

# Prevalence of symptoms of vaginal fistula in 19 sub-Saharan Africa countries: a meta-analysis of national household survey data



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## Summary

**Background** Vaginal fistula is a serious medical disorder characterised by an abnormal opening between the vagina and the bladder or rectum, which results in continuous leakage of urine or stool. The burden of this disorder in sub-Saharan Africa is uncertain. We estimated the lifetime and point prevalence of symptoms of vaginal fistula in this region using national household surveys based on self-report of symptoms.

**Methods** We considered all Demographic and Health Surveys (DHS) and Multiple Indicators Cluster Surveys (MICS) from sub-Saharan Africa and included data for women of reproductive age (15–49 years). We estimated lifetime prevalence and point prevalence of vaginal fistula with use of Bayesian hierarchical meta-analysis.

**Findings** We included 19 surveys in our analysis, including 262 100 respondents. Lifetime prevalence was 3·0 cases (95% credible interval 1·3–5·5) per 1000 women of reproductive age. After imputation of missing data, point prevalence was 1·0 case (0·3–2·4) per 1000 women of reproductive age. Ethiopia had the largest number of women who presently have symptoms of vaginal fistula.

**Interpretation** This study is the first to estimate the burden of vaginal fistula in 19 sub-Saharan Africa countries using nationally representative survey data. Point prevalence was slightly lower than previously estimated but these earlier estimates are within the prevalence's credible intervals. Although vaginal fistula is relatively rare, it is still too common in sub-Saharan Africa.

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## Introduction

Vesicovaginal or rectovaginal fistula (vaginal fistula) is a serious disorder in which an abnormal opening (fistula) exists between the vagina and the bladder or rectum. Vaginal fistula in resource-poor settings usually results from prolonged or obstructed labour (obstetric fistula), but can also be the result of sexual assault or inadvertent injuries during surgery, among other reasons. It is a highly debilitating condition, with women often ostracised because of the resulting constant leakage of urine or stool through the vagina.<sup>1,2</sup> Eliminating obstetric fistula has been on the agenda of the United Nations Population Fund, through its Campaign to End Fistula, and the US Agency for International Development (USAID) programme for almost a decade.<sup>3,4</sup> However, quantifying progress through reliable health indicators is difficult. The burden of vaginal fistula among women in sub-Saharan Africa is largely unknown. The most recent community-based estimate of prevalence, using data from only two African countries (Ethiopia and The Gambia), is 1·60 (95% CI 1·16–2·10) obstetric fistulas per 1000 women of reproductive age.<sup>5</sup>

Accurate estimates of the number and proportions of women with vaginal fistula are especially difficult to obtain, as is often the case with indicators of maternal

morbidity,<sup>6</sup> because the disorder is rare and patients face discrimination and marginalisation.<sup>1,2</sup> In a 2007 review, Stanton and colleagues<sup>6</sup> described three types of report about frequency, incidence, and prevalence of obstetric fistula. The first category is mostly based on personal communications that report, without denominators, the number of patients treated. This approach was used for the Global Fistula Map,<sup>7</sup> developed by Direct Relief and the Fistula Foundation in partnership with the United Nations Population Fund, which maps the worldwide treatment capacity for vaginal fistula and the number of corrective surgeries done each year. The second type of publication relies on declarations made by the authors, or on surgeons' estimates but the source of data is often unclear. The third type, which is least common, describes methods and provides appropriate denominators, albeit with varying degrees of transparency.

In sub-Saharan Africa, the two main sources of standardised nationally representative survey data are the Demographic and Health Surveys (DHS), sponsored by USAID, and the Multiple Indicators Cluster Survey (MICS) sponsored by UNICEF. In 2004, DHS started to include questions to estimate the prevalence of vaginal fistula symptoms. However, a standardised vaginal fistula module was introduced only after the

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recommendations of a 2006 expert meeting. Similarly, the fourth round of MICS (2009–11) included a smaller but similar module of questions in a small number of countries. Some of these survey data have been used to describe the scope and magnitude of the problem of vaginal fistula.<sup>8–11</sup> However, only recently have a sufficiently large number of standardised surveys been done to enable systematic cross-country analysis.

