

# Global burden of obstructed labour in the year 2000

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## 1. Introduction

Labour is considered obstructed when the presenting part of the fetus cannot progress into the birth canal, despite strong uterine contractions. It is more common in humans than in primates, because the birth canal of a woman is not as straight and wide as in primates<sup>1</sup>. The most frequent cause of obstructed labour is cephalo-pelvic disproportion - a mismatch between the fetal head and the mother's pelvic brim. The fetus may be large in relation to the maternal pelvic brim, such as the fetus of a diabetic woman, or the pelvis may be contracted, which is more common when malnutrition is prevalent. Some other causes of obstructed labour may be malpresentation or malposition of the fetus (shoulder, brow or occipito-posterior positions). In rare cases, locked twins or pelvic tumours can cause obstruction<sup>1</sup>.

Neglected obstructed labour (OL) is a major cause of both maternal and newborn morbidity and mortality. The obstruction can only be alleviated by means of an operative delivery, either caesarean section or other instrumental delivery (forceps, vacuum extraction or simphysiotomy). Maternal complications include intrauterine infections following prolonged rupture of membranes, trauma to the bladder and/or rectum due to pressure from the fetal head or damage during delivery, and ruptured uterus with consequent haemorrhage, shock or even death. Trauma to the bladder during vaginal or instrumental delivery may lead to stress incontinence. By far the most severe and distressing long-term condition following obstructed labour is obstetric fistula - a hole which forms in the vaginal wall communicating into the bladder (vesico-vaginal fistula) or the rectum (recto-vaginal fistula) or both. In developing countries, fistulae are commonly the result of prolonged obstructed labour and follow pressure necrosis caused by impaction of the presenting part during difficult labour. In the infant, neglected obstructed labour may cause asphyxia leading to stillbirth, brain damage or neonatal death<sup>1</sup>.

Obstructed labour ranked 41<sup>st</sup> in GBD 1990, representing 0.5% of the burden of all conditions and 22% of all maternal conditions.<sup>2</sup> It was estimated to be the most disabling of all maternal conditions. This draft paper summarizes the data and methods used to produce the Version 2 estimates of obstructed labour burden of the year 2000.

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## 2. Case and sequelae definitions

There is no clear definition and confusion of terms used by different authors remains<sup>3</sup>. The term "dystocia" is most frequently used as an equivalent for obstructed labour, but it covers a broad range of conditions, from labour lasting more than 12 hours to uterine rupture, feto-pelvic disproportion or abnormal fetal presentation. Moreover, estimating the duration of labour may be difficult, especially in settings without appropriate monitoring technology. It is, however, accepted that if obstruction cannot be overcome by manipulation or instrumental delivery, caesarean section is needed. The definitions used by GBD 2000 for obstructed labour and its sequelae are listed in table 2.1.

**Table 2.1 GBD 2000 case and sequelae definitions for obstructed labour**

Cause category	GBD 2000 Code	ICD 9 codes	ICD 10 codes
Obstructed labour	U046	660-665	O62-O66

Sequela	Definition
Cases	Labour with no advance of the presenting part of the fetus despite strong uterine contractions, left untreated (neglected)
Caesarean section for obstructed labour	Cases of obstructed labour for which a caesarean section has been performed
Stress incontinence	Cases with frequent leaking of urine during sneezing or coughing as a result of obstructed labour
Recto and vesico-vaginal fistula	Cases with communication between the vaginal wall and the bladder or the rectum resulting from obstructed labour

## 3. Population prevalence and incidence studies

Appropriate surveys were identified by a MEDLINE and PubMed search, using the words "obstructed labour", "dystocia", "incidence", and "epidemiology" and by tracking references from the papers identified in this way; in addition, we examined regional offices' literature databases and statistics, performed a key word search of major obstetric and gynaecology journals and consulted with experts for unpublished work. We included the studies in our analysis if they had a clear definition of cases, if data were available on incidence, mortality or case fatality rate, natural history and age distribution, and if sample size was adequate. We gave priority to population-based studies, but used also the information from hospital-based studies in regions where most deliveries take place in hospitals.

Self-reported maternal morbidity tends to overestimate incidence and results depend on the sensitivity and specificity of the instrument. Several attempts have been made to validate the results of self-reported maternal morbidity by comparing responses from women interviews shortly after hospital delivery with their hospital case notes. Table 3.1 presents the sensitivity and specificity of prolonged labour as recalled and reported to interviewers in these studies. Comparisons are difficult, as studies may have used

different definitions and study design, and their results may not be generalised to women who do not deliver in hospital. Thus, self-reported maternal morbidity cannot provide exact estimates of prevalence and incidence. However, until a more comprehensive data collection on all deliveries, especially in the developing world, will become available, self-reports in response to well-designed and well worded interviews may be the only way to collect information about maternal morbidity<sup>4</sup>.

