



## **Epidemiologic and Demographic Characteristics of Obstetric Fistula at Al-Thawra General Modern Hospital from May 2012-December 2015**

**Dr. Belquis Al-Jailani MD, Hadeel Qahtan Khalaf MD, Aisha Al-Jailani MD, Amina Al-Jailani MBBS**

Obstetrics and Gynecology Department, Al-Thawra Hospital, Sana'a, Yemen

### **Abstract**

**Objective:**

To determine the following:

- The epidemiological determinants of obstetric fistula in Yemen, and maternal sociocultural factors predisposing to obstetric fistula.
- Different types of obstetric fistula.
- To assess the success rate of obstetrical fistula operations.

**Study Design:**

This is a prospective, descriptive, analytical study carried out in the fistula unit at Al-Thawra Hospital in Sana'a, Yemen from May 2012 – December 2015, with a total of 86 cases. Data was collected through direct interviews with all patients admitted at the hospital suffering from fistula.

**Results:**

There were a total of 86 cases of obstetrical fistula. The age of patients at the time of presentation ranged between 15-60 years, with the mean age being 33 years and a median of 30 years. For 58% of cases, the age at marriage ranged from 13-29 years, and the age at first pregnancy ranged between 14-31 years. 58% of cases came from rural areas, whereas 42% came from urban areas. 88% of cases were married. 67% of cases were brought by the patients' husband to the hospital. Parity ranged from 1-12. 38% of cases were multipara and 30% were primipara. 63% of cases had urinary incontinence. 66% of cases did not seek any antenatal care. 90% of cases had fistula due to obstructed labor. The most common type of fistula was urogenital fistula (67%). 91% were operated transvaginally, and success rate at first repair attempt was 88%.

**Conclusion:**

- Obstructed labor and lack of access to transportation and primary health care in rural communities were the main contributory causes of obstetric fistula.
- Success rate is high for first attempt repair surgeries performed by a well-trained fistula surgeon.

**Keywords:** Obstetric fistula, genital fistula, etiology, surgery, epidemiology, obstructed labor, fistula, Yemen.

## Introduction

Yemen remains among the countries with the highest maternal mortality in the region with 148 maternal deaths per 100,000 live births.<sup>[1]</sup> Obstetric fistula is a common problem in our socioeconomic setup. Worldwide, an estimate of 300 million women suffer from pregnancy and childbirth-related complications.<sup>[2]</sup> Globally, 99% (286,000) of maternal deaths are in developing countries.<sup>[3, 4]</sup>

For each maternal death, 15-30 other women are left with serious morbidities, including obstetric fistula, a preventable condition.<sup>[5]</sup> Each year, an estimate of 50,000–100,000 women develop obstetric fistula worldwide.<sup>[6]</sup> Around two million women are living with an untreated condition. Obstetric fistula is one of the neglected causes of maternal mortality and morbidity in developing countries, including Yemen. Obstetric fistula is a condition in which the tissues normally separating the vagina from the bladder and/or the rectum are destroyed during obstructed labor. Prolonged obstructed labor during pregnancy and the unavailability of health care services are major causes of obstetric fistula.<sup>[7]</sup> Obstructed labor occurs when the fetus does not fit through the birth canal, and if labor continues for a long period of time, the blood supply to the compressed tissues is disrupted. Eventually, the injured tissues will necrose and slough away, leading to the formation of a passageway (fistula) between adjacent organs.<sup>[8]</sup> This often occurs between the vagina and bladder (vesicovaginal fistula), but may also develop between the vagina and rectum (rectovaginal fistula). In severe cases, more than one type of fistula can develop.

The physical sequelae of obstetric fistula are urinary and/or faecal incontinence, which are continuous and unremitting. These can lead to other medical complications such as infection, genital ulceration, pain, and secondary infertility.<sup>[8]</sup> In the worst cases, women with a fistula are constantly soaked in urine, shunned by people around them, banished from the family house, divorced by their husbands, and forced to the margins of society.<sup>[9, 10]</sup>

Obstetric fistula has been more prevalent in sub-Saharan Africa and Asia, with a pooled incidence of around 1.13 per 1,000 women of reproductive age.<sup>[11]</sup> In Pakistan, an estimate of 3,500 cases of obstetric fistula occur every year.<sup>[12]</sup>

