Gender Disadvantage and Reproductive Health Risk Factors for Common Mental Disorders in Women

A Community Survey in India

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Background: Gender disadvantage and reproductive health are major determinants of women's health in developing countries.

Objective: To determine the association of factors indicative of gender disadvantage and reproductive health with the risk of common mental disorders (CMDs) in women.

Design: Cross-sectional survey from November 1, 2001, to June 15, 2003.

Participants: A total of 3000 women randomly selected from a sampling frame of women aged 18 to 45 years in Goa; 2494 women participated.

Main Outcome Measures: The primary outcome was the presence of a CMD, as defined by the Revised Clinical Interview Schedule. An interview and blood and vaginal/urine specimens were collected to ascertain risk factors.

Results: The prevalence of CMD was 6.6% (95% confidence interval [CI], 5.7%-7.6%). Mixed anxiety-depressive disorder was the most common diagnosis (64.8%). Factors independently associated with the risk for CMD were factors indicative of gender disadvantage, particularly sexual violence by the husband (odds ratio [OR], 2.3; 95% CI, 1.1-4.6), being widowed or separated (OR, 5.4; 95% CI, 1.0-30.0), having low autonomy in decision making (OR, 1.98; 95% CI, 1.2-3.2), and having low levels of support from one's family (OR, 2.2; 95% CI, 1.4-3.3); reproductive health factors, particularly gynecological complaints such as vaginal discharge (OR, 3.2; 95% CI, 2.2-4.8) and dyspareunia (OR, 2.5; 95% CI, 1.4-4.6); and factors indicative of severe economic difficulties, such as hunger (OR, 2.7; 95% CI, 1.6-4.6). There was no association between biological indicators (anemia and reproductive tract infections) and CMD.

Conclusions: The clinical assessment of CMD in women must include exploration of violence and gender disadvantage. Gynecological symptoms may be somatic equivalents of CMD in women in Asian cultures.

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COMMON MENTAL DISORDERS (CMDs) are depressive and anxiety disorders that are typically encountered in community and primary care settings.[1] Although depressive and anxiety disorders are classified as separate diagnostic categories in the *International Statistical Classification of Diseases, 10th Revision (ICD-10)*,[2] the concept of CMDs is valid in community settings because of the high degree of comorbidity between these categories and the similarity in their epidemiological profiles and treatment responsiveness.[1,3-5] This study describes the association of 2 key determinants of women's health in developing countries, gender disadvantage and reproductive health, with the prevalence of CMDs among women in a general population in India. We use the term *gender* to refer to the distinguishing features of men and women that are socially constructed. Gender influences the control men and women have over the determinants of their health, including their economic position and social status, access to resources, and treatment in society.[6] Factors associated with gender disadvantage are crucial to understanding the epidemiological features of health problems in poor countries, such as the increasing rates of human immunodeficiency virus infection and AIDS in women.[7] Examples of gender disadvantage are the experience of intimate partner violence, lack of autonomy in decision making, lack of support for daily activities, and being married and bearing children during adolescence. Reproductive health is one of the

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major priorities in global public health, and is a fundamental and inalienable part of women's health.[8] Women experience unique social roles related to menstruation, childbearing, and infertility. Reproductive tract infections (RTIs) are common and pose a heavy burden of physical ill health on women.[9] Anemia, typically associated with heavy menstrual bleeding and poor nutrition, is common in developing countries.

METHODS

SETTING

The study was located in Goa, on India's west coast (population, 1.4 million). Goa has been the setting of a series of studies[10,11] on the epidemiological features and treatment of CMDs. The main language is Konkani. The 1998 to 1999 National Family Health Survey–2[12] reported that Goa ranked highly on some indicators of reproductive health. For example, fertility was low in Goa, with an average of 1.8 children per woman (national average, 2.9); this was largely attributed to the high median age of first marriage and first childbirth. On the other hand, more than 1 in 10 women reported physical violence from their spouse, and current use of a modern contraceptive was low (36%).

SAMPLE

The study population was women aged 18 to 45 years living in the catchment area of the Aldona Primary Health Centre of the north Goa district (n=8595). The area includes 9 villages and an urban area bordering a national highway. A total of 3000 women were randomly selected from the sampling frame (the population registers maintained by the health department). The eligibility criteria for recruitment were age between 18 and 50 years (because the enumeration registers were up to 4 years old in some villages); residence in the area for the next 12 months (to enable participation in the longitudinal component of the study); speaking one of the study languages (Konkani, English, Hindi, or Marathi); not experiencing cognitive impairment, which would make responding to the interview and giving informed consent difficult; and not being pregnant (because of the invasive research methods involved). If the randomly selected woman did not meet any of these criteria, or if the woman was no longer living in the area, then the researcher was instructed to replace the woman using a priori criteria for identifying an eligible woman. Eligible women who refused to participate were not replaced. Recruitment took place over a 19-month period from November 1, 2001, to June 15, 2003.

