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REVIEW ARTICLE

Obstetric fistula in low-income countries

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ABSTRACT

Objective: To identify, survey, and systematically review the current knowledge regarding obstetric fistula as a public health problem in low-income countries from the peer-reviewed literature. *Methods:* The Medline and Science Citation Index databases were searched to identify public health articles on obstetric fistula in low-income countries. Quantitative evidence-based papers were reviewed. *Results:* Thirty-three articles met the criteria for inclusion: 18 hospital-based reviews; 6 on risk factors/prevention; 4 on prevalence/incidence measurement; 3 on consequences of obstetric fistula; and 2 on community-based assessments. *Conclusion:* Obstetric fistula has received increased international attention as a public health problem, but reliable research on the burden of disease and interventions is lacking.

1. Introduction

Obstetric fistula (OF) remains a major public health problem in areas where unattended obstructed labor is common and maternal mortality is high. Historically, this condition occurs outside of the medical system and results in social isolation. The global prevalence and incidence of OF are largely unknown. The most frequently cited figures are 2 million cases worldwide and an annual incidence of 50 000 to 100 000 cases [1].

OF presents a major clinical challenge to physicians in low-income countries. Much of the published literature on OF pertains to clinical aspects of the problem, yet diagnosis, treatment, and outcome of fistula repair are still not standardized, and no evidence-based relationships have been established.

A comprehensive understanding of OF includes not only prevention measures, but identification of women with the condition, access to care, and reintegration after repair. A recent supplement to the *International Journal of Gynecology and Obstetrics* published in November 2007 [2] contributed significantly to the evidence base for fistula. In the present paper, quantitative, evidence-based public health research pertaining to OF in low-income countries is systematically reviewed.

2. Methods

Medline and Science Citation Index databases were searched to identify articles on OF published between 1990 and 2008. Searches were conducted with the key terms: "vaginal fistula, urinary fistula, vesicovaginal fistula, rectovaginal fistula, fistula, urinary bladder fistula, or rectal fistula," and "obstructed labor complications, pregnancy complications, pregnancy," as well as separate searches for "obstetric fistula." The search was first conducted in February 2007 then repeated in July 2008 for updates.

Articles that were quantitative, evidence-based, in English, and regionally focused on low-income countries were selected for the review. Articles that focused solely on the clinical aspects of care, case studies, presentations of cases, and research on repair outcomes and techniques were not included. The sequence and criteria for exclusion are given in Fig. 1. Case series papers presenting psychosocial data were included. References of primary articles were searched for secondary references.

In addition to the quantitative research papers reviewed in this article, the searches produced numerous evidenced-based qualitative research reports, review papers, opinions/editorials (commentaries, advocacy), and programmatic papers (current and suggested initiatives) pertaining to OF in low-income countries. The full bibliography of all articles identified is available at the University of Michigan Global Initiatives website (http://www.med.umich.edu/obgyn/research/global/index.htm).

3. Results

The 33 quantitative, evidence-based research papers that met the criteria for inclusion were categorized according to scope and research topic: 18 hospital-based reviews; 6 risk factors/prevention papers; 4 prevalence/incidence measurements; 3 consequences of OF papers; and 2 community-based assessments.

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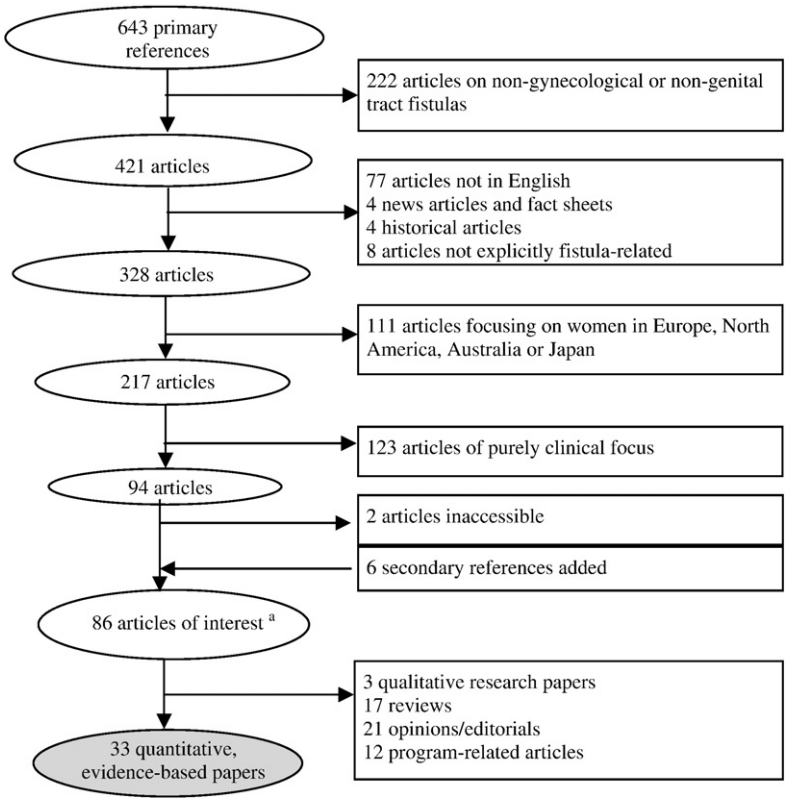