Obstetric fistulas are particularly prevalent in parts of the world where emergency obstetric care is limited, nutrition is poor, there is an early age of marriage,<sup>[13]</sup> poor antenatal care, neglected prolonged labor, usually conducted by untrained birth attendants, and reduced pelvic dimensions (caused by early childbearing). The affected women are usually condemned to live with the disease in their early reproductive life. Obstructed labor remains the most important cause of obstetric fistula in developing countries (overall 90%).<sup>[14-18]</sup> These are virtually unknown to resource-rich countries: maternal mortality and severe obstetric morbidity (e.g. fistula) have decreased greatly in high-income countries during the 20<sup>th</sup> century.<sup>[19, 20]</sup> Obstetric fistulas are largely confined to the poorest 15% of the world's population.<sup>[7, 21]</sup>

Other obstetric fistula causes include caesarian section with or without hysterectomy.<sup>[15, 22, 23]</sup> Social, cultural, and health system factors contribute to the prevalence of obstetric fistula in low-income countries.<sup>[24, 25]</sup> The incidence rate of obstetric fistula is higher in places where access to obstetric care is absent or limited. However, in developing countries, poverty and malnutrition are considered as the root causes of fistula.<sup>[26, 27]</sup>

Major risk factors for obstetric fistula include child marriage associated with an early age at pregnancy, short stature, illiteracy, poverty, not attending antenatal care, rural place of residence or living far away from a health facility, lack of emergency obstetric services, and poor health services.<sup>[28-33]</sup> Other risk factors that contribute to obstetric fistula include primiparity, prolonged labor, stillbirth delivery, and poor socioeconomic status.<sup>[34-37]</sup> Lack of access to appropriate emergency obstetric care is one of the main risk factors for obstetric fistula.<sup>[38]</sup> Lack of knowledge, cultural beliefs and values, isolation, unreliable public transportation and no direct methods of communication between villages and rural health centers or district hospitals contribute to the delay of seeking health care in cases of emergency.<sup>[39]</sup>

There are three delays that contribute to the development of obstetric fistula: delay in making the decision to seek care, delay in arriving at a health facility, and delay in the provision of adequate obstetrical care.<sup>[40]</sup> Obstetric fistula has several consequences on women's reproductive health, and it is considered a major public health threat.<sup>[41]</sup> Women

with obstetric fistula are indicators of the failure of health systems in delivering accessible, timely, and appropriate intrapartum care.

Obstetric fistula cases are prevented by taking adequate care during pregnancy,<sup>[42]</sup> the diagnosis of obstructed labor is made early, and prompt intervention takes place before extensive ischemia has occurred.<sup>[43]</sup>

Women with obstetric fistula suffer significant psychological and physical repercussions, and social effects, including isolation, rejection by society, divorce, loss of social roles, loss of income, stigmatization, shame, and diminished self-esteem<sup>[44]</sup>. It is important to prevent and manage fistula in order to improve maternal health status. Reliable data and research on this maternal morbidity are lacking due to the stigma related to this condition.<sup>[45-47]</sup> No population-based data for prevalence of obstetric fistula is available. Research on causes and consequences of obstetric fistula is needed. The underestimation of fistula cases is another issue of concern. In Yemen, the actual incidence of obstetric fistula is not well-documented.

In order to determine the epidemiological and demographic characteristics of obstetric fistula and maternal sociocultural factors predisposing to obstetric fistula, we carried out this prospective study in Al-Thawra General Modern Hospital, which is one of the largest referral hospitals in Yemen, from the 1<sup>st</sup> of May 2012 to the 31<sup>st</sup> of December 2015.

## Objectives

- To determine the etiology of obstetric fistula
- To determine the maternal demographic characteristics, risk factors, and sociocultural factors predisposed to obstetric fistula in women who have been admitted with obstetric fistula
- To determine the different types of obstetric fistula
- To examine the epidemiological determinants of obstetric fistula in Yemen
- To assess the success rate of operations performed on women with obstetric fistula

## Materials and Methods

This is a prospective, descriptive, analytic study in Al-Thawra General Modern Hospital, which is one of the largest referral hospitals in Yemen. Conducted by

direct face-to-face interviews using a close-ended and open-ended questionnaire with all women admitted to the obstetric fistula unit at Al-Thawra Modern General Hospital who suffered from either urinary, stool, or both incontinence. A total of 90 women suffering from obstetric fistula were admitted to the gynecological department in the fistula unit at Al-Thawra Hospital in Sana'a between May 2012 and December 2015. Four patients were excluded from the study because they suffered from inoperable obstetric fistula, as we do not perform divarication operations such as urethro-sigmoid anastomosis. Sources of patients' admissions were the gynecological outpatient department, various filtered camps organized in rural areas of Yemen, self-referred patients, patients referred by successfully cured patients, medical practitioners working in rural- and district-level hospitals, midwives working in rural areas, and the midwife society who brought patients from different rural areas to the hospital. A detailed history of each patient was obtained, including information regarding urinary or stool incontinence or both, residence, marital status, whether or not the patient received antenatal care during pregnancy, and demographic characteristics such as age at presentation, age at first pregnancy, parity, duration of illness, duration of labor, mode of delivery, and previous attempts of repair.