**Table 3.1. Sensitivity and specificity of prolonged labour as recalled and reported to interviewers**

	Philippines 1995 <sup>5</sup>	Bolivia 1998 <sup>6</sup>	Ghana 1996 <sup>7</sup>	Indonesia 1997 <sup>8</sup>
Questions	“labour lasting more than 12 hours”	“extended pushing” (for sensitivity) “extended labour” (for specificity)		“labour lasting more than 24 hours, responses in hours”
Sensitivity	0.41	0.21	0.74	0.31
Specificity	0.88	0.99	0.83	0.77

Adapted from ref. 4

### 3.1 Incidence

As shown in table 3.2, epidemiological studies of obstructed labour demonstrated varying estimates in the incidence of obstructed labour. This is likely to be due to a number of factors including variations in case definition and inadequate case ascertainment. Furthermore, hospital based studies of obstructed labour will not give valid estimates of incidence as the study population includes only those who access health services.

Studies often use caesarean section or instrumental delivery due to obstructed labour/dystocia as a proxy measure for obstructed labour. This is problematic, however, as the rate in developing countries may not represent met need and the rate in developed countries is likely to be inflated due to other factors. For example, in the United States in the 1980s there were six times as many indications for a caesarean for cephalo-pelvic disproportion than in Ireland for groups of women who showed the same characteristics (nulliparity, known risk factors, age of mother and birth weight of child) and delivered in comparable hospitals. The difference was therefore not epidemiological but due to a subjective "cultural" factor when assessing the need for intervention.

Due to these problems in estimating obstructed labour incidence from epidemiological studies, it has been assumed as in GBD1990 that the incidence of obstructed labour varies between 3 and 6 per cent (Table 3.3). The lower figure was applied in more developed regions (Regions A to C) and the lower figured to less developed areas where early marriage and childhood malnutrition are more prevalent (sub-regions D and E). The proportion of births within a health facility by sub-region was used as a proxy for timely access to treatment (caesarean section, instrumental delivery, symphysiotomy) to estimate the incidence of neglected obstructed labour (Table 3.3). Where health facility births were greater than 95%, treatment coverage was assumed to be 100%.

**Table 3.2. Incidence studies for obstructed labour**

Region	Study population	Type of study	Years	Sample size	Diagnostic criteria	Incidence per 100 live births (deliveries)	Ref.
AFRO D							
Senegal	2 urban areas (Saint Louis and Kaolack)	Population-based study on a cohort of pregnant women	1996	3,476 live births	OL leading to instrumental delivery, C-section, uterine rupture, laceration of perineum or death)	2.36	9
Niger	Niamey (6 maternity wards)	Hospital (maternity wards)-based, longitudinal study	1997	3,625 deliveries	Obstructed labour: dystocia, uterine rupture and vesico-vaginal fistulae	3.60	10
Burkina Faso, Mali, Mauritania, Niger, Senegal, Cote d'Ivoire*	Ouagadougou, Bamako, Nouakchott, Niamey, Kaolack region, Abidjan*	Population-based, multicentre door-to-door census of all pregnant women	Dec 1994-June 1996	20,326 women; 16318 deliveries	Prolonged labour lasting more than 12h, uterine rupture, assisted vaginal delivery, compression, fetopelvic disproportion resulting in caesarean delivery or abnormal fetal lie requiring surgical delivery	18.3 (17.7-18.9)	3
Burkina Faso, Mali, Mauritania, Niger, Senegal, Cote d'Ivoire	Ouagadougou, Bamako, Nouakchott, Niamey, Kaolack region, Abidjan	Population-based, multicentre door-to-door census of all pregnant women	Dec 1994-June 1996	20,326 women; 19694 live births	Obstructed labour requiring either instrumental extraction or C-section, and uterine rupture and other complications such as laceration of perineum, pelvic fistulae or death	2.05 (1.86-2.26)	11
Nigeria	Eastern Nigeria	Population based	1985-1989	11,299 deliveries	cephalo-pelvic disproportion	4.70	12
Nigeria	University College Hospital, Ibadan	Retrospective hospital based	1978-1991	39,456 deliveries	labour where further progress was impossible without interference	0.96	13
EURO A							
UK	St Michel's Hospital and Southmed Hospital, Bristol,	Prospective hospital cohort	Febr 1999-Jan 2000	10,106 deliveries	singleton cephalic pregnancies requiring operative delivery in theatre at full dilatation	3.90	14
Ireland	The National Maternity Hospital, Dublin	Retrospective hospital based	1990-1994	9,018 nulliparous women	Labour lasting more than 12 h from the time of admission to the delivery ward until delivery of the infant	1.6	15