Fig. 1. Search methodology. [a]References for articles of interest that are not included in this review are available at: http://www.med.umich.edu/obgyn/research/global/index.htm.

3.1. Hospital-based reviews

Eighteen retrospective, hospital-based papers met the criteria for inclusion. Of these, 15 papers were case series or descriptive studies of general fistula patient characteristics (summarized in Table 1), and most were from Ethiopia or Nigeria.

Of the 5 case series based in Ethiopia, 4 were based at the Addis Ababa Fistula Hospital, the largest fistula repair center in the world. As summarized in Table 1, the women often acquired fistula at a young age and with the first pregnancy [3–7]. Furthermore, participants reported high divorce rates and low educational levels. Patients at Addis Ababa traveled 700 km or more and walked an average of 12.3 hours to reach the hospital [3]. Many were dependent on others for their livelihood, and some presented with other disabilities or suffered marked weight loss [4]. Another study found that distance, financial constraints, and poor knowledge were the most frequently cited problems for delays in decision and transport to health institutions during labor [7]. However, in general, the women had little or no access to healthcare, prenatal or emergency obstetric care.

Six of the descriptive studies were conducted in Nigeria [8–13] and, as summarized in Table 1, presented demographic characteristics and labor experiences similar to those of patients in Ethiopia, although Nigerian women tended to be older and developed fistula at higher parity (4 or 5). In addition, 1 study found that the women experienced delays in seeking care during obstructed labor mainly due to a lack of permission to seek care and little accessible transportation. Also among other diseases and causes, the traditional Hausa surgery known as “gishiri cutting” (a series of random cuts made inside the vagina with a sharp instrument to enlarge the birth passage) was mentioned as a cause of fistula [12]. One study reported a hospital-based incidence estimate of 1.1 per 1000 births [13].

One study in Ghana reviewed cases over a 25-year period and found the highest incidence to occur at the extremes of reproductive age and parity. A crude incidence of 1 OF per 1000 deliveries was estimated [14].

In a more recent study in Niger, characteristics of women with OF who were treated at the Niger Fistula Center at the National Hospital were mostly consistent with those presented in other case series. However, the majority of these women began the birthing process at home but delivered in a health center. While the labor duration is shorter on average than those found in previous case series, there is still indication that women are reaching the healthcare system too late, highlighting delays in access as a major problem [15].

In a recent descriptive study in Zambia, most of the women were found to have married or developed fistula at a later age than in other studies, indicating problems with prenatal care (had more visits) and access to emergency obstetric care [16].

Finally, another recent case series covered first-time fistula patients in East Africa. Findings were consistent with those from other regions, although the women had experienced shorter labor durations and more delivered in hospitals. As such, findings highlight problems with the quality and timeliness of emergency obstetric care access [17].

In addition to case series presented in Table 1 and summarized above, 2 other hospital-based reviews were identified. One specifically reviewed postcoital injuries in Ethiopia at the Addis Ababa Fistula Hospital, reporting 91 women with fecal incontinence, 46 of whom had a rectovaginal fistula [18]. The majority occurred “under the cover of marriage” and the rest were kidnapped and raped with or without intention of marriage. All of the women were either divorced or abandoned after the onset of fistula [18]. Another retrospective review of 470 women with fistula in Nigeria examined perineal nerve injury post partum, 5% of whom noted significant motor weakness; another 470 patients were evaluated prospectively, where 65% either had a history or current signs of perineal nerve injury [19].

