

Prevalence of Obstetric Fistula and Pelvic Organ Prolapse in Bangladesh: Summary of the 2016 National Estimates

Background

Nonfatal complications of childbirth can have severe and long term consequences for women and their families. The true global burden of maternal morbidity is unknown, though it is estimated that for every maternal death, 20 to 30 other women suffer from acute or chronic morbidity.¹ Obstetric fistula (OF) and pelvic organ prolapse (POP) are two of the most important chronic maternal morbid conditions.^{2,3} Measuring prevalence of these conditions is challenging; self-reported data from surveys are known to have low diagnostic value and tend to overreport OF and POP. Correct diagnoses of OF and POP require clinical examination.

Very few studies of OF and POP have been done in Bangladesh, and these were based on self-reports. In a 2003 cross-sectional study, 1.69 per 1,000 Bangladeshi women who had ever been married reported OF symptoms.⁴ In a 1996 cross-sectional study, the prevalence of self-reported POP symptoms was 150 per 1,000 among Bangladeshi women.⁵

Measuring Obstetric Fistula and Pelvic Organ Prolapse at the National Level

The Bangladesh Maternal Mortality and Health Care Survey (BMMS) in 2016 aimed to measure national levels of OF and POP. Validating self-reported cases of OF and POP in the BMMS sample through clinical examination was not feasible for a nationwide sample of women. Therefore, we conducted a complementary study—the Maternal Morbidity Validation Study (MMVS)—to gather information on the validity of the self-reported OF and POP that can then be used to adjust the national level estimate from the BMMS data. The study was implemented by a partnership including MEASURE Evaluation, icddr, the Maternal & Child Health Integrated Program, Fistula Care Plus, Bangladesh's National Institute of Population Research and Training, and Johns Hopkins University, with funding from USAID and UKAID. The MMVS had two goals:

- Validate the diagnostic properties of a screening tool administered both in the BMMS 2016 and MMVS 2016.



Box 1. Screening questions

Self-reported obstetric fistula cases

- Does your urine leak continuously, even when you are not urinating/trying to urinate?
- Do you currently experience feces passing through the birth canal that you cannot stop, even when you are not defecating?

Self-reported 3rd- and 4th-stage POP

- In the last one year did you feel any bulge or something coming out in your vaginal area?

Self-reported urinary incontinence cases

- Do you leak urine when you are in stress—like laughing, coughing, sneezing, or lifting heavy weights?
- Do you suddenly feel the urge to go to the toilet, and accidentally leak urine?

- Apply the adjustment factors derived from the diagnostic performance to adjust the self-reported symptoms of OF and POP in the BMMS 2016 and provide national estimates.

Methods^a

- A screening questionnaire was developed to identify possible cases of OF and POP (Box 1). It was administered both in the BMMS 2016 (to a subgroup of 204,035 married women ages 15–49 with at least one birth) and the MMVS 2016 (to 56,140 married women ages 15–64 with at least one birth).
- In the MMVS 2016, all women reporting OF and a sample of women reporting POP and urinary incontinence (UI) symptoms were invited for clinical examination. The UI cases were examined to estimate the extent to which true OF and POP cases are missed by the screening questions.
- Community and individual sensitization and mobilization took place to ensure maximum attendance at the clinical examination sessions. Clinical examination was conducted at 13 clinic sites by teams of trained female medical doctors, nurses, and paramedics.
- Based on the clinical examinations, adjustment factors were derived from the sensitivity and specificity of the screening questionnaire for OF and POP cases. These

^a Details of the MMVS methods can be found in the Primer section of this brief.

adjustment factors were applied to the BMMS 2016 self-reported OF and POP cases to estimate the national prevalence of OF and of third- and fourth-stage POP.^b

Findings

Findings from the MMVS^c

- High sensitivity and specificity of the OF questions were observed. This means that the questions are unlikely to miss women with OF and that women without fistula are unlikely to be classified with fistula. However, a low positive predictive value (PPV) was also observed, which means that many women identified with fistula in the survey are not true cases. Therefore, the survey questions overestimate prevalence at the population level.
- Sensitivity and specificity of the POP questions are lower than for OF but are still relatively high. However, PPV is low, so many women identified as POP cases by the questions do not have Stage 3 or 4 POP. Therefore, the survey questions overestimate prevalence at the population level.