DATA COLLECTION

This study was nested in a community cohort study of psychosocial factors and gynecological morbidity. The 2 mandatory requirements for participation in this study were a face-to-face interview with a trained researcher and the collection of biological samples for the diagnosis of anemia (finger-prick sample of blood) and RTIs (vaginal and/or urine specimens). Blood samples were collected by trained field workers or laboratory technologists. Vaginal specimens were collected by either self-administered swabs or, if women consented to a medical examination, a gynecologist. The use of self-administered swabs was shown in pilot studies to be a feasible and reliable method of collection of specimens for the diagnosis of RTIs.[13] The study used a semistructured interview, which was a composite of questions eliciting data on different aspects of the woman's personal and health history, derived from several sources cited later.

The composite interview was piloted with 100 women attending gynecological outpatient clinics in the Asilo Hospital and Goa Medical College Hospital in north Goa. The interrater reliability for dichotomous items measuring key gender disadvantage and reproductive health risk factors was satisfactory (κ value range, 0.58-0.87). The data collected from participants were organized in the following manner for the analyses presented in this article.

Sociodemographic and Economic Risk Factors

Information on residence, age, education, religion, and marital status was collected from all subjects, including those who refused to participate further in the study. Data were collected from participants on the type of housing, access to water and sanitary facilities, household composition and income, employment status, indebtedness, and the experience of hunger in the previous 3 months. These questions were derived from interviews used in previous studies in Goa, including the National Family Health Survey–2[12] and a study of poverty and mental illness.[10]

Reproductive Health Factors

All participants were asked about pregnancies; numbers of pregnancies and their outcome were recorded. History of pregnancies and abortions in the previous 12 months was recorded. Participants who were sexually active in the past year were asked about their experience of difficulty in conception (infertility) in the previous 12 months and use of contraceptives. A menstrual history elicited the experience of irregular menstrual cycles, dysmenorrhea, and hypermenorrhea in the previous 12 months. Participants were asked about the experience of 6 gynecological symptoms (abnormal vaginal discharge, dysuria, lower abdominal pain, genital itching, genital sores, and dyspareunia [ie, pain or bleeding during sexual intercourse, for sexually active participants]) in the previous 3 months. Definitions of all these symptom categories were derived from recent guidelines for reproductive health research.[14] In addition to the interview data, biological indicators of reproductive health were hemoglobin level and RTIs. Estimation of hemoglobin level was based on a finger-prick sample of blood, using a hemoglobin analyzer (HemoCue system; HemoCue Ltd, Derbyshire, United Kingdom). The system gives accurate results, comparable to estimates of more sophisticated laboratory methods.[15] The diagnosis of RTIs was established using the following tests: for chlamydial and gonococcal infections, polymerase chain reaction using an automated system (Amplicor system; Roche Molecular Systems, Alameda, Calif); for *Trichomonas vaginalis*, culture using another system (InPouch TV Culture Kit; Biomed Diagnostic, San Jose, Calif); for bacterial vaginosis, the reading of gram-stained slides based on the Nugent score[16]; and for candidiasis, the reading of gram-stained slides using a rating of the density of yeast cells seen per high-power field. These are all considered gold standard tests for RTI diagnosis.[17]

Gender Disadvantage Factors

Questions covered 5 domains. The first domain of factors related to marital history: being widowed or divorced, which poses specific disadvantages for women in South Asia; and being married or having had a pregnancy during adolescence (<20 years), which indicates restricted reproductive choices.[18] The second domain covered the lifetime experience of verbal, physical, and sexual violence by the spouse and concerns about the spouse's extramarital relationships and substance use habits. Violence experienced from any other person was elicited from all par-
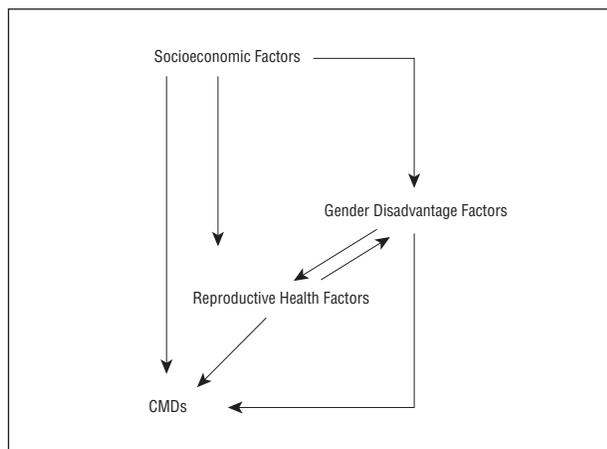
Figure. A conceptual framework for the social risk factors for common mental disorders (CMDs) in women.

ticipants. The third domain covered the autonomy the woman had to make decisions regarding visiting her mother's or friend's home, seeing a physician, keeping money aside for personal use, and having time to do things for herself. The responses to these 4 items (each scored 0-2) were combined to generate an autonomy score (range, 0-8). The fourth domain inquired about the level of engagement, in the past 3 months, in 4 activities (religious activities, participation in a community or voluntary group, social outings to meet friends or relatives, and having friends or relatives visit). The responses to these 4 items (each scored 0-4) were combined to generate a social integration score (range, 0-16). The fifth domain consisted of items regarding social support from family when faced with 5 different situations (good news, a personal problem, needing to borrow a small amount of money, feeling low, and when ill). The responses to these 5 items (each scored 0 or 1) were combined to generate a family support score (range, 0-5). Questions on these domains were derived from the National Family Health Survey–2 interview[12] and interviews used in a study of gender and postnatal depression in Goa.[19]

