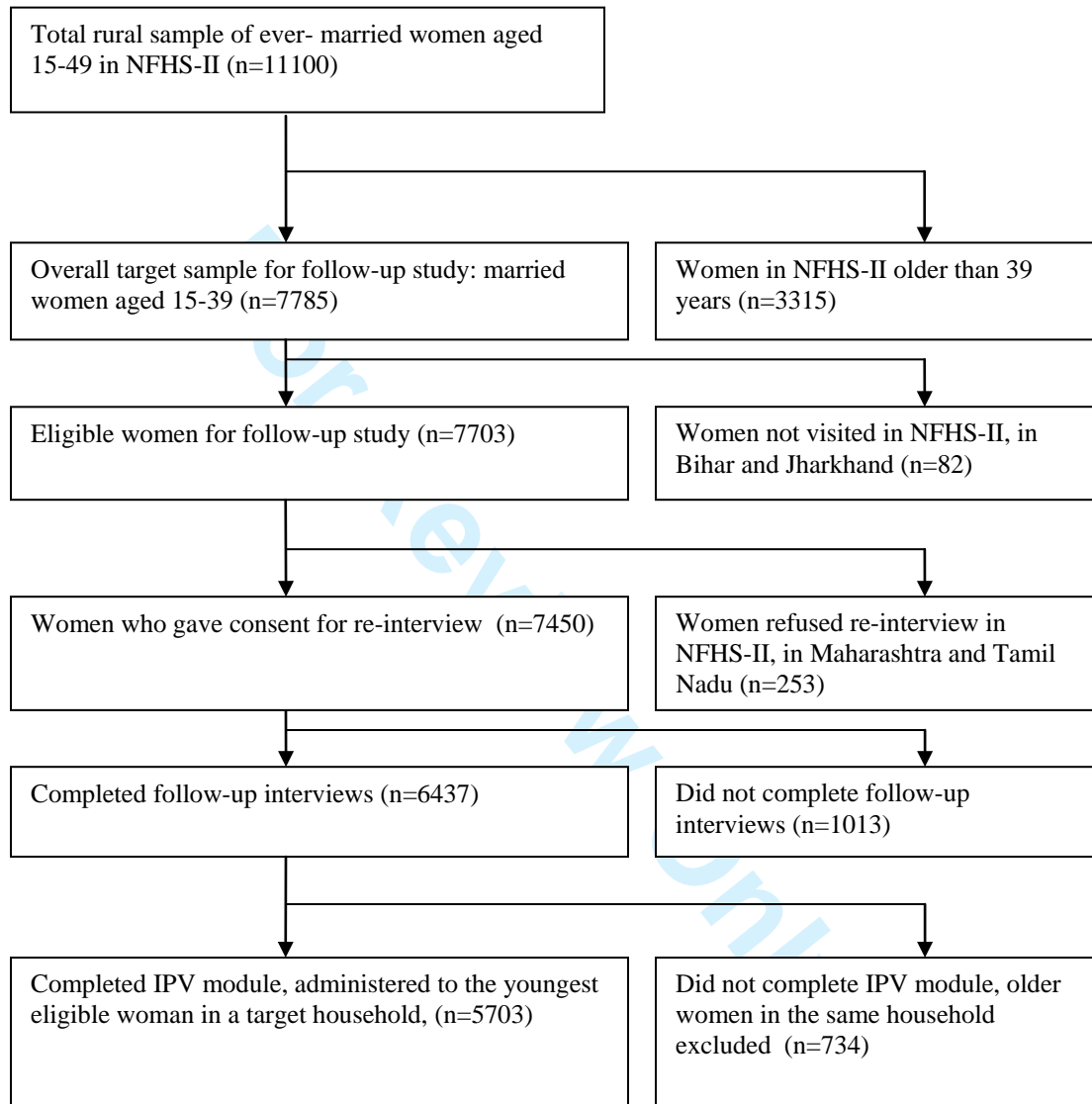




Figure 2: Flow chart of sample selection



**Table 1: Univariable analysis of association of factors associated with Common Mental Disorders (N= 5703, unless otherwise specified)**