The final hospital-based study on obstetric destructive procedures in Ghana reviewed 2870 deliveries from 1990–1993. Of the 28 women (less than 1%) whose deliveries involved obstetric destructive procedures, 27.2% also suffered from vesicovaginal fistula and

Table 1
Case series describing characteristics of obstetric fistula patients in low-income countries

Citation	Series size	Time period	Age (at repair)	Age/parity at fistula	Labor/delivery experience	Sociodemographic characteristics	Height	Etiology[a]
Ethiopia								
Kelly [3]; Kelly and Kwast [4]	309 (drawn from 3000)	1983–1988	Ave 22.4 (9–45)	63% primiparous	Ave 3.9 days labor (1–6)	52% deserted by husband after fistula		97% obstetric
Muleta [5]	1210	1991–1992	Ave 21.6 (10–50)	56% younger than 20, 55% primiparous	77% labored more than 3 days	44% divorced after fistula, 8% had rudimentary education		97.4% obstetric 96% prolonged obstructed labor
Gessessew and Mesfin [6]	193	1993–2001	Mean 24.7 60% under 25	40% younger than 19, 47% primiparous	Ave 3.6 days labor (1–7), 92% no PNC, 58% delivered at home	67% married, 81% illiterate, 93% rural		95.3% obstetric
Muleta [7]	639	1999–2000		84% younger than 20, 64% primiparous	Ave 3.8 days labor, 84% labored more than 3 days, 44% delivered at home	Marriage age average 14.7, first delivery ave age 17.8, 62% owned "nothing valuable," 54% divorced	Ave 149 cm	
Nigeria								
Ghatak [8]	70	1975–1980		52% age 15–19, 70% primiparous, 18% parity>4	67% delivered in hospital	93.6% married before age 18, 95% no education, 75% very poor	68% under 150 cm	83% prolonged obstructed labor
Hilton and Ward [9]	656	1990–1994	Ave 28 (7–68)	31% primiparous, Ave parity: 3 (0–17)	Ave 2.5 days labor, 57% managed labor at home	62.5% married, 29% could sign name, 37% aware of own age		92.2% obstetric 80% prolonged obstructed labor (2389 cases 1970–1994)
Gharoro and Abedi [10]	49	1992–1997	Ave 31 (20–65)	Ave parity: 3 (1–11)	Ave 3 days labor, 65% operative delivery			
Ibrahim et al. [11]	31	1996–1997		60% age 13–15, Ave age 15, 81% primiparous	Ave: 4 days labor	55% divorced, 6% literate, 60% rural	Ave 149 cm (140–159)	100% prolonged obstructed labor
Wall et al. [12]	932	1992–1999	Ave 27	45.8% primiparous, 20% parity>4	24% home delivery	26% married, ave age at marriage 15.5, 78% illiterate, common occupation in manual labor	Typical 44 kg, under 150 cm	96.5% obstetric
Ijaiya and Aboyeji [13]	24	1989–1998		26% age 15–19 yrs, Ave age 23.9, 50% primiparous, 32% parity>5	91% attempted home delivery	94.1% illiterate, 24% separated/divorced		82% prolonged obstructed labor
Ghana								
Danso et al. [14]	164	1977–1992	Ave 26.6	43% primiparous, Ave parity 2.6				91.5% obstetric
Niger								
Meyer et al. [15]	58	2005–2006	Ave 26.1 (16–44)	45% primigravida	Ave 2.6 days labor, 95% began labor at home, 91% at health center by delivery	62% married, ave age at marriage 15.6, ave first pregnancy at 17.3, all illiterate	Median 148 cm	
Zambia								
Holme et al. [16]	254	2003–2005	Median 25 (15–59)	Median age 22 (11–45), 49% primiparous, 27.6% parity >	67.5% 2 days+in labor, Delays to EmOC mostly due to transport, 97.5% attended PNC, 84.% in labor 1–3 days	15% divorced, median marriage age 18, 69% did not complete primary education	68% under 150 cm	
Kenya, Tanzania, Uganda								
Raassen et al. [17]	581	2001–2003	Median 25 (14–65)	Median age 22 (13–46), 45% primigravida, median third delivery	11.5% perinatal survival, 80% delivered in hospital, 25% labor ≥2 days	40% separated or never married, 31% completed primary education, 2% completed secondary education	70% shorter than 156 cm	100% obstructed labor

Abbreviations: Ave, average; EmOC, emergency obstetric care; PNC, prenatal care.
[a] Obstetric causes include prolonged obstructed labor, cesarean delivery, and uterine rupture.

rectovaginal fistula from prolonged obstructed labor, not the operation itself [20].