Outcome Measure

The primary outcome was the presence of a CMD, ie, an anxiety or a depressive disorder, measured using the Revised Clinical Interview Schedule (CISR), a structured interview for the measurement and diagnosis of a CMD in community and primary care settings.[20] The CISR has been widely used in developing countries, including India; the Konkani version used in the present study was earlier field tested for use in Goa.[21] This version was modified to prepare Hindi- and Marathi-language versions; both languages are related to Konkani. The CISR consists of 14 domains, such as anxiety, depression, irritability, obsessions, compulsions, and panic. Each domain includes mandatory and scoring questions. The sum of the scoring questions generates a total score (range, 0-57) that is a measure of nonpsychotic psychiatric morbidity; scores of 12 or more indicate case-level morbidity. The Programmable Questionnaire System generates *ICD-10* diagnoses of specific CMDs from the CISR data. In addition to the CISR, items inquired about lifetime suicide attempts and attempts to harm oneself without the intention to die.

Ethical Issues

Each selected woman was sent an information brochure on the project; a visit was scheduled to the woman's home soon after

this, at which time questions were answered and consent was obtained. The study proposal had received ethical approval from the ethics review board of the London School of Hygiene & Tropical Medicine and from the Independent Ethics Commission, Mumbai, India. Interviewers were trained in basic counseling methods, and provided advice on sources of help for those who were facing social difficulties, such as violence. Those who had severe depression, anemia, or RTIs were offered free care by the study clinical staff.

ANALYSIS

Logistic regression was used for all analyses, with CMD coded as a binary outcome (present or absent). Common mental disorder was defined based on the cutoff score of the CISR; participants who scored 12 or more were classified as cases. Analyses of the determinants of illnesses need to take into account the hierarchical relationships between determinants; an a priori conceptual framework of the relationships between these determinants provides a model to guide multivariate analyses.[22] The framework we used for the analyses is shown in the **Figure**.

First, the association of each socioeconomic factor with the outcome was estimated; all determinants whose association reached significance at $P<.10$ were included in a multivariate model. The factors independently significantly associated with the outcome ($P<.10$) in the multivariate model were retained for subsequent analyses. Next, the associations of factors in the other domains (gender and reproductive health) with CMDs were estimated, adjusting for the socioeconomic factors previously identified. In the next step, multivariate models were used to identify variables within each domain that were independently significantly associated with the outcome ($P<.10$). Analysis of risk factors associated with contraception and spousal relationships was restricted to married participants because only a few (12 of 744) unmarried, divorced, or widowed participants had had a sexual relationship in the previous year. The final model consisted of all the significant socioeconomic, reproductive health, and gender disadvantage factors independently associated with CMDs. Scores for autonomy, social integration, and family support were converted to categorical variables (tertiles or quartiles). Other continuous variables, such as household size and total household income, were also categorized based on the distribution of scores. Anemia was evaluated as a categorical variable (absent, hemoglobin level >11 g/dL; mild to moderate, hemoglobin level of 8-11 g/dL; and severe, hemoglobin level <8 g/dL). Reproductive tract infections were treated as a composite variable of any RTI (bacterial vaginosis, candidiasis, trichomoniasis, chlamydia, or gonorrhea) or any sexually transmitted infection (chlamydia, gonorrhea, or trichomoniasis). Missing values for infections were imputed as negative findings. The number of missing values for specific RTI diagnoses ranged from 6 (0.2%) for trichomoniasis to 71 (2.8%) for *Chlamydia trachomatis* infection. The primary reasons for missing values for bacterial vaginosis and candidiasis were inadequate smear results (57 of 62 for both); and for *C trachomatis* infection and gonorrhea, inhibition of the sample due to the presence of inorganic ions during the polymerase chain reaction procedure (48 of 71 missing values for the former). We report odds ratios (ORs) and 95% confidence intervals (CIs) for associations.

RESULTS

Of the 3000 randomly selected women, 2494 (83.1%) consented to participate in the study. Of those who partici-

pated, 957 (38.4%) were subjects who replaced a randomly selected woman, the most common reasons being that the selected woman was no longer a resident (41.7%) or was unlikely to be a resident for the duration of the study (4.7%) and errors in the records of the Family Health Register (39.8%). The most common reasons for refusal to participate were that the woman did not have time to participate (52.4%) or that a family member had not given permission for her to participate (18.8%). Compared with participants, refusers were more likely to be ethnic Goans (9.9% vs 1.6%; *P*<.001), Christian (39.7% vs 22.2%; *P*<.001), unmarried (41.4% vs 26.7%; *P*<.001), younger (mean age, 31.3 vs 32.3 years; *P*=.01), and more educated (mean, 10.2 vs 8.4 years; *P*<.001).