Clinical examination under anesthesia and dye test using diluted povidone-iodine was carried out on all patients to determine whether it was urinary or rectovaginal fistula, to confirm type, size, and number of fistulae, and to discover any associated pathologies, such as recto-vaginal fistulae, urinary and vaginal calculi, and vaginal adhesions. The tissue mobility was assessed and accordingly decisions were made regarding the route of surgery and whether it was operable or inoperable.

The fistulae were classified as complicated when one of the following features were present: size larger than 3 centimeters, total destruction of urethra or ureteric orifices at the edge or outside the fistula, presence of combined vesicovaginal and recto-vaginal fistula, presence of vaginal and vesical calculi, or a fibrosed or stenosed vagina.<sup>[48]</sup>

Cystoscopy, intravenous urography, and/or retrograde pyelourethrography were carried out in cases with suspected concomitant ureteric injury and/or ureterovaginal fistula. Primary data were recorded and analyzed using SPSS statistical program version 16.

**Ethical Considerations:**

Approval to conduct this study was sought from the ethical committee of the hospital, and a verbal consent was obtained from each patient with obstetric fistula.

**Results**

A total of 86 women with obstetrical fistula were admitted from May 2012 to December 2015 to the obstetric fistula unit at Al-Thawra General Modern Hospital. The age of patients at the time of

presentation ranged between 15-60 years, with the mean age being 33 years and a median of 30 years.

Overall, 76 cases (88%) were married, whereas 10 women (12%) were divorced. Most of the obstetric fistula patients came from rural areas (50 cases, 58%), and the remainder (36 cases, 42%) from urban areas.

The age at marriage ranged from 13-29 years, with a median of 17 years. Age at first pregnancy ranged between 14 and 31 years, and median age was 18 years (Table 1).

**Table 1 Demographic Characteristics of Women with Obstetrical Fistula Admitted At Al-Thawra Hospital from 2012-2015**

Variable	Number	Percentage
<b>Age at presentation (years)</b>		
<20	8	9.30%
20-29	32	37.20%
30-39	30	34.88%
40+	16	18.60%
Total	86	100%
<b>Marital Status</b>		
Married	76	88%
Divorced	10	12%
Total	86	100%
<b>Residence</b>		
Urban	36	42%
Rural	50	58%
Total	86	100%
<b>Age at Marriage</b>		
<20	51	58.30%
20-25	28	32.55%
26-29	4	4.65%
30+	3	3.48%
Total	86	100%
<b>Age at First Pregnancy</b>		
<20	50	58.13%
20-25	25	29.06%
26-29	10	11.62%
30+	1	1.16%
Total	86	100%

Parity ranged from 1-12. 6 cases (7%) were nullipara, 26 cases (30%) were primipara, 34 cases (38%) were multipara, and 20 cases (23%) were grand multipara (Table 2).

**Table 2 Distribution of the Patients with Obstetrical Fistula Who Were Admitted to Al-Thawra Hospital's Obstetrical Fistula Unit according to Parity**

Parity	Number	Percentage
Zero	6	7%
One Birth	26	30%
Two-Four Births	34	38%
Five Or More Births	20	23%
Total	86	100%

57 women (66%) did not seek any antenatal care, whereas 29 cases (34%) did.

58 of the women (67%) were brought by husband and 28 (33%) by a relative to get treatment.

Of the 86 women, 90% of cases developed obstetric fistula after obstructed labor. Of these, 53% developed

obstetric fistula following vaginal delivery, 24% following caesarian section, and 13% following caesarian hysterectomy.

54 (63%) of the cases had urinary incontinence, 29 (34%) of cases has stool incontinence and 3 (3%) of the cases had both stool and urinary incontinence (Table 3).

**Table 3 Type of incontinence among women with obstetrical fistula at the obstetrical fistula unit in Al-Thawra Hospital**

Type of Incontinence	Number	Percentage
Urine	56	63%
Stool	27	34%
Both	3	3%
Total	86	100%

The duration of illness ranged from <1 year to 36 years. The median duration of illness was 2.7 years (Table 4).

**Table 4 Duration of fistula**

Duration of Fistula (years)		
<1	23	27%
1-4	27	31%
5-10	19	22%
>10	17	20%
Total	86	100%

56 cases (89.53%) were due to obstructed trauma. Of these 56 cases, 36(64%) women had obstructed labor delivered vaginally, 20 (26%) had obstructed labor delivered by caesarian section, 11 (14.8%) women had

obstructed labor which ended by caesarian hysterectomy, and 9 (11%) of the fistula cases were due to trauma (Table 5).