**Table 3.3. Estimates of the incidence of obstructed labour by region**

WHO region	Estimated incidence of obstructed labour per 100 live births	Proportion deliveries in health facilities (per 100 live births)	Estimated incidence of NEGLECTED obstructed labour per 100 live births
AFRO D	6.0	33	4.0
AFRO E	6.0	38	3.7
AMRO A	3.0	99	0.0
AMRO B	3.0	79	0.6
AMRO D	6.0	49	3.1
EMRO B	3.0	69	0.9
EMRO D	6.0	39	3.7
EURO A	3.0	98	0.0
EURO B1	3.0	98	0.0
EURO B2	3.0	98	0.0
EURO C	3.0	98	0.0
SEARO B	3.0	33	2.0
SEARO D	6.0	21	4.8
WPRO A	3.0	97	0.0
WPRO B1	3.0	54	1.4
WPRO B2	3.0	52	1.4
WPRO B3	3.0	85	0.5

### 3.2 Incidence and prevalence of sequelae of obstructed labour

Available data on prevalence of sequelae of obstructed labour are scarce. For **stress incontinence**, most studies come from the USA and Europe, with minimal information on other parts of the world. A literature review by Mason et al. in 1999 showed that the prevalence of stress incontinence during pregnancy ranges between 23-67% and declines following delivery. In postpartum women stress incontinence (of varying severity) ranges from 6 to 29%<sup>16</sup>. In the same study, the authors interviewed 1008 pregnant women attending antenatal clinics in the UK, initially at 34-36 weeks of gestation and then at 8-10 weeks following delivery. Using a questionnaire to elicit symptoms of stress incontinence and its severity, they found a prevalence of daily stress incontinence during pregnancy of 11%, and of stress incontinence several times per week of 19%. The corresponding figures for symptoms following delivery were 2% and 5% respectively. Viktrup et al in 1992 found that 1% of women had daily stress incontinence following delivery<sup>17</sup>.

In another study, including 109 nulliparous women, examined by means of a questionnaire, clinical examination, perineal sonography, and urethral pressure profiles, Meyer et al. found a prevalence of stress urinary incontinence after spontaneous and instrumental delivery of 21% and 34%, respectively<sup>18</sup>. However, the study did not give details on the severity of symptoms. Although the length of second stage of labour has not been associated with stress incontinence, forceps delivery is responsible for a ten-times increase of the risk of postpartum stress incontinence in a developed country<sup>19</sup>. However, some other authors report that there is no difference in the prevalence of delivery<sup>16, 20, 21</sup>. Grand multiparity was shown to be associated with an increased risk of

developing persistent stress incontinence during reproductive age, and the delivery of at least one baby weighing more than 4000g seems to be a predominant factor<sup>22</sup>.

The GBD 1990 assumed that all cases of OL were followed by stress incontinence. The current version of the GBD considers assumed that a quarter of cases of obstructed labour left untreated would develop moderate or severe stress incontinence, with a disability weight of 0.025 for women between 15-49 and 0.033 for women older than 50 years.

For **caesarean section**, we assumed that in 90% of cases of treated obstructed labour a caesarean section is performed, and in the remaining 10% an instrumental delivery.

For **rectovaginal and vesico-vaginal fistula**, in developing regions the incidence ranges from 0.01% to 0.08% of births (Table 3.4). These reports are mostly from Africa are available, and largely from surgical series rather than the population-based studies. In a population-based study from West Africa, where 19,342 women were followed up for 42 days postpartum, 2 cases of vesico-vaginal fistula were diagnosed, resulting in an incidence of 0.01% of deliveries. Both cases occurred in a rural area, giving a rural incidence of fistula of 0.12% deliveries. On the basis of this study, the authors estimated a minimum annual incidence of fistula in rural Sub-Saharan Africa of 33,451 new cases for the year 1999<sup>23</sup>. Danso et al. retrospectively identified 153 cases of genito-urinary fistula at a teaching hospital in Kumasi, Ghana between 1977-1992. 150 of these were of obstetric origin (91.5%) and 121 were due to prolonged obstructed labour (73.8%). The hospital incidence of obstetric fistula was estimated at 0.1% of deliveries<sup>24</sup>. Prual et al., in a longitudinal study in Niamey, Niger of 3,625 deliveries, found 2 cases of vesico-vaginal fistula, with a hospital incidence of 0.06% of deliveries<sup>25</sup>. Hilton et al. reported 715 cases of fistula in a hospital in Nigeria between 1990-1994, 92.2% of which were of obstetric origin, and 80.3% following neglected obstructed labour<sup>26</sup>. No obstetric fistula resulting from obstructed labour is seen today in developed countries.