PREVALENCE OF CMDs

The prevalence of CMDs was 6.6% (n=164) (95% CI, 5.7%-7.6%). Only 2 participants who were classified as cases based on the cutoff score did not meet the *ICD-10* criteria for a diagnosis of a mental disorder. Of the remaining 162 participants, the most common diagnosis was mixed anxiety-depressive disorder (n=105), followed by mild depressive disorder (n=36), moderate or severe depressive disorder (n=13), phobic disorder (n=5), panic disorder (n=2), and generalized anxiety disorder (n=1). Sixty-two participants (2.5%) reported ever having attempted suicide; just more than a third (38.7%) of them had attempted suicide in the previous year. Forty-seven participants (1.9%) had attempted to harm themselves, but without suicidal intent. Lifetime suicide attempts were strongly associated with current CMD (OR, 18.6; 95% CI, 11.0-31.5), as were lifetime attempts to harm oneself without suicidal intent (OR, 11.8; 95% CI, 6.5-21.6).

ASSOCIATION OF CMDs
WITH SOCIOECONOMIC RISK FACTORS

Socioeconomic characteristics of the study population are presented in **Table 1**. Most participants were Hindu, and most of the remainder were Christian. Of the participants, 14.3% were unable to read and write. Most participants were homemakers; a fifth were paid employees; and the remainder were students, seasonally employed, or self-employed. Most participants lived in homes that belonged to their family. Less than half the homes had a toilet or piped water. The average household income per month was 4575 rupees (approximately US $100) or a mean per capita income per month of 988 rupees (approximately US $21). A third of households were in debt, but severe economic difficulties, as reflected by the experience of hunger in the past 3 months, were uncommon. Table 1 shows the univariate ORs for the associations for socioeconomic variables with CMDs.

Several factors, such as marital status, low education, illiteracy, being a migrant, low household per capita income, being in debt, and having experienced hunger in the previous 3 months, were associated with the risk for CMDs. After adjustment for other socioeconomic factors, the following factors were independently associated with CMDs: being single compared with being mar-

ried (OR, 0.5; 95% CI, 0.3-0.7; *P*=.001); being divorced or widowed compared with being married (OR, 2.5; 95% CI, 1.4-4.8; *P*=.003); being in debt (OR, 1.6; 95% CI, 1.1-2.2; *P*=.007); having experienced hunger in the previous 3 months (OR, 4.1; 95% CI, 2.6-6.5; *P*<.001); living in a household with 4 or more members (OR, 0.7; 95% CI, 0.5-1.0; *P*=.07); and monthly household income (≥5000 rupees vs <2000 rupees; OR, 0.6; 95% CI, 0.4-1.0; *P*=.05). These variables were included in further analyses of other domains (gender and reproductive health).

ASSOCIATION WITH
GENDER DISADVANTAGE
AND REPRODUCTIVE HEALTH RISK FACTORS

Table 2 presents the ORs for the association of factors indicative of gender disadvantage with the risk for CMDs, adjusted for socioeconomic factors. Nonsignificant trends were observed for participants who had experienced limited reproductive choices, as indicated by having had their first pregnancy during their adolescence. Risk of CMDs was significantly increased among participants who had been married during adolescence, those who had reduced autonomy in decision making, those who were less integrated in social activities, and those who were receiving less support from their families. Violence was also associated with an increased risk. The strongest risks were associated with experiencing unwanted sex with one's husband and being concerned about his sexual relationships with other women. Of the 372 participants who were worried about their husband's habits, most (77.4%) cited alcohol as a concern. Violence from someone other than a spouse was also strongly associated with CMDs; of the 93 married participants who reported such an experience, more than half (59.1%) had experienced violence from their in-laws. Of these participants, 15.1% were cases of CMDs.

Table 3 presents the ORs for the association of reproductive health factors with the risk for CMDs, adjusted for socioeconomic factors. The strongest associations were noted for gynecological symptoms (vaginal discharge, lower abdominal pain, sores in the genital area, itching in the genital area, dysuria, and dyspareunia) in the past 3 months. Menstrual complaints of irregular menses and menstrual cramps were also associated with CMDs, but hypermenorrhea was not. Among married participants, the risk was increased for those who had undergone a sterilization operation. There was no association found with obstetric factors, notably abortions, infertility, and number of pregnancies. Reproductive tract infections and hemoglobin levels were not associated with CMDs.

The final model (**Table 4**) shows that 3 domains of risk factors were independently associated with CMDs: gynecological symptoms (notably, vaginal discharge and dyspareunia), indicators of gender disadvantage (notably, autonomy, family support, sexual violence by one's husband, being widowed or divorced, and social integration), and socioeconomic factors (household size, debt, and hunger).