**Table 5 Causes of obstetrical fistula**

Causes		Number	Percentage	
Obstructed Trauma	Obstructed Labor	Vaginal Delivery	46	53%
		Caesarian Section	20	24%
	Caesarian Hysterectomy		11	13%
	Traumatic		9	10%
Total		86	100%	

31 (36%) of patients with obstetrical fistula had prior fistula surgery repair (Table 6).

**Table 6 History of fistula surgery repair among obstetrical fistula patients at the obstetrical unit of Al-Thawra hospital**

Previous Fistula Surgery Repair	Number	Percentage
Yes	31	36%
No	55	64%
Total	86	100%

Of the 86 women with obstetrical fistula, 78 (91%) were operated transvaginally and 9 (9%) transabdominally.

The success rate (88%) achieved at first repair attempted (Table 7).

**Table 7 Success rate of fistula repair operations at Al-Thawra hospital**

Fate of Operation	Number	Percentage
Successful	76	88%
Failed	10	12%
Total	86	100%

**Discussion**

Obstetrical fistula is one of the major health problems among women of childbearing age in developing countries. It is probably the most distressing and demoralizing condition a women can experience<sup>[49]</sup>. Obstetrical fistula is a health condition caused by the interplay of numerous physical factors and the social,

cultural, and economic situation of the women. This interplay determines the status of the women, their health, nutrition, fertility, behavior, and susceptibility of obstetric fistula.<sup>[49]</sup> An accurate prevalence rate of obstetric fistula nationally and globally are unavailable due to inaccurate reporting, underreporting due to the stigma associated with fistula, and shame which keeps women from complaining of fistula.<sup>[50]</sup>



The high frequency of obstetric fistula in Yemen reflects the low socio-economic status and the lack of proper obstetrical care. The majority of the women with obstetric fistula were married and 12% of cases were divorced. All of the divorced women attributed their divorce to fistula development. The proportion of fistula patients who were divorced was much lower than other countries, such as Ethiopia and Nigeria.<sup>[51,52]</sup>

This can be explained by the cultural and religious beliefs in Yemen. Most of the patients' husbands expressed sympathy with their wives and brought them to get treatment (67%) while the remainder (33%) were brought by relatives.

Nearly half of the women were married by 17 years of age or less. This young age of marriage is comparable to what has been found in other low-income countries, like Ethiopia and Ghana, where the mean age at marriage among women with fistula was 22 and 25 years respectively.<sup>[53-55]</sup>

In this study, the majority of women with obstetrical fistula (57%) were from rural areas where there is limited accessibility to health services and emergency obstetrical care as well as limited availability of midwives. This explains the high prevalence of obstetrical fistula in rural areas.<sup>[6]</sup> Most women were illiterate with low levels of education. This is comparable with other studies conducted in Africa where no education or low levels of education was a significant risk factor for obstetrical fistula.<sup>[56-58]</sup>

In our study, we found that most of the patients were multipara (38%). This corresponds with earlier studies carried out in Port Harcourt, South Sudan, Nigeria, and Pakistan.<sup>[39,59,60,61]</sup> However, conflicts with the studies by Tahzib, Wall, and Ampofoetal<sup>[30,62,63]</sup> that state obstetric fistula occurs more commonly in primigravida. The time it took for women in our study to seek medical help ranged from <1 year to 36 years with a mean duration of illness of 2.7 years. The delay in seeking help may be attributed to shame which keeps women from complaining for several years, poverty, illiteracy, or low socio-economic status. Most of the women were housewives and subsistence farmers living in rural areas. They lack independent income and are of low socio-economic status, this is similar to findings in different studies.<sup>[64-67]</sup>

Delay in seeking medical attention, delay in reaching a health care facility, and delay in receiving adequate obstetric care are factors that lead to a poor obstetric

outcome.<sup>[68]</sup> Delay in seeking medical care is influenced by the lack of husband's permission and inadequate transportation.

The mean age of patients at first pregnancy in this study was 18 years old and this is higher than most studies in Africa.<sup>[69-71]</sup> This could mean the obstetric fistula cases were due to an underdeveloped pelvis, and it highlights the importance of timely and appropriate delivery services for complicated deliveries.