Use of household surveys to estimate prevalence of vaginal fistula, and maternal morbidity generally, is challenging.<sup>12,13</sup> The survey's questions are not as accurate as the gold standard of a gynaecological examination, which could result in overestimated prevalence of such a rare disorder.<sup>14,15</sup> Sensitivity is not a major concern for vaginal fistula because the disorder is rare, therefore prevalence will be overwhelmingly conditioned by the survey's specificity. However, uncertainty remains about the usefulness of self-reported symptoms because the DHS vaginal fistula module has yet to be validated.

We estimated the prevalence of vaginal fistula, adjusting for uncertainty in self-reports, and the characteristics of patients from nationally representative surveys done in sub-Saharan Africa.

## Methods

### Data sources

We considered all nationally representative DHS and MICS reports with available individual-data records from sub-Saharan Africa. We included only surveys with questions about “constant leakage of urine or stool through vagina” or that incorporated a vaginal fistula module in the questionnaire (appendix). Both DHS and MICS are face-to-face household surveys administered to women of reproductive age (15–49 years).<sup>16</sup> They are household surveys that use a multistage sampling method to select a nationally representative sample of women, excluding homeless and institutionalised individuals. The sampling process is generally stratified by geographic regions, degree of urbanisation, or both. A standard questionnaire is administered by trained staff to obtain information on sociodemographic characteristics, health indicators, and, in some countries, self-reported symptoms of vaginal fistula.

### Procedures

The list of fistula-related questions varied by survey, but for those with a vaginal fistula module, respondents were asked about their knowledge of fistula, experience of fistula symptoms, presumed cause of their fistula, whether treatment was sought, and the outcome of this treatment. Additionally, some of the DHS questionnaires and all MICS questionnaires used a contingency question about fistula knowledge before asking about experience of fistula symptoms. Probing questions were often used, as well as local terms to describe the condition (eg, *maladie d'urine* in francophone countries; appendix). For surveys with a contingency question, we

have assumed that, if a respondent had never heard of “a problem such that [a woman] experience a constant leakage of urine or stool from her vagina during the day and night”, this respondent had never had symptoms of vaginal fistula.

A few surveys included fistula questions only for women who had had a livebirth in the past 5 years, for ever-pregnant women, or for ever-married women. Because these surveys used different population denominators, they were excluded from our prevalence estimates. For countries with more than one survey of fistula symptoms, only the most recent survey was used to estimate prevalence.

We assessed two main estimates of prevalence. First, we estimated lifetime prevalence of fistula symptoms. This measure is the proportion of respondents who reported having ever had symptoms of vaginal fistula. Second, we estimated point prevalence (or present prevalence) of fistula symptoms. One survey explicitly asked if women suffered from such symptoms at the time of interview (ie, DR Congo DHS 2007), whereas others collected information for women who sought treatment for vaginal fistula and the outcome of such treatment. Only women who reported a complete remission (no more leakage of urine or stool) were considered cured and were therefore not included in the numerator of point prevalence.

We estimated the number of women who had ever had fistula symptoms and the number of women who presently had vaginal fistula symptoms for each country by multiplying the prevalence estimates by the country-specific number of women of reproductive age according to the 2010 population estimates from the UNDP World Population Prospects.<sup>17</sup>

### Statistical analysis

We calculated prevalence for each country separately with sampling weights provided by DHS and MICS. These proportions were then back-transformed to the number of women reporting symptoms of vaginal fistula and rounded to the nearest integer. This step enabled us to account for the respondents' different probabilities of inclusion in the surveys. Clustering of observations for lifetime prevalence of vaginal fistula symptoms could be safely ignored because the estimated intraclass correlation coefficient<sup>18</sup> for this rare outcome is very small (0.004) and the average number of women surveyed per cluster was also small (<30).

We calculated pooled prevalence of vaginal fistula with use of a flexible hierarchical Bayesian approach, which enables sources of variation to be incorporated.<sup>19,20</sup> To adjust for limitations of the survey instruments, we adapted the latent-class model described by Joseph and colleagues<sup>21</sup> for meta-analysis of prevalence. The model assumes that each survey has its own true, but unobserved, prevalence and that the survey instruments

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