Table 1. Association of Socioeconomic Factors With CMDs in a Community Sample of Women in Goa, India*

Factor	% of the Sample†	Prevalence of CMDs‡	Univariate OR (95% CI)	2-Tailed P Value
Personal Demographic Data				
Age, y				
18-24	20.2	23/504 (4.6)	1.0	.05 (trend)
25-29	18.4	27/460 (5.9)	1.3 (0.7-2.3)	
30-34	20.0	40/499 (8.0)	1.8 (1.1-3.1)	
35-39	18.9	32/473 (6.8)	1.5 (0.9-2.6)	
40-50	22.4	42/558 (7.5)	1.7 (1.0-2.9)	
Subject type				
Random	61.6	101/1537 (6.6)	1.0	.99
Replacement	38.4	63/957 (6.6)	1.0 (0.7-1.4)	
Language				
Konkani	83.2	131/2074 (6.3)	1.0	.22
English	13.7	24/343 (7.0)	1.1 (0.7-1.7)	
Other	3.1	9/77 (11.7)	2.0 (0.9-4.0)	
Education, y				
0	9.7	29/241 (12.0)	1.0	<.001 (trend)
1-9	39.9	86/995 (8.6)	0.7 (0.4-1.1)	
10-14	39.6	39/989 (3.9)	0.3 (0.2-0.5)	
15-23	10.8	10/269 (3.7)	0.3 (0.1-0.6)	
Literate (read and write)				
Yes	85.7	119/2138 (5.6)	1.0	.01
No	14.3	45/356 (12.6)	2.5 (1.7-3.5)	
Ethnicity				
Goan	90.1	136/2247 (6.0)	1.0	.003
Migrant	9.9	28/247 (11.3)	2.0 (1.3-3.0)	
Religion				
Hindu	74.6	113/1860 (6.1)	1.0	NA
Christian	22.2	43/553 (7.8)	1.3 (0.9-1.9)	.15
Muslim	3.2	8/81 (9.9)	1.7 (0.8-3.6)	.17
Occupation				
Homemaker	66.7	107/1663 (6.4)	1.0	NA
Employed	20.9	32/521 (6.1)	1.0 (0.6-1.4)	.81
Other	12.4	25/310 (8.1)	1.3 (0.8-2.0)	.29
Marital status				
Married	70.2	128/1750 (7.3)	1.0	NA
Single	26.7	21/665 (3.2)	0.4 (0.2-0.7)	<.001
Divorced, widowed, or separated	3.2	15/79 (18.9)	3.0 (1.6-5.3)	<.001
Household size				
1-3	16.7	38/417 (9.1)	1.0	.04
4-5	53.7	75/1339 (5.6)	0.6 (0.4-0.9)	
≥6	29.6	51/738 (6.9)	0.7 (0.5-1.1)	
No. of children <18 y in the household				
0	26.4	43/659 (6.5)	1.0	.24
1	24.8	32/620 (5.2)	0.8 (0.5-1.2)	
2	30.3	51/755 (6.7)	1.0 (0.7-1.6)	
≥3	18.4	38/460 (8.3)	1.3 (0.8-2.0)	
Economic Characteristics				
Housing				
Own home	89.1	134/220 (6.0)	1.0	.004
Rented or other	10.9	30/274 (10.9)	1.9 (1.3-2.9)	
Toilet access				
In house	40.6	52/1013 (5.1)	1.0	.01
Outside house	59.4	112/1481 (7.6)	1.5 (1.1-2.1)	
Tap water in house				
Yes	44.4	68/1107 (6.1)	1.0	.43
No	55.6	96/1387 (6.9)	1.1 (0.8-1.6)	
Total household income per month, rupee (n = 2492)				
<2000	34.4	80/857 (9.3)	1.0	<.001 (trend)
2000-2999	17.4	32/433 (7.4)	0.8 (0.5-1.2)	
3000-4999	24.6	25/613 (4.1)	0.4 (0.3-0.6)	
≥5000	23.6	26/589 (4.4)	0.5 (0.3-0.7)	
Family in debt (n = 2443)				
No	64.7	84/1613 (5.2)	1.0	.001
Yes	33.3	75/830 (9.0)	1.8 (1.3-2.5)	
Hunger in the past 3 mo				
No	94.8	133/2364 (5.6)	1.0	<.001
Yes	5.2	31/130 (23.8)	5.3 (3.4-8.1)	

Abbreviations: CI, confidence interval; CMD, common mental disorder; NA, data not applicable; OR, odds ratio.
*N = 2494 unless otherwise specified.
†Percentages may not total 100 because of rounding.
‡Data are given as number/total number (percentage).

Table 2. Association of Gender Disadvantage Factors With CMDs in a Community Sample of Women in Goa, India*