The age of patients at presentation ranged between 15-60 years; the median age was 30 years. This finding is similar to the study done at Kenyatta National Hospital where they found 26.6% of women with obstetric fistula were 20 years old and 81.3% were 30 years old.<sup>[72]</sup> It is also similar to a study done in Africa where obstetric fistula was most prevalent and at least 70% of women with obstetric fistula were 30 years old.<sup>[73]</sup> 66% of cases did not seek any prenatal care. This may be explained by the fact that most cases came from rural areas which lack emergency obstetric care centers, knowledge about the importance of prenatal care, and accessible health services because of poverty and transportation difficulties.

In developed countries, obstetric fistula due to obstructed labor has been completely eradicated, and only infrequently occurs due to gynecological surgeries such as abdominal or vaginal hysterectomy. In developing countries, prolonged obstructed labor remains the most common cause of obstetric fistula.<sup>[74-76]</sup>

In our study, obstructed trauma resulting from neglected, prolonged obstructed labor was responsible for developing 90% of the cases which is comparable to studies done in India.<sup>[77]</sup> It is also consistent with the study done by Hilton and Wallas 2005.<sup>[15,72]</sup>

Most of the patients with obstetric fistula had vesicovaginal fistula alone, with juxtacervical fistula being the most common. This is similar to a study performed by Iloabachia.<sup>[74]</sup> Juxtacervical fistula was the most common site of obstetric urogenital fistula in the Ilorin experience.<sup>[76]</sup>

Numerous methods for the treatment of obstetric fistula have been described, and abdominal and vaginal approaches are used for the repair of obstetric fistulae. The selected approach is dependent on many factors, but is probably best determined by the

experience and training of the surgeon. Most fistulae experts are of the opinion that almost all cases can be repaired by vaginal route.<sup>[77]</sup>

In our study, 91% of the cases were repaired by the vaginal route. The transabdominal route was reserved only for the repair of uretero-vaginal fistula, vesico-uterine fistula, or ureteric transplantation. The vaginal route was preferred since it avoids laparotomy and splitting of the bladder and recovery time is shorter with less morbidity, blood loss, post operation bladder irritability, and post-surgical pain.<sup>[14]</sup>

The success rate after repair varied from 85-92%. The best chance for success is with the first operation.<sup>[78]</sup> In our study, the success rate after the first attempt of repair was 88% which is comparable to the success rate given in the literature.<sup>[50,71,77,78]</sup>

## Conclusion

Obstetric fistula remains a public health issue of concern in Yemen, where child marriage, low education, poverty, low-skilled birth attendance, and low contraceptive uptake are prevalent. Obstetric fistula is a severe condition which can have devastating consequences on a woman's life and is generally associated with poor obstetric services. Obstetrical trauma due to obstructed labor is the most common cause of obstetrical fistula. The success rate of genito-urinary repair is 88%. The majority of fistula patients on short-term follow-up showed improvement of urinary symptoms, only a few suffered from stress incontinence. The women reported improved quality of life and social reintegration after fistula closure at a 3 months follow-up after the operation. Obstetric fistula remains a significant obstetrical problem in low-resource countries. It is associated with stillbirth, as both are related to obstructed labor in the absence of obstetrical care. Increased awareness of the condition, improvement of maternal care services, and an increase in skilled personnel to perform fistula repair is needed to reduce the burden of this condition.

## Recommendation

- In order to prevent and eliminate this tragic morbidity, actions should be taken to ensure the availability of midwives and emergency antenatal care facilities across the country, particularly in remote areas.

- Effort should be made to initiate a community-based health awareness program to educate women about the risk factors of developing obstetric fistula.
- Public advocacy and formation of laws and policies to protect girls from early marriage and encouraging girls to obtain secondary level education.
- Provision of accessible and affordable maternity services to improve skilled birth attendance rate.
- Public education and provision of family planning services.
- Women with obstetric fistula and with low levels of education or no education should be targeted during health education sessions to explain the need for delivery under skilled attendance.
- Avoiding early marriage, empowerment of women, and early access to health facilities would be a great step to reduce the number of obstetric fistula cases.

## References

1. Ministry Of Public Health & Population & Central Statistical Organization. Yemen National Health & Demographic Survey 2013: pg. 73
2. DE BERNIS, L. 2007. Obstetric fistula: guiding principles for clinical management and programme development, a new WHO guideline. International Journal of Gynecology & Obstetrics, 99, S117-S121
3. WHO (2005) Make every mother and child count. Geneva, Switzerland.
4. WHO (2012) Trends in maternal mortality: 1990 to 2010 WHO, UNICEF, UNFPA, and The World Bank estimates.
5. UNFPA (2005) The Campaign to End Fistula New York: UNFPA.
6. Tebeu P. M., Fomulu, J. N., Khaddaj, S., De Brunis, L., DelVaux, T. & Rochat, C. H. 2012. Risk factors for obstetric fistula: a clinical review. Int Urogynecol J, 23, 387-94.
7. Wall LL. Obstetric vesicovaginal as an international public health problem. Lancet 2006;368(9542):1201-9
8. Arrowsmith S, Hamlin EC, Wall LL: Obstructed labor injury complex: obstetric fistula formation and the multifaceted morbidity of maternal birth trauma in the developing world. Obstet Gynecol Surv 2006, 51:568-574.