^b POP Stage 0 = No prolapse is demonstrated; I = The most distal portion of the prolapse is >1 cm above the level of the hymen; II = The most distal portion of the prolapse is ≤1 cm proximal or distal to the plane of the hymen; III = The most distal portion of the prolapse is >1 cm below the hymen but protrudes no further than 2 cm less than the total vaginal length; IV = Complete eversion of the total length of the vagina. The distal portion protrudes at least the total vaginal length minus 2 cm beyond the hymen.

^c Further details of the MMVS results can be found in the Primer section of this brief

Table 1: Prevalence of obstetric fistula and 3rd- and 4th-stage POP, by age group, among ever-married women 15+ years with at least one birth (BMMS 2016 national estimates)

	15–49	Age (years) 50–64	65+	Total
Female population with at least one birth in Bangladesh	34,840,027	8,014,556	4,142,888	46,997,471
Prevalence and burden of 3rd- and 4th-stage POP (per 1,000)				
Self-reported prevalence	52.0	–	–	–
Adjusted prevalence	7.9	21.5*	21.5*	11.4
Total estimated number of cases (POP)	273,873	172,316*	89,074*	535,263
Prevalence and burden of OF (per 1,000)				
Self-reported prevalence	1.21	–	–	–
Adjusted prevalence	0.38	0.53*	0.53*	0.42
Total estimated number of cases (OF)	13,357	4,218*	2,180*	19,755

*Adjusted for reporting differences in POP symptoms between the MMVS and BMMS studies

- Most (51%–61%) of the women with symptoms of OF, POP, or UI in the MMVS 2016 who had been clinically examined had some degree of perineal tear.
- Among the 19 confirmed OF cases, all reported having sought care and six reported attempted corrective surgery in the past.
- During the clinical examination, one out of the 19 confirmed OF cases reported that the continuous dripping of urine started after a pelvic surgery—suggesting possible iatrogenic fistula
- More than 500,000 Bangladeshi women are currently suffering from POP, which affects their quality of life in numerous ways. The country has no strategic health plan or intervention program for screening and management of POP.
- The cost and challenge of identification, treatment, and management of the current caseload of OF and POP is daunting for Bangladesh's health system. Therefore, the effort to combat these conditions should focus on prevention of OF and POP, to limit the number of new cases. Prevention can begin with building public awareness that OF and POP are both preventable and treatable and should not be an acceptable consequence associated with childbirth. Community awareness should be initiated on what causes OF and POP and that they can be avoided through delivery by skilled birth attendants.

National Estimation

- The national prevalence for OF was 0.42 per 1,000 women with at least one birth. In the case of recognizable POP, the national prevalence was 12 per 1,000 women with at least one birth.
- Prevalence rates of OF and POP were higher among women 50 years or older.
- In Bangladesh, there are an estimated 535,263 POP cases among women 15 years and older; half of these cases are among women between 15 and 49 years of age.
- There are also an estimated 19,755 cases of OF in Bangladesh, two-thirds of which are among women between 15 and 49 years of age.
- In the BMMS 2016, 27 women, out of 221 self-reported OF cases, reported that the continuous dripping of urine started after a surgery (13 after Caesarean section and 14 after other surgeries).
- Effective screening and identification of OF and POP depend on awareness among women of the signs and symptoms and an active screening mechanism at every point of contact with health providers. An efficient referral system must be established from the screening points to the treatment facilities for management of women diagnosed with OF and POP.
- For OF cases, surgery and rehabilitation services are not widely available, because the number of skilled surgeons in Bangladesh is limited. In addition, because surgery needs to be followed by an extended stay at a health facility, women are discouraged from seeking care. Thus, innovative solutions to increase and improve access and use of treatment are required.

Conclusions and Implications

- This is the first study to estimate the national burden of OF and POP based on adjustments for clinical confirmation of cases. It shows that the current burden of OF is roughly 20,000, which is lower than the previous estimate of 71,000 based on self-reported symptoms. Bangladesh has an OF program, but its current surgery rate is around 300 cases annually. At that rate, it would take almost 60 years to treat the women who are already living with OF. Bangladesh has a National Strategy for Fistula, which needs a comprehensive plan of action for the prevention and treatment of this condition.
- Women living with OF face a lot of social stigma and isolation. Thus, effective counseling of clients and their families is essential for proper rehabilitation and reintegration in the family and society.