Factor	% of the Sample†	Prevalence of CMDs‡	Adjusted OR (95% CI)§	2-Tailed P Value
Age at marriage, y‖				
<18	8.5	21/148 (14.2)	1.0	.04 (trend)
19-20	24.6	36/430 (8.4)	0.6 (0.3-1.2)	
21-24	36.1	40/631 (6.3)	0.5 (0.3-0.9)	
≥25	30.9	31/541 (5.7)	0.5 (0.3-0.9)	
Age at first pregnancy, y¶				
<20	14.9	33/257 (12.8)	1.0	.70 (trend)
20-29	76.3	94/1320 (7.1)	0.7 (0.4-1.1)	
30-39	8.8	7/152 (4.6)	0.4 (0.2-1.0)	
Husband abuse‖				
Verbal				
No	85.2	78/1491 (5.2)	1.0	<.001
Yes	14.8	50/259 (19.3)	3.3 (2.2-4.9)	
Physical				
No	90.6	90/1585 (5.7)	1.0	<.001
Yes	9.4	38/165 (23.0)	3.5 (2.2-5.6)	
Sexual				
No	96.3	109/1686 (6.5)	1.0	<.001
Yes	3.7	19/64 (29.7)	4.4 (2.4-8.1)	
Violence from others				
No	94.6	140/2358 (5.9)	1.0	<.001
Yes	5.4	24/136 (17.6)	2.8 (1.7-4.7)	
Concerns about husband's extramarital affair‖				
No	98.6	119/1726 (6.9)	1.0	<.001
Yes	1.4	9/24 (37.5)	5.5 (2.1-14.1)	
Concern about husband's habits‖				
No	78.8	70/1379 (5.1)	1.0	<.001
Yes	21.2	58/371 (15.6)	2.7 (1.8-3.9)	
Social integration				
High	31.5	42/785 (5.3)	1.0	.02
Medium	32.8	41/819 (5.0)	1.0 (0.6-1.5)	
Low	35.7	81/890 (9.1)	1.6 (1.0-2.3)	
Autonomy in decision making				
High	33.4	39/832 (4.7)	1.0	.001
Medium	42.6	67/1062 (6.3)	1.5 (0.9-2.3)	
Low	24.0	58/600 (9.7)	2.2 (1.4-3.4)	
Support from family				
High	52.4	56/1306 (4.3)	1.0	<.001
Medium	28.3	47/706 (6.7)	1.5 (1.0-2.3)	
Low	19.3	61/482 (12.7)	2.7 (1.8-4.0)	

Abbreviations: See Table 1.
*N = 2494 unless otherwise specified.
†Percentages may not total 100 because of rounding.
‡Data are given as number/total number (percentage).
§Adjusted for marital status, household size, income, debt, and hunger.
‖N = 1750 (married women only).
¶N = 1729 (women who reported a pregnancy).

COMMENT

Our study sought to describe the associations between factors indicative of gender disadvantage and reproductive health, 2 major determinants of women's health, with the risk for CMDs in women aged 18 to 50 years. This age band was chosen because it is the target for reproductive health research and because the burden of CMDs falls disproportionately on women of childbearing age.[23] The principal findings of our study are that, in a population of women living in a rural and periurban community in India, the risk for CMDs was significantly higher in those who had experienced gender disadvantage and economic difficulties. Common mental disorders were

strongly associated with several gynecological complaints, but they were not associated with obstetric factors or the 2 biological markers of reproductive health: RTIs and anemia.

The strengths of this population-based study are the relatively high participation rates despite the invasive nature of the investigations required; the use of standardized, validated, and field-tested methods for diagnosis of CMDs; the use of indicators of economic, reproductive health, and gender disadvantage, which are culturally appropriate and validated; and the use of biological indicators of reproductive health exposures. The sociodemographic characteristics of our sample were similar to those for the population in north Goa.[12] The limitations

Table 3. Association of Reproductive Health Factors With CMDs in a Community Sample of Women in Goa, India*

Factor	% in the Sample†	Prevalence of CMDs‡	Adjusted OR (95% CI)§	2-Tailed *P* Value
Obstetric Factors				
Ever pregnant				
No	30.7	30/765 (3.9)	1.0	.84
Yes	69.3	134/1729 (7.7)	0.9 (0.4-1.9)	
Pregnancy in the past year‖				
No	85.0	119/1469 (8.1)	1.0	.40
Yes	15.0	15/260 (5.8)	0.8 (0.4-1.4)	
No. of pregnancies‖				
1	44.6	51/771 (6.6)	1.0	.71 (trend)
2	45.2	66/782 (8.4)	1.2 (0.8-1.7)	
≥3	10.2	17/176 (9.7)	1.0 (0.5-1.8)	
Lifetime induced abortions‖				
No	78.4	105/1355 (7.7)	1.0	.56
Yes	21.6	29/374 (7.7)	1.1 (0.7-1.8)	
Induced abortion in the past year‖				
No	97.0	129/1678 (7.7)	1.0	.35
Yes	2.9	5/51 (9.8)	1.7 (0.5-5.4)	
Infertility in the past year¶				
No	91.2	114/1596 (7.1)	1.0	.51
Yes	8.8	14/154 (9.1)	1.2 (0.6-2.3)	
Use of intrauterine contraceptive device¶				
No	95.8	124/1677 (7.4)	1.0	.62
Yes	4.2	4/73 (5.5)	0.8 (0.3-2.2)	
Sterilized¶				
No	74.3	78/1300 (6.0)	1.0	.02
Yes	25.7	50/450 (11.1)	1.7 (1.1-2.5)	
Gynecological Complaints				
Vaginal discharge				
No	85.5	104/2133 (4.9)	1.0	<.001
Yes	14.5	60/361 (16.6)	4.4 (3.0-6.2)	
Itching in genitals				
No	85.3	114/2128 (5.4)	1.0	<.001
Yes	14.7	50/366 (13.7)	2.8 (1.9-4.0)	
Sores in genitals				
No	96.3	147/2403 (6.1)	1.0	<.001
Yes	3.6	17/91 (18.7)	3.6 (2.0-6.5)	
Pain in abdomen				
No	86.1	111/2148 (5.2)	1.0	<.001
Yes	13.9	53/346 (15.3)	3.0 (2.1-4.4)	
Dysuria (burning while urinating)				
No	90.6	127/2260 (5.6)	1.0	<.001
Yes	9.4	37/234 (15.8)	2.8 (1.8-4.2)	
Dyspareunia (pain or bleeding during sex) (20 missing responses)¶				
No	93.1	102/1629 (6.2)	1.0	<.001
Yes	5.8	25/101 (24.7)	5.1 (3.0-8.6)	
Irregular menses#				
No	35.6	39/805 (4.8)	1.0	.02
Yes	64.4	109/1457 (7.5)	1.6 (1.1-2.3)	
Bled for >10 d#				
No	95.7	140/2164 (6.5)	1.0	.64
Yes	4.3	8/98 (8.2)	1.2 (0.6-2.6)	
Menstrual cramps#				
No	45.3	44/1025 (4.3)	1.0	<.001
Yes	54.7	104/1237 (8.4)	2.2 (1.5-3.2)	
Biological Indicators				
Hemoglobin level, g/dL**				
<8.0	1.4	4/35 (11.4)	1.0	.37
8.0-10.9	17.2	30/430 (6.9)	0.4 (0.1-1.4)	
≥11.0	80.9	130/2018 (6.4)	0.4 (0.1-1.3)	
Any RTI				
No	73.0	114/1822 (6.3)	1.0	.81
Yes	26.9	50/672 (7.4)	1.0 (0.7-1.5)	
Any STI				
No	95.9	154/2393 (6.4)	1.0	.61
Yes	4.0	10/101 (9.9)	1.2 (0.6-2.4)	