3.2. Risk factors/prevention

Six papers on 5 studies analyzed risk factors or prevention measures for obstetric fistula. One study in Nigeria with 241 cases and 148 controls found fistula patients to be younger in age and shorter in height than control patients. Fistula patients were also significantly more likely to be divorced [21,22]. Another study in Nigeria with 50 controls and 50 cases examined broader sociomedical risk factors, confirming that fistula patients are shorter, weigh less, have less education, and are of lower socioeconomic status than women who have given birth without complications [23]. In addition, age at marriage, parity, husband's occupation, and level of education were found to be predictive variables for the conditions [23]. Similarly, in a prospective comparative study of 80 consecutive cases of OF and 80 controls in northern Nigeria, the risk factors identified ($P=0$) were: age at first marriage, short stature, illiteracy, low socioeconomic status, lack of prenatal care, and rural location [24].

Outside of Nigeria, a case-control study in Bangladesh with 132 cases and 150 controls found that a higher percentage of women with fistula had smaller foot-size and height, and also no surviving children. Other psychosocial factors were explored: libido plummeted for half of the patients, over 60% expressed fear of an unhappy conjugal life, embarrassment in social life, a constant sense of impurity, and 87% were limited in spiritual activities because of the condition [25].

Finally, one paper conducted deeper analysis into risk factors using logistic regression analysis for data on deliveries in Niger, Nigeria, and Tanzania to examine correlations with obstructed labor. The authors then predicted how delaying childbearing could affect occurrence of OF. Using local data for prolonged labor and stillbirth rates and assumptions on fistula formation rates, the authors predicted that "the proportion of women experiencing prolonged/obstructed labor would be reduced by 11.2% in Niger, 11.4% in Nigeria, and 13.1% in Tanzania if the risks associated with young maternal age at first delivery and primiparity were eliminated" [26].

3.3. Incidence and prevalence

Four of the papers pertained to national-level epidemiological measurements for OF. One population-based study used a door-to-door census approach to interview pregnant women in 6 major cities and a rural area in West Africa; it provided incidence estimates of severe maternal morbidity and, in a separate paper, incidence of fistula specifically in rural Africa [27,28]. Two cases of vesicovaginal fistula occurred in 19 342 women followed through the postpartum period, giving an incidence rate of 10.3 per 100 000 deliveries (95% CI, 0–37) overall and 123.9 per 100 000 (95% CI, 15–446) deliveries in the rural areas [27]. Given the population size of rural Africa and annual number of deliveries, a minimum number of women with OF in rural Sub-Saharan Africa was calculated to be approximately 33 451 cases annually [28].

In another cross-sectional study in Ethiopia on fistula prevalence, 19 153 households with 97 765 inhabitants were surveyed. Fifty-five women with fistula were identified, of which 39 untreated and 13 treated women were interviewed. The overall prevalence of OF was 2.2 per 1000 women of reproductive age, and the untreated fistula rate was 1.5/1000 [29].

Finally, the 2005 Malawi Demographic and Health Survey (DHS) was one of the first efforts to collect national prevalence data on OF, albeit through a proxy measure of symptoms, and successfully interviewed 11 698 women. A crude rate of 1557 per 100 000 live births and a lifetime prevalence of 4.7% was found. Fistula was significantly related to age, wealth, education, age at first marriage, stillbirth, and sexual violence, but not to height, age at first birth, or whether a woman has say in her own health care. However, this proxy measure has not been validated and further qualitative studies are needed [30].

3.4. Consequences of obstetrics fistula

Three papers discussed the various consequences of OF. In a hospital-based observational study of the mental health of fistula patients in Ethiopia and Bangladesh, women with fistula were found to be more likely than the controls (female hospital workers) to screen positive for probable mental health dysfunction: 97% (66/68) and 32% (9/28), respectively [31].

In another paper, the authors conducted a meta-analysis of 2 major consequences of fistula—divorce/separation and fetal/perinatal loss—on systematically-identified fistula articles in low-income countries from 1985–2005. The meta-analysis showed a wide range of divorce rates, with 36% of all women either divorced or separated. On average, 85% of women incurred fetal loss from the delivery in which the fistula developed [32].

Another paper investigated psychosocial consequences of fistula in both treated and untreated fistula patients identified through a national survey in Ethiopia [33]. While treatment improved the women's family and social life, some health, social, and sexual problems persisted. Depression is an issue, even for treated women. This highlights the need for support for reintegration and proper follow-up post repair.