9. Mselle LT, Moland KM, Evjen-Olsen B, Mvungi A, Kohi TW. "I am nothing": experiences of loss among women suffering from severe birth injuries in Tanzania. *BMC WOMens Health* 2011; 11:49.
10. Wall LL. Fitsari 'dan Duniya. An African (Hausa) praise song about vesicovaginal fistulas. *Obstet Gynecol* 2002;100(6):1328-32
11. ADLER, A. J., RONSMANS, C., CALVERT, C. & FILIPPI, V. 2013. Estimating the prevalence of obstetric fistula: a systematic review and meta-analysis. *BMC Pregnancy Childbirth*, 13, 246.
12. SRICHAND, P. Urogenital Fistula in Developing Countries.
13. Konje J, Lapido OA. Nutrition and obstructed labor. *Am J Clin Nutr* 2000;72(1 Suppl.):2915-75
14. Angioli, R, M. Penalver, L. Muzii, L. Mendez, R. Mirhashemi, F. Bellati, C. Croce and P.B, Panici, 2003. Guidelines of how to manage vesicovaginal fistula. *Crit. Rev. Oncol. Hematol.* 48: 295-304.
15. Wall, L.L., S.D. Arrowsmith, N.D. Briggs, A. Browning and A. Lassey, 2005. The obstetric vesicovaginal fistula in the developing world. *Obstet. Gynecol. Surv.*, 60: S3-S51.
16. Wall, L.L., J.A. Karshima, C. Kirschner and S.D. Arrowsmith, 2004. The obstetric vesicovaginal fistula: Characteristics of 899 patients from Jos, Nigeria. *Am. J. Obstet. Gynecol.*, 190: 1011-1019.
17. Lee, R.A., R.E., Symmonds and T.J. Williams, 1998. Current status of genitourinary fistula. *Obstet. Gynecol.*, 72: 313-315.
18. Chaudhry, M.R., 1995. Transvesical repair of vesicovaginal fistula. *Pak. Armed Forces Med. J.*, 45: 59-62.
19. De Brouwere V, Tonglet R, Van Lerberghe W. Strategies for reducing maternal mortality in developing countries: what can we learn from the history of the industrialised West? *Trop Med Int Health* 1998;3(10):771-82.
20. Loudon I. Maternal mortality in the past and its relevance for developing countries today. *Am J Clin Nutr* 2000;72(1 Suppl.):241S-6S.
21. Collier P. *The Bottom Billion: Why the Poorest Countries are Failing and What Can Be Done About it.* New York, NY: Oxford University Press USA; 2007
22. Waaldjik K (2008) *obstetrics fistula surgery art and science.* Campion press.
23. Hancock B (2005) *First Steps In Vesico-Vaginal Fistula Repair.* London: The Royal Society of Medicine Press Lid.
24. FIGO P (2011) *Global Competency-Based Fistula Surgery Training Manual.* 119-157.
25. Abrams P, de Ridder D, de Vries C, Elneil S, Esegbona G, et al. (2012) Epidemiology of obstetric fistula . In: Abrams P, editor. *Obstetric fistula in the developing world: international continence society (SIU)* pp. 17-25.
26. MULETA, M. 2006. Obstetric fistula in developing countries: a review article. *J Obstet Gynaecol Can*, 28, 962-6.
27. Odu, B.K. 2013. The predisposing FACTORS affecting the prevalence of vesico-vaginal fistula among women of reproductive age in northern Nigeria. *European journal of advanced research in biological and life sciences*, 1.
28. Melah GS, Massa AA, Yahaya UR, Bukar M, Kizaya DD, El-Nafaty Au: Risk factors for obstetric fistulae in north-eastern Nigeria. *J Obstet Gynaecol* 2007, 27 (8):819-823.
29. Murphy M: Social consequences of vesico-vaginal fistula in northern Nigeria. *J Biosoc Sci* 1981, 13(2):139-150.
30. Ampfo EK, Omotara BA, Otu T, Uchebo G: Risk factors of vesico-vaginal fistulae in Maiduguri, Nigeria: a case-control study. *Trop Doct* 1990, 20(3): 138-139.
31. FIGO (2006) Ethical guidelines on obstetric fistula. *Int J Of Gynecology and Obstetrics* 94: 174-175.
32. Melah GS, Massa AA, Yahaya UR, Bukar M, Kizaya DD, et al. (2007): Risk factors for obstetric fistulae in north-eastern Nigeria. *J Obstet Gynaecol* 2007, 27:819-823.
33. Tebeu PM, Fomulu JN, Khaddaj S, de Bernis L, Delvaux T, et al. (2012) Risk factors for obstetric fistula:: a clinical review. *Int. Urogynecol J* 23: 387-394.
34. Murray C, Goh JT, Fynes M, Carey MP (2002) Urinary and faecal incontinence following delayed primary repair of obstetric genital fistula. *BJOG: An International Journal of Obstetrics & Gynaecology* 109: 828-832.
35. Thomson AM (2007) Women with obstetric fistula in Ethiopia. *Midwifery* 23: 335-336.
36. Kelly J, Kwast BE (1993) Epidemiologic study of vesicovaginal fistulas in Ethiopia. *International Urogynecology Journal* 4: 278-281.
37. Williams G (2007) The Addis Ababa fistula hospital: Aholistic approach to the management of patients with vesicovaginal fistulae. *Surgeons* 5: 54-57.
38. Tahzib F (1983) Epidemiological determinants of vesicovaginal fistulas. *BJOG: An International Journal of Obstetrics & Gynaecology* 90: 387-391.