Abbreviations: CI, confidence interval; CMD, common mental disorder; OR, odds ratio; RTI, reproductive tract infection; STI, sexually transmitted infection.
*N = 2494 unless otherwise specified.
†Percentages may not total 100 because of rounding.
‡Data are given as number/total number (percentage).
§Adjusted for marital status, household size, income, debt, and hunger.
‖N = 1729 (women who reported ever having a pregnancy).
¶N = 1750 (married women only).
#N = 2262 (excluding menopausal women and those who had had a hysterectomy).
**N = 2483.

of our study lie in the possibility of a sampling bias arising because of nonparticipation in the study. Factors associated with nonparticipation included education and being given permission by family members, which were indicative of gender disadvantage and which we hypothesized were associated with the risk of CMDs. The same interviewer carried out the interviews, which elicited data on the risk factors and outcomes; this may have led to a bias due to lack of blinding. However, the interview used for the diagnosis of CMDs is structured and was validated for use in the setting.

The rates of CMDs vary greatly between populations in South Asia, with a median rate of 10% in adult populations.[24,25] The prevalence rate we report is lower than this; the rate is lower than that reported from studies in developed countries, such as the United States and United Kingdom,[26,27] and indicates better mental health in this population. However, virtually all population-based studies have also reported a strong association between social and economic deprivation and the risk for CMDs. Among the probable explanations for our finding of lower rates are that they are a reflection of the overall better status of social and economic development in general, and women's status in particular, in this state of India, relative to neighboring states of the country.[12] Recent reviews[23,28] on the risks associated with women's health, and more specifically mental health, highlight the important role of gender disadvantage. There has been little research on the association of socially determined vulnerabilities for women, in particular those reflecting gender disadvantage with CMDs in developing countries. Our study provides evidence that a range of factors indicative of gender disadvantage are strongly associated with the risk for CMDs. Because ours is a cross-sectional survey, we cannot make definitive inferences on the temporal direction of this association; however, we think that the most likely explanation for the association is that gender disadvantage increases the likelihood of experiencing adverse life events, a well-established risk factor for CMDs.[29]

While considerable improvement in the status of women has occurred in recent decades, most South Asian cultures continue to be characterized by a dominant patriarchal social matrix. Thus, for example, boys are often favored over girls, a value system that is largely to blame for the growing sex imbalance in the population.[30] The birth of a girl, especially when a mother has already borne girls, is associated with an increased risk of depression in mothers.[19] Boys are more likely to access various opportunities, from education and employment to control over financial resources, than girls. Girls are often married during adolescence, and childbearing is the primary social role for married women; children are borne early, and often in quick succession, following which contraception is most often through female sterilization.[31] Many of these factors were associated with the risk for CMDs in our study. In addition, having low autonomy and poor support from one's family, and lack of integration with social activities, were risk factors for CMDs. Being widowed or separated is a source of considerable stigma and discrimination in Indian society, and it was not surprising that these women had a greater risk for CMDs.