For GBD2000 we expressed the obstetric fistula rate of 0.08% of births as a proportion of neglected obstructed labour cases for the AFRO E region. The same rate of 0.08% of births was used in GBD1990. This results in an incidence rate of obstetric fistula of 2.15% of neglected obstructed labour cases. This rate was applied to the regional rates of neglected obstructed labour to determine the overall incidence of obstetric fistula.

### 3.3 Determinants and trends in obstructed labour

The likelihood of obstructed labour can be anticipated if the mother is short and/or has had prior difficult labour<sup>27</sup>. In the MOMA study<sup>3</sup> small stature, previous caesarean section and nulliparity were associated with an increased risk of dystocia, but none of these factors have adequate positive predictive value as screening tools. It is thus almost impossible to predict the occurrence of dystocia before the onset of labour. Labour must therefore be monitored carefully and systems to manage or refer complications must be available.

Trends in obstructed labour are difficult to assess because studies may have used different definitions. However, as some of the potential risk factors have not improved significantly (nutrition, access to delivery in health facilities etc.) one can assume that the incidence of OL has remained stable during the last ten years.

**Table 3.4. Incidence studies for recto-vaginal (RVF) and vesico-vaginal fistula (VVF)**

Region	Study population	Type of study	Years	Sample size	Diagnostic criteria	RVF/VVF incidence per 100 deliveries	Ref.
AFRO D							
Niger	6 maternity wards, Niamey	Maternity wards-based, longitudinal	1997	3,625 deliveries	vesico-vaginal fistulae following delivery	0.06%	25
Ghana	Komfo Anokye Teaching hospital, Kumasi	Retrospective hospital based, medical records	Jan 1977-Dec 1992	157,449 deliveries	genito-urinary fistula	0.10%	24
Burkina Faso, Mali, Mauritania, Niger, Senegal, Cote d'Ivoire	Ouagadougou, Bamako, Nouakchott, Niamey, Kaolack region, Abidjan	Population based prospective study	1994-1996	19,342 pregnant women	permanent leakage of urine and/or faeces through vagina	0.01%; in rural area: 0.12%	37
Nigeria	Eastern Nigeria	Population based	1985-1989	11,299 deliveries		0.65% (14% of all cases of OL)	12