Variable	Prevalence n (%)	Presence of CMD	Timeline of measurement	Unadjusted odds ratio with 95% CI	p value
<b>Socio-Economic factors</b>					
Woman's age			Baseline		
15-22 years	1477 (25.7)	144 (9.8)		1	
23-27 years	1442 (25.3)	144 (10.1)		1.1 (0.8-1.3)	0.613
28-32 years	1392 (24.5)	161 (11.6)		1.3 (1.0-1.6)	0.055
33-39 years	1392 (24.5)	160 (11.6)		1.3 (1.1-1.6)	0.006
Woman's status (education)			Baseline		
Less than middle school	4843 (84.9)	570 (11.8)		1	
Middle school or above	860 (15.1)	39 (4.5)		0.4 (0.3-0.5)	<0.001
Standard of Living Index (n=5669)			Baseline		
Low	3059 (54.0)	391 (12.9)		1	
Medium	2176 (38.3)	192 (8.8)		0.7 (0.5-0.8)	<0.001
High	434 (7.7)	21 (4.9)		0.4 (0.2-0.6)	<0.001
Caste (n=5694)			Baseline		
Scheduled Caste/Scheduled Tribe	1639 (29.1)	207 (12.5)		1	
Other Backward Class	2972 (51.9)	285 (9.6)		0.8 (0.7-1.1)	0.128
None	1083 (19.0)	116 (10.7)		0.9 (0.6-1.2)	0.350
<b>Marital and gender disadvantage factors</b>					
Spousal Inequality (years of age) woman elder or of same age			Baseline		
diff upto 5yrs	182 (3.2)	20 (11.3)		1	
diff bet 5 to 10	2528 (44.4)	284 (11.3)		1.1 (0.6-1.8)	0.779
diff more than 10	2160 (37.8)	211 (9.8)		1.0 (0.6-1.7)	0.985
	833 (14.6)	94 (11.4)		1.2 (0.7-2.0)	0.615
Husband's reaction to dowry (n=5701)			Follow-up		
Satisfied	4358 (76.4)	403 (9.3)		1	
Unsatisfied	208 (3.6)	54 (26.0)		4.0 (2.7-6.0)	<0.001
Not applicable	1135 (20.0)	151 (13.3)		1.7 (1.4-2.1)	<0.001
Husband's			Baseline		

employment					
Employed	5602 (98.2)	597(10.7)		1	
Unemployed	101 (1.8)	12 (11.8)		0.9 (0.6-1.4)	0.758
Husband's alcohol intake (n=5699)			Follow-up		
No	3382 (59.2)	296 (8.8)		1	
Yes	2317 (40.8)	312 (13.6)		1.5 (1.3-1.8)	<0.001
IPV			Baseline and Follow-up		
None	2883 (50.4)	217 (7.6)		1	
Only Baseline	497 (8.6)	45 (9.1)		1.3 (0.9-2.0)	0.164
Only Follow-up	1785 (31.4)	257 (14.5)		2.2 (1.7-2.9)	<0.001
Both	538 (9.5)	90 (16.8)		2.7 (1.9-3.8)	<0.001
Intergenerational exposure to violence (n=5690)			Follow-up		
No	4411 (77.4)	451 (10.3)		1	
Yes	1279 (22.6)	156 (12.3)		1.3 (1.1-1.6)	0.006
Age at first marriage (years)			Baseline		
15 or less	2241 (39.2)	274 (12.2)		1	
16-18	2315 (40.7)	233 (10.2)		0.9 (0.7-1.0)	0.091
19 or more	1147 (20.1)	102 (9.0)		0.8 (0.7-1.1 )	0.153
Physical and reproductive health factors					
Body Mass Index (n=5576)			Baseline		
20 or less	3582 (64.2)	409 (11.5)		1	
20-25	1753 (31.4)	166 (9.6)		0.9 (0.7-1.0)	0.150
More than 25	241 (4.3)	15 (6.2)		0.6 (0.4-1.0)	0.084
Haemoglobin levels (gm/dl) (n=5363)			Baseline		
Less than 12	3492 (65.1)	394 (11.4)		1	
More than 12	1871 (34.9)	165 (8.8)		0.8 (0.6-0.9)	0.028
Total no. of children			Baseline		
None	694 (12.2)	83 (12.1)		1	
One	872 (15.3)	98 (11.3)		1.0 (0.7-1.5)	0.873
Two	1170 (20.5)	105 (9.0)		0.8 (0.6-1.1)	0.196
Three or more	2967 (52.0)	323 (10.9)		0.9 (0.7-1.3)	0.600
Ever had a terminated pregnancy			Baseline		
No	4683 (82.1)	503 (10.8)		1	
Yes	1020 (17.9)	106 (10.5)		1.1 (0.9-1.4)	0.346