39. Muleta, M., 2004. Socio-demographic profile and obstetric experience of fistula patients managed at the Addis Ababa Fistula Hospital. *Ethiop. Med. J.*, 42: 9-16.
40. Thaddeus S, Maine D: Too far to walk: maternal mortality in context. *Soc Sci Med* 1994, 38(8):1091–1110.
41. Medina M, Roedee G, Decosas J, et al. Thematic evaluation of the national programmes and UNFPA experience in the campaign to end fistula: assessment of national programmes. Final synthesis report. New York, NY: UNFPA; 2010.
42. WHO. Mental health aspects of women's reproductive health: a global review of the literature. Geneva, Switzerland: World Health Organization; 2009.
43. Ronsmans C, Holtz S, Stanton C. Socioeconomic differentials in caesarean rates in developing countries: a retrospective analysis, *Lancet*. 2006;368:1516-23
44. Roush KM. Social implications of obstetric fistula: an integrative review. *J Midwifery Womens Health*. 2009; 54:e21–33.
45. Zheng AX, Anderson FW. Obstetric fistula in low-income countries. *Int J Gynaecol Obstet* 2009; 104:85-9.
46. Hardee K, Gay J, Blanc AK. Maternal morbidity: neglected dimension of safe motherhood in the developing world. *Global Public Health* 2012; 7:603-17.
47. Stanton C, Holtz Sa, Ahmed S. Challenges in measuring obstetric fistula. *Int J Gynaecol Obstet* 2007; 99:4-9.
48. Kelly J. Vesico-vaginal and recto-vaginal Fistulae. *J Obstet Gynaecol* 1998; 18:249-51.
49. Naru T, Rizi JH, Talati J. Surgical Repair of Genital Fistulae. *J Obstet Gynaecol Res* 2004; 30:293-6.
50. Kapoor R, Ansari MS, Singh P, Gupta P, Khurana N, Mandhani A, et al. Management of Vesicovaginal fistula: An experience of 52 cases with a rationalized algorithm of choosing the transvaginal or transabdominal approach. *Indian J Urol* 2007; 23:372-6.
51. Maybeya H: characteristics of women admitted with obstetric fistula in the rural hospitals in West Pokot, Kenya through website, [http://www.gfmer.ch/medicaleducation\\_En/PGC\\_RH2004/obstetric\\_fistula\\_keyna](http://www.gfmer.ch/medicaleducation_En/PGC_RH2004/obstetric_fistula_keyna), accessed: 14/09/2006.
52. (No authors listed): Lessons from developing world: obstructed labour and the vesicovaginal fistula, through websites: <http://www.medspace.com/viewarticle/455965-4>, accessed: 16/02/2007.
53. Muleta M, Hamlin EC, Fantahun M, Kennedy RC, Tafesse B: Health and social problems encountered by treated and untreated obstetric fistula patients in rural Ethiopia. *J Obstet Gynaecol Can* 2008, 30(1):44–50.
54. Kabir M, Iliyasu Z, Abubakar IS, UU I: Medico-social problems of patients with vesico-vaginal fistula in Murtala Mohammed Specialist Hospital, Kano. *Annals of African Medicine* 2003, 2(2):54–57.
55. Danso KA, Martey JO, Wall LL, Elkins TE (1996) The epidemiology of genitourinary fistulae in Kumasi, Ghana, 1977–1992. *International Urogynecology Journal* 7: 117–120.
56. Larissa M, Ascher-Walsh CJ, Norman R, Idrissa A, Herbert H, et al. (2007) Commonalities among women who experienced vesicovaginal fistulae as a result of obstetric trauma in Niger: results from a survey given at the National Hospital Fistula Center, Niamey, Niger. *American Journal of Obstetrics and Gynecology* 197: 90. e91–90. e94.
57. Raassen T, Verdaasdonk E, Vierhout M (2008) Prospective results after first time surgery for obstetric fistulas in East African women. *International Urogynecology Journal* 19: 73–79.
58. Hilton P, Ward A. 1998. Epidemiological and surgical aspects of urogenital fistula: a review of 25 years experience in South-east Nigeria. *International Urogynecology Journal of Pelvic Floor Dysfunction* 9:189-194.
59. Gharoro EP, Abedi AO. 1999. Vesico-vaginal fistula in Benin City, Nigeria. *Nigeria International Journal of Gynaecology Obstetrics* 64:313-314.
60. Weston K, Mutiso S, Mwangi JW, Qureshi Z, Beard J, Venkat P: Depression among women with obstetric fistula in Kenya. *Int J Gynaecol Obstet* 2011, 115(1):31–3.
61. Wall LL. 1999. Birth Trauma and the pelvic floor lessons from the developing world. *Journal of Women's Health* 8:149-155.
62. Ampofo K, Otu T, Uchebo G. 1990 Epidemiology of vesicovaginal fistulae in Northern Nigeria. *West African Journal of Medicine* 9:98-102.
63. Nnato S, Esho J, 1985. Abdominal approach to difficult vesicovaginal fistula. *Tropical Journal of Obstetrics Gynaecology* 5:27-31.
64. Tahzib F. 1989. Social factors in the aetiology of vesicovaginal fistulae. In: Iman A, Pittin R, Omole H, editors. *Women and the family in Nigeria. Nigeria: (ODOESRIA) Book series.* pp 75-79.