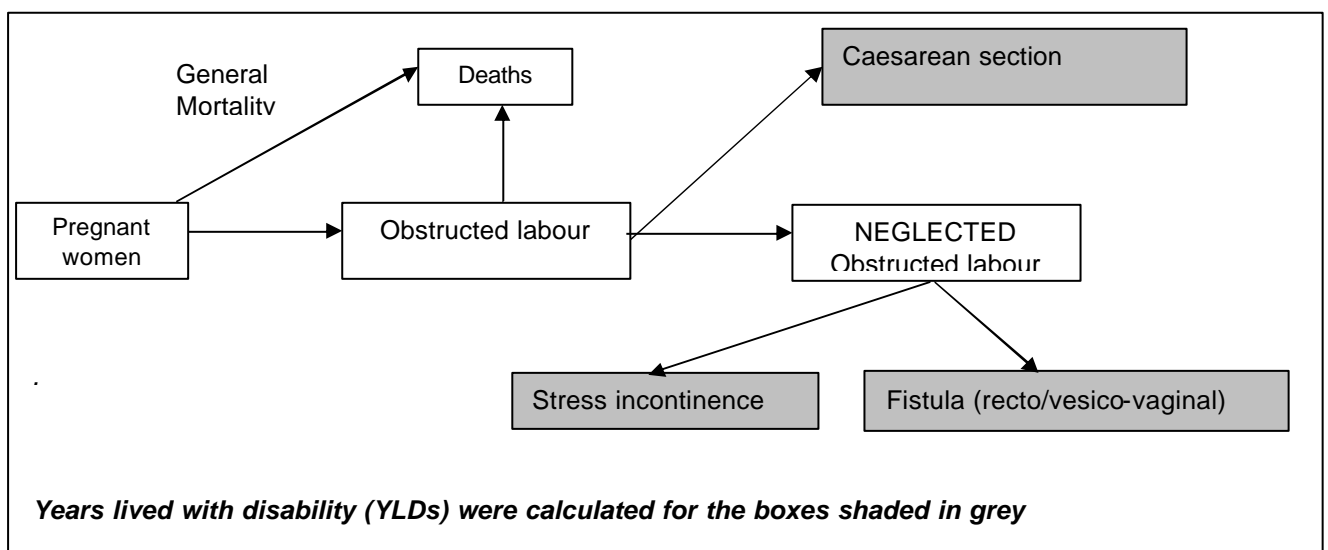
#### 4. Mortality and case fatality

There is relatively more information on mortality from obstructed labour when compared with incidence studies. These data, however, must be interpreted with caution, because a death due to OL may be misclassified under other headings, including sepsis, ruptured uterus or haemorrhage, all of which could be secondary to obstructed labour<sup>1</sup>. Data from community-based studies that assessed the cause-specific maternal mortality are summarized in Table 4.1.

The GBD 1990 estimated deaths due to obstructed labour starting from the total number of maternal deaths, and apportioning a percentage to OL, based on reports from different sources<sup>1</sup>. A first set of regional estimates of total number of maternal deaths was produced using the methodology developed for WHO/UNICEF 1995 estimates of maternal mortality<sup>28</sup>. Available information on cause of death distributions in each region, including data from vital registration systems were then used to estimate the proportion of different causes of maternal mortality. The general methodology used for mortality estimates of the GBD 2000 is described in Mathers et al.<sup>29</sup> Using this methodology it was estimated that globally obstructed labour is responsible for 8% of all maternal deaths.

**Table 4.1. Proportion of maternal deaths due to obstructed labour – community-based studies**

WHO Region/Country	Setting	Type of study	Period of study	Total number of maternal deaths	% due to obstructed labour	Ref
AFRO D						
Gambia	A rural area	RAMOS	Jan 1993- Dec 1998	18	5.6	30
Guinea-Bissau	the 5 northern regions of Guinea-Bissau	RAMOS	1989-1996	144	16.7	31
Ghana	Ejisu health district	community based survey of maternal mortality	1985-1990	44	6.8	32
Burkina Faso, Mali, Mauritania, Niger, Senegal, Cote d'Ivoire	5 urban areas and 1 rural area	population based prospective study	1994-1996	55	12.7	33
AMRO B						
Mexico	3 states in Mexico	Verbal autopsy	1995	145	8	34
SEARO D						
Bangladesh	Matlab area, Bangladesh	Verbal autopsy in demographic surveillance system	1987-1993	174	8	35

**Figure 5.1. Obstructed labour disease model**

## 5. Disease model for obstructed labour

Figure 5.1 shows the disease model for obstructed labour.

Compared to the GBD 1990, the current version of burden estimates is based on the assumption that a proportion of cases of obstructed labour will have access to timely treatment (mainly caesarean section). Thus, only those cases for which obstructed labour is neglected (untreated) may develop stress incontinence (the proportion of which is thought to be 25%) or obstetric fistula. Stress incontinence is mainly a consequence of normal vaginal delivery and its burden is captured under the category of "other maternal conditions". The assumptions on mortality due to obstructed labour remain unchanged.

**Table 5.1. Comparison between GBD 1990 and GBD 2000 disease models**

	<b>GBD 1990</b>	<b>GBD 2000</b>
Stages/Sequelae	Episodes Stress incontinence Recto-vaginal and vesico-vaginal fistula	Episodes Caesarean section for obstructed labour Stress incontinence Recto-vaginal and vesico-vaginal fistula
Incidence rates for episodes	5.1% globally	6% for sub-regions D and E, 3% for sub-regions A, B and C.
Incidence rate for caesarean section	N/A	In developed regions, 90% of all treated OL cases.
Incidence rate for stress incontinence	All cases with obstructed labour	25% of neglected obstructed labour cases develop moderate to severe stress incontinence
Incidence rate for obstetric fistula	Between 50 and 80 per 100,000 births	2.15% of neglected obstructed labour cases
Remission rate for sequelae	0	0
Case fatality for episodes	Proportional mortality model (8% of all maternal deaths globally)	Proportional mortality model (8% of all maternal deaths globally)
Disability weight for caesarean section	N/A	0.349
Disability weight for stress incontinence	0.025 (15-59 years) 0.033 (60+ years)	0.025 (15-59 years) 0.033 (60+ years)
Disability weight for recto-vaginal and vesico-vaginal fistula	0.430 (treated and untreated)	0.430 (treated and untreated)

## 6. Health state descriptions and disability weights

Complications of obstructed labour/sequelae considered for the burden of disease estimates 2000 were caesarean section, stress incontinence and recto-vaginal fistula.