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4	Woman's alcohol			Baseline	
5	intake (n=5702)				
6	No				
7	Yes	5599 (98.0)	586 (10.5)	1	
8		103 (2.0)	23 (22.7)	1.7 (1.2-2.5)	0.005
9					
10	Woman's			Baseline	
11	tobacco intake				
12	no tobacco	5204 (91.2)	536 (10.3)	1	
13	smoking/chewing	499 (8.8)	73 (15.1)	1.7 (1.2-2.2)	<0.001
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**Table 2: Multivariable analyses of factors associated with Common Mental Disorders**

Variables	Model 1	p-value	Model 2	p-value	Model 3	p-value	Model 4	p-value
<b>Socio-economic factors</b>								
Woman's age								
15-22 years	1		1		1		1	
23-27 years	1.0 (0.8-1.3)	0.801	1.0 (0.8-1.3)	0.752	1.0 (0.8-1.3)	0.990	1.0 (0.8-1.3)	0.938
28-32 years	1.2 (0.9-1.5)	0.168	1.3 (0.9-1.6)	0.067	1.3 (1.0-1.6)	0.103	1.2 (1.0-1.5)	0.111
33-39 years	1.2 (1.0-1.5)	0.101	1.3 (1.0-1.7)	0.005	1.3 (1.1-1.6)	0.052	1.3 (1.0-1.5)	0.017
Woman's status (education)								
Less than middle school	1		1		1		1	
Middle school or above	0.5 (0.3-0.7)	<0.001	0.6 (0.4-0.8)	0.003	0.6 (0.4-0.8)	0.003	0.6 (0.4-0.8)	0.004
Standard of Living Index								
Low	1		1		1		1	
Medium	0.7 (0.6-0.9)	0.002	0.8 (0.6-0.9)	0.016	0.8 (0.7-1.0)	0.058	0.8 (0.7-1.0)	0.029
High	0.5 (0.3-0.9)	0.009	0.7 (0.4-1.1)	0.124	0.7 (0.4-1.1)	0.147	0.7 (0.4-1.1)	0.137
<b>Marital and gender disadvantage factors</b>								
Husband's reaction to dowry								
Satisfied			1		1		1	
Unsatisfied			3.1 (2.0-4.7)	<0.001	3.0 (2.0-4.4)	<0.001	3.1 (2.0-4.6)	<0.001
Not applicable			1.6 (1.3-2.0)	<0.001	1.6 (1.3-2.1)	<0.001	1.6 (1.3-2.1)	<0.001
IPV								
None			1		1		1	
Only Baseline			1.1 (0.8-1.7)	0.524	1.0 (0.7-1.6)	0.851	1.1 (0.7-1.7)	0.571
Only Follow-up			2.0 (1.5-2.6)	<0.001	2.0 (1.6-2.5)	<0.001	2.0 (1.5-2.6)	<0.001
Both			2.1 (1.4-3.2)	<0.001	2.2 (1.6-3.1)	<0.001	2.1 (1.4-3.2)	<0.001
Husband's alcohol intake								
No			1		1		1	
Yes			1.2 (1.0-1.4)	0.032	1.2 (1.0-1.4)	0.094	1.2 (1.0-1.4)	0.031
Intergenerational exposure to violence								
No			1					
Yes			1.1 (0.9-1.4)	0.427				
<b>Physical and reproductive health factors</b>								
Body Mass Index								
20 or less					1			
20-25					0.9 (0.8-1.1)	0.505		
More than 25					0.9 (0.5-1.6)	0.611		

1				
2				
3	Heamoglobin			
4	levels (gm/dl)			
5	Less than 12	1		
6	More than 12	0.9 (0.7-1.1)	0.158	
7	Woman's			
8	alcohol intake			
9	No			
10	Yes	1		
11		1.4 (0.8-2.6)	0.264	
12	Woman's			
13	tobacco			
14	intake			
15	no tobacco	1		1
16	smoking/che	1.3 (1.0-1.9)	0.077	1.3 (1.0-1.8) 0.033
17	wing			

Model 1: Socio-economic factors adjusted for each other (only factors significant in univariable analysis at  $p \leq 0.1$ )

Model 2: Marital and gender disadvantage factors adjusted for each other (only factors significant in univariable analysis at  $p \leq 0.1$ ) and factors from model 1 at  $p \leq 0.1$

Model 3: Physical and reproductive health factors adjusted for each other (only factors significant in univariable analysis at  $p \leq 0.1$ ) and factors from model 2 at  $p \leq 0.1$

Model 4: Final multivariable model