65. Thaddeus S, Maine D. Too far to walk: maternal mortality in context. Soc Sci Med 1994;38(8):1091-110.
66. Amoth PO: Social consequences of vesicovaginal fistula at Kenyatta National Hospital. M Med. 2001. University of Nairobi.
67. Vyas N, Nandi PR, Mahmood M, Tandon V, Dwivedi US, Singh PB. Bladder Mucosal autographs for repair of vesicovaginal fistula. BJOG 2005;112:112-4.
68. Donnay F, Weil L. Obstetrics Fistula : The international response. Lancet 2004;363:71-2.
69. Cohen BL, Gousse AE. Current techniques for vesicovaginal fistula repair: surgical pearls to optimize cure rate. Curr Urol Rep 2007;8:413-8.
70. Rant V, Bhattacharya M. Vesical fistulae—an experience from developing countries. J Postgrad Med 1993;39:20-1.
71. Biswas A, Bal R, Alauddin MD, Saha S, Kundu MK, Mondal P. Genital Fistula- our experience. J Indian Med Assoc 2007;105 (3) 123-6.
72. Hilton P, 2003. Vesico-vaginal fistulas in developing countries. Int. J. Gynaecol. Obstet., 82:285-295.
73. Mariam A.M. A, X: (2007). Genital Tract Fistulae in the Republic of Yemen, Sana'a. Journal of Medical Sciences, 7:473-476.  
DOI: 10.3923/jms473.476  
URL: <http://scialert.net/abstract/?doi=jms473.476>.
74. Iloabachie GC. 1987. The juxta urethral fistula. East African Medical Journal 64:488-492.
75. Kelly J. 1995. Ethiopia: an epidemiological study of vesico-vaginal fistula in Addis Ababa. World Health Statistics Quarterly 48:15-17.
76. Ijaiya MA, Aboyeji PA: Obstetric urogenital fistula: the Ilorin, Nigeria> Trop Doct. 1990 Jul;20(3): 138-9.
77. Sarkar B, Ghoshory S, Saha SK, Mukherjee A, Ganguly RP, Saha S. A study of Genitourinary Fistulae in North Bengal. J Obstet Gynecol 2001;51(5):165-9.
78. Khan RM, Raza N, Jehanzib M, Sultana R, Vesicovaginal Fistula: An Experience of 30 cases at Ayub teaching Hospital Abbottabad. J Ayub Med Coll Abbottabad; 17(3); 48-50.

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