### Caesarean section

For caesarean section following obstructed labour these version 2 estimates of the GBD2000 use the interim disability weight elicited by the authors of the Australia and Victoria burden of disease study. The authors used the EuroQol5+ classification system from the Netherlands Disability Weights study to describe the health state based on 6 dimensions of health: mobility, self care, usual activities, pain/discomfort, anxiety/depression, cognition. This disability weight will be revised using health state valuation data from the WHO World Health Survey in 2003.

### Stress urinary incontinence

In general, very few studies examined the physical, emotional and practical effects of stress incontinence after childbirth. Typically, most studies report on the effects of incontinence in general, irrespective of type, and on a wide age range or on an elderly population. A literature view conducted by Mason et al. provides a fairly comprehensive description of the health state of women affected by urinary incontinence in general<sup>36</sup>. It has been suggested that women with stress incontinence have fewer psychological problems, or perceive their complaint to be less of a problem compared to women with urge or mixed incontinence. Nevertheless, because in our estimates we considered the moderate to severe cases of stress incontinence, the description provided by Mason et al. may be considered as appropriate for our purpose.

Some women described incontinence as a social rather than a medical problem, and it was also perceived as an inevitable consequence of motherhood. Few women seek help for this condition, and those who do, usually wait for one year or more after it develops to discuss it. Incontinence was reported to affect levels of self-esteem and confidence. Women's mental and physical health suffered as a result of their condition. One quarter of incontinent women believe that their mental health was affected by their incontinence to a moderate or severe extent. Other reported psychological effects included depression, anxiety, irritability, worry, frustration and tension. Incontinence also affected the desire or ability to take part in recreational or sporting activities. It restricted the type of activity, such as shopping, travel, or going on holiday, that involved unfamiliar places where toilet facilities were unknown or unavailable.

### Recto-vaginal and vesico-vaginal fistula

Recto-vaginal and vesico-vaginal fistula represent a communication between the vaginal wall and the rectum and/or the urinary bladder. Usually the conditions appear after prolonged and neglected obstructed labour in places where delivery is not appropriately assisted. In developing countries it is usually a feature of young and malnourished primipara, having an obstructed labour and lacking the means for a rapid referral to a health facility. In developed regions, fistula usually follows gynaecological surgery, or radiotherapy for cervical cancer.

When labour is obstructed (compacted pelvis, macrosomia, malpresentation, uterus atony), the fetal head impacts against the soft tissue of the pelvic floor, pinning the bladder base and the urethra against the pelvic bone. It is the duration of impaction without relief rather than the magnitude of the pressure, which determines the degree of tissue necrosis. The fistula site depends greatly on the degree of cervical effacement and dilatation, and the level at which the presenting part impacts. In the absence of any intervention, this condition may last for several days, in which time at the place of the impact the damaged tissue is extending due to lack of vascularisation and eventually a hole appears from vagina into the bladder, and sometimes the rectum. At the end of this interval, the fetus dies and is macerated; the mothers are exhausted because of bleeding and or sepsis and they will deliver a stillborn fetus.

The consequence of fistula is urinary or faecal incontinence, i.e. permanent leaking of urine or faeces through the vagina, a condition that is almost unendurable for women, who have to continue living thereafter unclean, outcast, smelling of urine and faeces<sup>37</sup>. In addition to their physical injuries, women who have experienced prolonged obstructed labour often develop serious social problems, including divorce, exclusion from religious activities, separate from their families, worsening poverty, malnutrition and almost unendurable suffering.

## 7. Regional incidence, prevalence and mortality estimates

**Table 7.1. Obstructed labour: age-specific incidence and mortality rate estimates for WHO epidemiological subregions, 2000.**

Subregion	Incidence neglected obstructed labour/1000 women 15-59	Stress incontinence incidence/1000 women 15-59	RVF/VVF incidence/100,000 women 15-59	Mortality obstructed labour/100,000 women 15-59
AFRO D	6.1	1.3	13.0	13.1
AFRO E	5.8	1.3	12.3	13.3
AMRO A	0.0	0.0	0.0	0.0
AMRO B	0.4	0.1	0.9	0.0
AMRO D	2.9	0.7	6.2	0.6
EMRO B	0.9	0.2	1.8	0.2
EMRO D	3.8	0.9	8.0	0.4
EURO A	0.0	0.0	0.0	0.0
EURO B1	0.0	0.0	0.0	0.0
EURO B2	0.0	0.0	0.0	0.0
EURO C	0.0	0.0	0.0	0.0
SEARO B	1.4	0.3	2.9	1.4
SEARO D	4.8	1.1	10.3	4.5
WPRO A	0.0	0.0	0.0	0.0
WPRO B1	0.7	0.2	1.5	0.0
WPRO B2	1.1	0.3	2.4	1.1
WPRO B3	0.5	0.1	1.2	1.1
World	2.0	0.5	4.3	2.4