The Maternal Morbidity Validation Survey: A Primer

- The MMVS was implemented in a random sample of unions in two upazilas in Sylhet. Any clusters included in the BMMS 2016 sample in these two upazilas were excluded from the MMVS.
- There were three phases to the MMVS study: (1) household census, (2) community sensitization, and (3) clinical examination.

1. Household census: All households in the selected unions were interviewed using a household questionnaire to identify members of the household. An individual morbidity screening questionnaire was then administered to all ever-married women ages 13–64 years identified in the households with the same questions used in BMMS 2016. Women who had ever given birth were asked a series of questions about OF, POP, and UI symptoms. Women who reported OF and POP symptoms were asked additional questions about their symptoms and treatment seeking.

2. Community sensitization: All women who screened positive for OF on the screening questions were visited at home by fieldworkers from the MaMoni project who provided them with information about OF and POP, gave them a referral card with a date and location for a clinical examination, and encouraged them to attend. A sample of women who screened positive for POP and other UI symptoms on the screening questionnaire were also visited at home and invited for clinical examination. The referral cards were double-blinded to hide each woman's response to the screening questions.

3. Clinical examination: Upon arrival at the designated health facility or camp, women who were selected for the clinical examination were examined by a qualified medical provider to obtain a clinical diagnosis that could be linked to the women's responses to the screening questions. Clinically positive cases of OF and POP were then referred to an appropriate facility for proper management.

- The household census identified 51,642 households of which 48,816 were interviewed. In these households, 65,740 women ages 13–64 were identified. Of these, 56,140 women reported they had ever given birth and were asked the screening questions for OF and POP.
- From the household survey, 67 women reported OF symptoms, and all these women were invited for clinical exam. Of these, 58 women attended the clinical exam and 57 completed the exam. A random sample of 181 women who reported POP symptoms (but not OF) were invited for clinical exam. Of these, 150 attended the exam and 149 completed it. A random sample of 244 women who reported other UI symptoms (but not OF or POP) were invited for clinical exam. Of these, 200 attended the exam and 191 completed it.

Data Analysis

- The analysis involves three steps: (1) estimate sensitivity and specificity and positive and negative predictive values of the OF and POP survey questions for the clinical exam sample by cross tabulating the self-reported survey responses to the screening questions by the clinical exam diagnosis; (2) adjust the estimate of sensitivity and specificity for verification bias to account for the fact that not all women had a clinical exam; and (3) use the estimates of positive and negative predictive values to adjust population-based estimates of prevalence of OF and POP in the MMVS household survey and BMMS 2016. Box 2 illustrates this process for 3rd and 4th stage POP for the MMVS household sample.
- To estimate the number of women ages 15–49 suffering from OF and Stage 3 or 4 POP in Bangladesh, we multiply the adjusted prevalence estimates from the BMMS 2016 by the estimated population of women ages 15–49 who have ever given birth.^a
- BMMS 2016 includes only women ages 15–49. The reported prevalence of OF in BMMS 2016 and MMVS 2016 among women ages 15–49 was almost identical. We assumed that this similarity holds true for older women and used the prevalence from the MMVS for women ages 50–64 to estimate the number of women age 50 and over with OF to obtain the total disease burden of fistula.
- We followed a similar process to estimate the number of women age 50 and over who are suffering from Stage 3 and 4 POP to obtain the total POP disease burden. However, we first calculated a scaling factor as the ratio of the POP prevalence reported in the BMMS and the MMVS for women ages 15–49. We then applied this scaling factor to the reported POP prevalence among women ages 50–64 in the MMVS to get an adjusted POP estimate for women ages 50–64 nationally. Finally, we multiplied this adjusted prevalence estimate by the population size of women 50 and older (who have ever given birth) to estimate the total expected number of women 50 and older who have POP.
- In summary, the calculations for women age 50 and over make the following assumptions: (1) that the national prevalence of OF among women ages 50–64 is the same as the prevalence in the MMVS study areas; (2) that the relative differential in reporting of POP symptoms in the MMVS study area among women ages 50–64 compared to the national level is the same as for women ages 15–49; (3) that the prevalence of these conditions among women age 65 and older is the same as that among women ages 50–64.