Table 4. Final Multivariate Model of Risk Factors for CMDs in 2494 Women in Goa, India

Risk Factor	Odds Ratio (95% Confidence Interval)	P Value
Gynecological Complaints		
Vaginal discharge	3.2 (2.1-4.8)	<.001
Pain in lower abdomen	1.6 (1.0-2.3)	.04
Dysuria	1.8 (1.1-2.9)	.01
Dyspareunia	2.5 (1.4-4.6)	.002
Menstrual cramps	1.6 (1.1-2.4)	.02
Gender Disadvantage		
Marital status		
Married	1.0	NA
Single	0.7 (0.1-3.7)	.70
Widowed, divorced, or separated	5.4 (1.0-30.0)	.05
Forced sex (in married women)		
No	1.0	.02
Yes	2.3 (1.1-4.6)	
Concern about husband's habits (in married women)		
No	1.0	.003
Yes	1.9 (1.2-2.9)	
Violence from others		
No	1.0	.005
Yes	2.2 (1.3-3.7)	
Social integration		
High	1.0	.06
Medium	1.0 (0.6-1.6)	
Low	1.5 (1.0-2.3)	
Support from family		
High	1.0	.001
Medium	1.3 (0.8-1.9)	
Low	2.2 (1.4-3.3)	
Autonomy		
High	1.0	.005
Medium	1.5 (0.9-2.3)	
Low	2.0 (1.2-3.2)	
Sociodemographic		
Household size		
1-3	1.0	NA
≥4	0.6 (0.4-0.9)	.02
Debt	1.4 (0.9-2.0)	.09
Hunger in the past 3 mo	2.8 (1.6-4.6)	<.001

Abbreviations: See Table 1.

Perhaps the most well-recognized indicator of gender disadvantage is gender-based violence. Domestic violence is extremely common in India; some surveys show that up to a third of married women report physical violence from their husbands, and that violence is strongly associated with lack of autonomy in decision making.[32] There is established evidence linking domestic violence with an adverse effect on women's mental health in rich and poor countries.[28,33] Our study has replicated these findings. Sexual violence within marriage is a relatively taboo subject in India; our study demonstrates that the experience of unwanted sex, although relatively infrequent, is strongly associated with CMDs. Pain or bleeding during sexual intercourse (dyspareunia) was also strongly associated with CMDs. We did not explore the context of this symptom; however, it is plausible that the complaint is linked to the experience of sexual violence

and an unhappy marriage. Violence by others, most often in-laws, was also a significant risk factor. Our findings are particularly significant in light of the evidence of an enormous global burden of gender-based violence and its relationship to social, economic, and culturally determined norms about sex roles in society.[34,35]

Our findings of a strong and consistent association between gynecological complaints and CMDs may be interpreted in 2 ways. First, we must consider the possibility that the presence of complaints leads to CMDs. Second, we must consider the possibility that gynecological complaints are somatic idioms for CMDs. Because ours was a cross-sectional survey, we are unable to assess the temporal direction of the relationship reported; for this, longitudinal studies are needed. However, none of the biological indicators of reproductive health were associated with CMDs and, thus, we think that the association is more likely to be explained by the fact that the complaints are the result of CMDs. The strong association of gynecological complaints with CMDs in developed countries is well established[36]; there is growing evidence demonstrating this relationship in developing countries, where cultural factors related to explanatory models of reproductive and mental health experiences may enhance the association between these health domains.[37,38] Thus, it is plausible that gynecological complaints are somatic idioms of distress associated with CMDs. An analysis of the risk factors for the complaint of abnormal vaginal discharge found that CMD was independently associated with the complaint.[39] Clinicians, particularly those concerned with gynecological health, should be sensitive regarding mental health issues in women with gynecological complaints.

The association of economic difficulties with CMDs replicates the findings of similar studies from other developing countries[40]; in many countries, poverty is disproportionately experienced by women, and our study demonstrates the double burden of gender disadvantage and poverty on the risk of CMDs in women. National surveys in India[12] and other developing countries clearly demonstrate that the strong linkages between gender disadvantage and poverty with women's health and global health policy are increasingly influenced by this evidence. There is an opportunity for mental health research in developing countries to ally with other public health research programs that have an emphasis on gender issues, and vice versa. Thus, if researchers working on gender and health issues were more aware of the powerful linkages with mental health, then a more complete picture of health could be achieved by integrating mental health concerns in their study designs. The area of maternal and reproductive health, one of the Millennium Development Goals,[41] provides a good example of the potential offered by adopting such an approach. The growing global concern regarding violence in families and communities, a significant proportion of which is fueled by alcohol abuse, similarly provides an opportunity for researchers on substance abuse to integrate gender into their work.[42] At the level of mental health policies, it is essential that social, cultural, and economic determinants of gender disadvantage be challenged at all levels of the health system to promote women's mental health.

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Announcement

Clinical Trials Registration Required. In concert with the International Committee of Medical Journal Editors, *Archives of General Psychiatry* will require, as a condition of consideration for publication, registration of clinical trials in a public trials registry (such as http://ClinicalTrials.gov or http://controlled-trials.com). Trials must be registered at or before the onset of patient enrollment. This policy applies to any clinical trial starting enrollment after March 1, 2006. For trials that began enrollment before this date, registration will be required by June 1, 2006. The trial registration number should be supplied at the time of submission.

For details about this new policy see the editorials by DeAngelis et al in the September 8, 2004 (2004;292: 1363-1364) and June 15, 2005(2005;293:2927-2929) issues of *JAMA*.