## 8. Global burden of obstructed labour in 2000

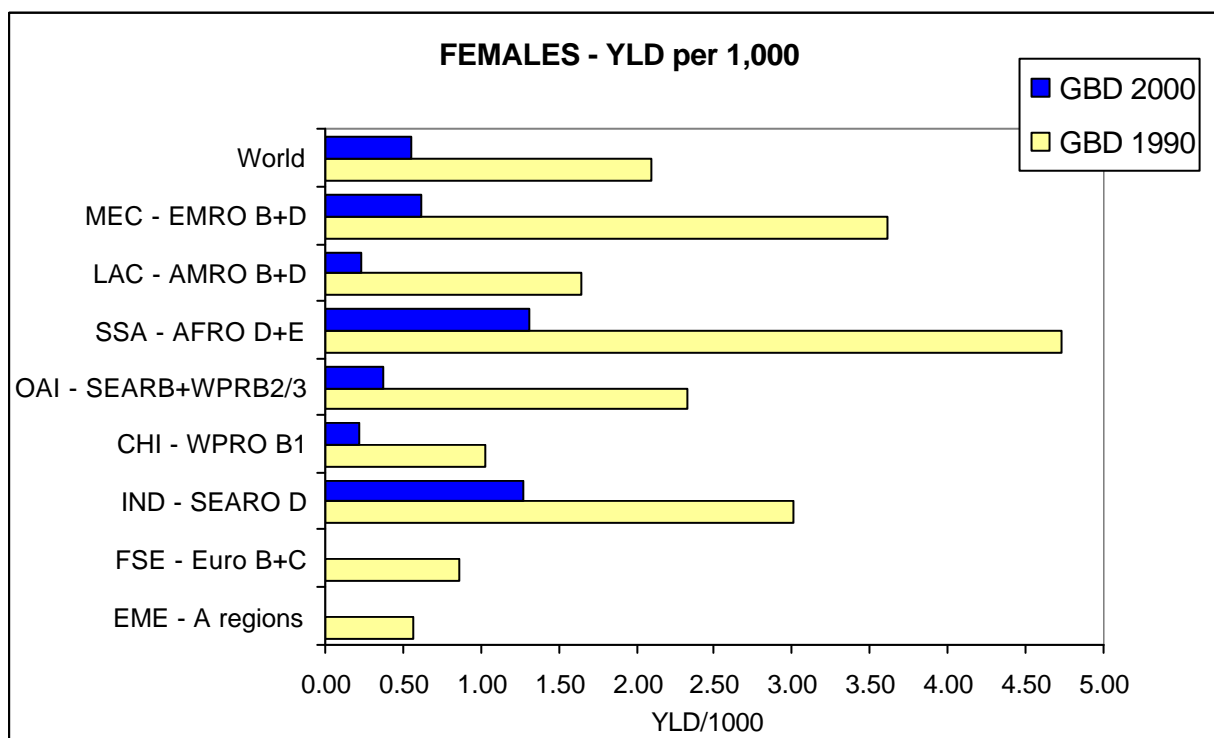
General methods used for the estimation of the global burden of disease are given elsewhere<sup>38</sup>. The tables and graphs below summarise the global burden of obstructed labour estimates for the GBD 2000 and compare them with the obstructed labour estimates from the GBD 1990<sup>39</sup>.