^a Source of population estimates: UN Population Division (<https://esa.un.org/unpd/wpp/DataQuery/>)

Box 2. Estimation of adjusted prevalence of 3rd- and 4th-stage POP for MMVS household sample

Step 1: Estimate sensitivity and specificity of POP questions in the clinical sample.

	Clinical Diagnosis		Total
	Yes	No	
Self-report (survey)			
Yes: POP reported			
w/o OF symptoms	28	121	149
with OF symptoms	6	24	30
No: POP reported			
w/o OF symptoms	1	190	191
with OF symptoms	1	26	27
Total	36	361	397

Sensitivity = probability of correctly identifying 3rd and 4th stage POP with the survey instrument, among women who have the condition = $(28+6)/36 = 0.944$

Specificity = probability of correctly identifying the absence of 3rd and 4th stage POP among women who do not have the condition = $(190+26)/361 = 0.598$

Positive predictive value (PPV) = probability that women who report a POP symptom on the survey actually have the condition = $(28+6)/(149+30) = 0.1899$

Negative predictive probability (NPV) = probability that women who do not report a POP symptom on the survey actually don't have the condition = $(190+26)/(191+27) = 0.9908$

Step 2: Adjust for verification bias

To adjust for verification bias, we have assumed that women who were not selected for a clinical exam would have screened similarly to women who had a clinical exam. For example, among the 13,022 women in the MMVS household survey who reported POP symptoms but did not undergo a clinical exam, $(28/149) * 13,022 = 2,447$ would be expected to be diagnosed with 3rd or 4th stage POP if they had undergone a clinical exam.

	Clinical Diagnosis		Unverified cases	Total
	Yes	No		
Self-report (survey)				
Yes: POP reported				
w/o OF symptoms	28 (+ 2447)	121 (+10,575)	13,022	13,171
with OF symptoms	6 (+1)	24 (+3)	4	34
No: POP reported				
w/o OF symptoms	1 (+ 223)	190 (+42,446)	42,669*	42,860
with OF symptoms	1 (+ 0)	26 (+6)	6	33
Total	36 (+ 2671)	361 (+53,030)	55,701	56,098

Adjusted sensitivity = $(28+2447+6+1)/(36+2,671) = 0.9169$

Adjusted specificity = $[(190+42,446)+(26+6)]/(361+53,030) = 0.799$

Adjusted PPV = $[(28+2447)+(6+1)]/(13171+34) = 0.188$

Adjusted NPV = $[(190+42,446)+(26+6)]/(42860+33) = 0.995$

*Includes women who reported other UI symptoms or no symptoms in the MMVS household survey. Women with no UI symptoms are assumed to have the same probability of being diagnosed with POP in a clinical exam as the women who reported only other UI symptoms in the clinical exam sample.

Step 3: Estimate the adjusted prevalence of 3rd- and 4th- stage POP in the MMVS household sample

- Self-reported prevalence of 3rd and 4th stage POP among ever-married women ages 15–64 who have ever given birth = $(13,171+34)/56,098 = 23.5\%$
- Adjusted prevalence of 3rd and 4th stage POP among ever-married women ages 15–64 who have ever given birth = $(36+2,671)/56,098 = 4.8\%$

Results

Results of validation of survey questions on obstetric fistula and pelvic organ prolapse (POP), Bangladesh MMVS 2016

Diagnostic Performance	Obstetric Fistula	POP (Stages 3 and 4)
Sensitivity		
Observed	100.0	94.4
Adjusted for verification bias	100.0	91.7
Specificity		
Observed	89.7	59.8
Adjusted for verification bias	99.9	79.9
Positive predictive value (PPV)		
Observed	31.5	19.0
Adjusted for verification bias	31.5	18.8
Negative predictive value (NPV)		
Observed	100.0	99.1
Adjusted for verification bias	100.0	99.5
Self-reported prevalence (ages 15–64)*	1.19	235
Adjusted prevalence (ages 15–64)*	0.40	48
Self-reported prevalence (15–49)*	1.15	232
Adjusted prevalence (15–49)*	0.37	35

*Per 1,000 ever-married women who have ever given birth

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