3.5. Community-based assessments

Two of the papers described community-based assessments, notably on repair facilities, using both quantitative and qualitative methods. The Campaign to End Fistula presented community and facility needs assessments conducted in 20 countries [34]. Key findings show a low number of repair facilities and a low number of medical personnel performing surgery, including visiting surgeons. Other key findings identify that community members have little knowledge about fistula and misconceptions on its cause include infidelity, punishment, sexually transmitted diseases, "God's will," and femininity. Poverty was found universally to be an underlying cause of fistula, and reintegration into society after fistula repair was also seen as a major area of necessary intervention.

The Women's Dignity Project, a non-governmental organization in Tanzania, conducted research on obstetric fistula care and related issues of social vulnerability, barriers to maternal care, and health inequities. Findings included a high reliance on outside surgeons, and financial and logistical barriers to care, which formed the basis of the National Fistula Program. Other results demonstrate inequities in care for the poor and marginalized, the wide age range of women with fistula, and also challenge the notion that all women with fistula are abandoned and ostracized by their families and communities [35].

4. Discussion

With clinically-focused articles excluded, the public health research on OF is dominated by hospital-based retrospective research with some case-control studies of risk factors. The abundance of this type of information demonstrates emerging awareness of OF as a public health problem, and many come to the consensus that fistula patients are young, poor, and lack adequate health care. However, our review does highlight the broad age range of fistula suffers and refutes the idea that all fistula sufferers are abandoned by husbands and family. In addition, these studies were also limited in regional scope; most focused on Nigeria and Ethiopia until recently, when studies from other countries in East and West Africa have been published.

The few community-based or national-level studies demonstrate a tremendous gap in knowledge on the incidence and prevalence of fistula and the difficulty of using survey data to identify fistula patients. Population-level demographic data is increasingly being collected, but identifying fistula by survey is challenging, as Stanton et al. [36] found in a review. Of the 3 population-based studies

identified by Stanton et al., two are included in this review. Similar sentiments in research gaps were shared by OF experts at a meeting on the prevention and treatment of OF hosted by the Bill & Melinda Gates Institute for Population and Reproductive Health in 2005 [37].

Despite the lack of prevalence and incidence measurements in academic literature, OF research has been conducted and published by non-governmental organizations (NGOs) and other institutions in non-academic sources. Population-level fistula prevalence has been assessed by country-level demographic health surveys, including in Uganda (3% prevalence rate found) and Tanzania, although the self-report methods have not been validated in these studies either [36,38]. In addition, as NGOs such as the Women's Dignity Project and EngenderHealth regularly carry out research projects on various aspects of OF that inform national policy, further investigation of the effects of grassroots efforts to improve fistula education, identification of cases, and facilitating treatment are necessary.

In addition to understanding fistula prevalence and incidence, studies highlighting the multi-dimensional consequences of fistula, persisting even after successful treatment, indicate a need for greater attention to postrepair rehabilitation issues. In particular, the high rates of depression and suicidal ideation among fistula patients evidenced in these reviews is alarming and requires both programs and research into acute and chronic depression treatment and postrepair issues.

Also, a paucity of providers of fistula surgical repair has been noted, with a reliance on foreign surgeons in many countries. Efforts to build capacity of obstetric and gynecological physicians through in-country training has led to increased retention in Ghana [39]. Further research in the training and retention of fistula surgeons in-country and their effects on maternal morbidity and mortality reduction are needed.

While this review focused on OF, only one discussed postcoital injuries [18]; none discussed traumatic gynecologic fistula, a similar condition caused by violent rape or other forms of sexual assault which often occur in conflict settings [40]. NGOs and other institutions working on these issues should publish more results and evaluations to fill gaps in the knowledge base on OF.

Finally, this review was limited to articles in English that focused on OF, potentially excluding data embedded within larger studies and non-English articles. However, the few relevant articles with English abstracts available were case series papers and most clinically-focused only. Regions covered include other countries in West and North Africa, as well as 1 country in Eastern Europe. One article from Burkina Faso [41] gave an incidence of 23.1/100 000 deliveries, lower than incidence estimates of around 1/1000 deliveries reported in Ghana [14] and Nigeria [13].

The gaps in knowledge are clear: the academic literature needs studies of OF in expanded regions of the world, operational guidelines for interventions, and evaluation of fistula prevention programs with attention paid to postrepair issues. As the international public health community is paying greater attention to the problem of OF, accurate measures for the burden of disease from population- or community-based research are needed to guide program development and evaluate impact. Future research need not focus on descriptive demographic characteristics, but should determine to what degree maternal morbidity and mortality can be averted and how successful interventions can be implemented.

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