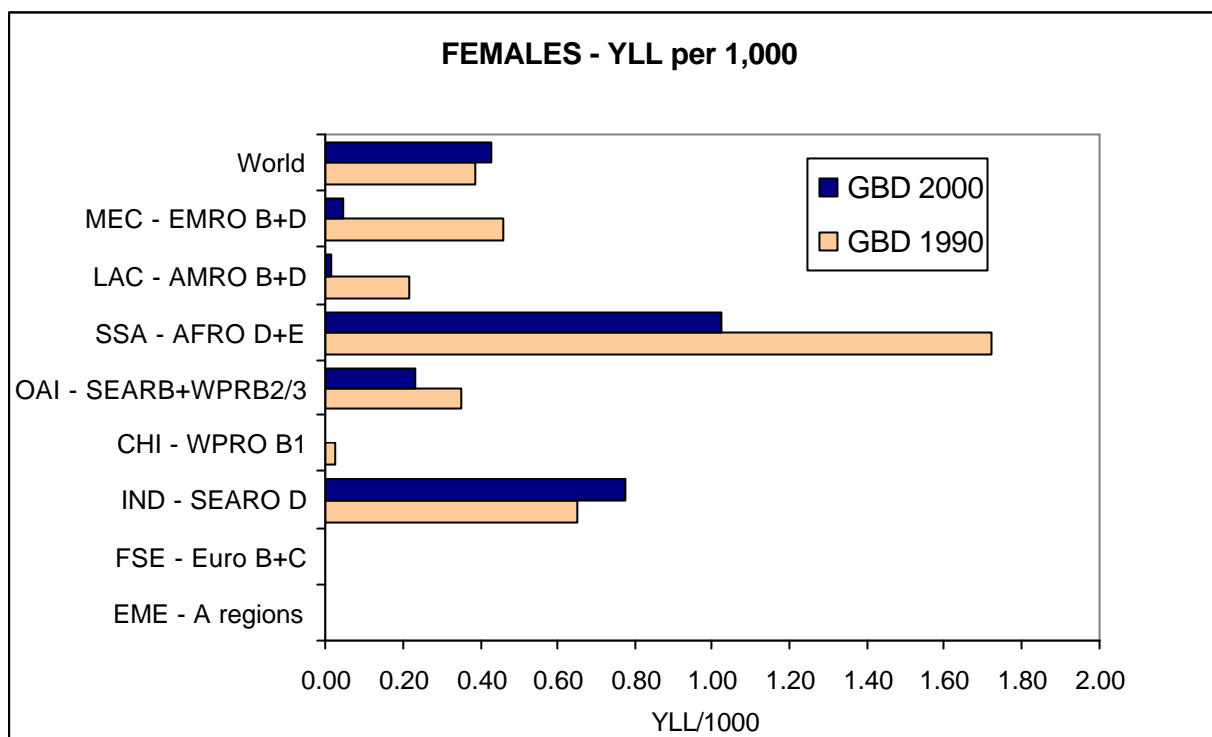
**Table 8.1. Obstructed labour: global Deaths, total YLD, YLL and DALY estimates, 1990 and 2000**

	GBD1990	GBD2000
Deaths ('000)	34	43
YLD('000)	5,457	1,672
YLL('000)	1,004	1,279
DALY('000)	6,462	2,951

**Table 8.2. Obstructed labour: YLD, YLL and DALY estimates for WHO epidemiological subregions, 2000**

Subregion	YLD/100,000	YLL/100,000	YLD('000)	YLL('000)	DALY('000)
AFRO D	139.6	208.0	234	349	583
AFRO E	121.4	203.8	206	346	552
AMRO A	1.4	0.0	2	0	2
AMRO B	14.4	0.3	32	1	33
AMRO D	78.7	9.8	28	3	32
EMRO B	24.3	3.4	16	2	19
EMRO D	98.0	6.2	67	4	71
EURO A	1.1	0.0	2	0	2
EURO B1	1.2	0.0	1	0	1
EURO B2	1.9	0.0	0	0	0
EURO C	0.9	0.0	1	0	1
SEARO B	39.8	25.0	78	49	128
SEARO D	127.2	77.6	831	507	1,338
WPRO A	1.1	0.0	1	0	1
WPRO B1	22.2	0.5	147	3	150
WPRO B2	31.8	19.1	23	14	37
WPRO B3	16.8	18.6	1	1	1
World	55.7	42.6	1,672	1,279	2,951

**Figure 8.1. Obstructed labour YLD rates, broad regions, 1990 and 2000.**

**Figure 8.2. Obstructed labour YLL rates, broad regions, 1990 and 2000.**

## 9. Conclusions

One of the main limitations in estimating the global burden of obstructed labour, as well as the other maternal conditions, is that epidemiological studies are currently using different definitions of the condition, rendering those studies difficult to compare. More efforts are needed to develop standard definitions, that researchers can refer to, and that may allow comparability of their work. These are version 3 estimates for the GBD 2000. Apart from the uncertainty analysis, updating estimates to reflect revisions of mortality estimates and any new or revised epidemiological data or evidence, it is not intended to undertake any major addition revision of these estimates.

We welcome comments and criticisms of these draft estimates, and information on additional sources of data and evidence. Please contact Colin Mathers (Evidence and Information for Policy, WHO Geneva) on email [matherse@who.int](mailto:matherse@who.int).

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