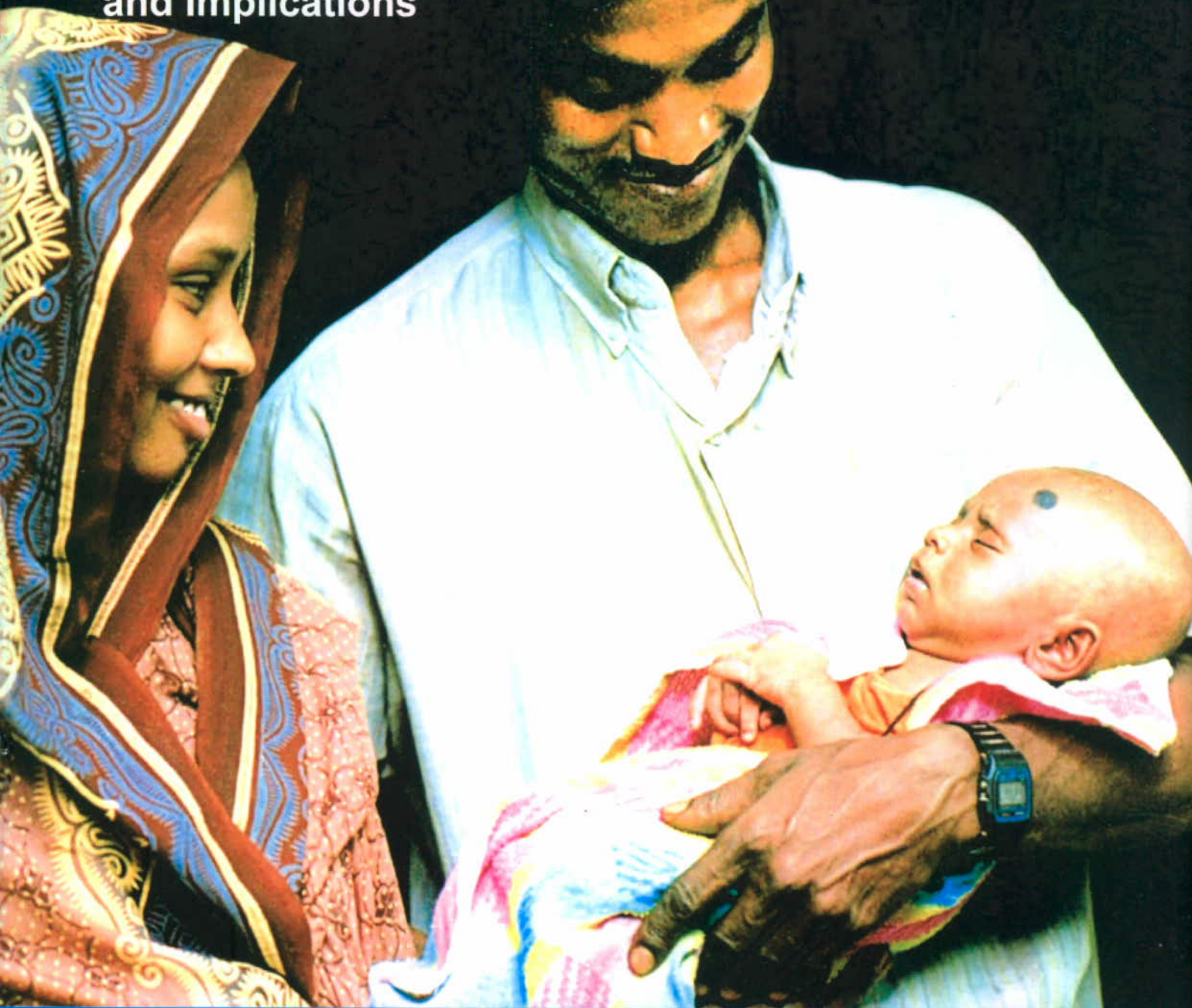


Bangladesh

Maternal Mortality and Health Care Survey 2010

Summary of Key Findings
and Implications



Australian Government
Aid Program



Introduction:

The Government of Bangladesh has invested on a maternal health program with support from a number of development partners. Committing to achieving the Millennium Development Goal (MDG) 5, Bangladesh's targets are to reduce the maternal mortality ratio (MMR) to 143 per 100,000 live births by 2015, and to increase skilled attendance at birth to 50 percent by 2010. In the last decade, the health, nutrition and population sector program of Bangladesh has adopted a national strategy for maternal health focusing on Emergency Obstetric Care (EmOC) for reducing maternal mortality, focusing especially on early detection and appropriate referral of complications, and improvement of quality of care. Since 2001, the government embarked on program to retrain existing government community health care workers as Community Skilled Birth Attendants (CSBA) as the primary operational strategy for achieving the 2015 target of 50% skilled attendance at birth.

Survey objectives:

The second Bangladesh Maternal Mortality and Health Service Survey was conducted in 2010 (BMMS 2010) with the major objectives to provide a maternal mortality estimate for the period 2008-2010, to determine whether MMR has significantly declined from the 1998-2001, and to ascertain the causes of maternal death. The first such national level survey was conducted on 2001 (BMMS 2001).

The specific objectives of BMMS 2010 were:

1. To estimate the Maternal Mortality Ratio (MMR) for the period 2008-2010;
2. To identify specific causes of maternal deaths;
3. To assess the level of use of antenatal care, post natal care, skilled birth attendant at delivery in 2005, 2006, 2007, 2008, 2009, and changes in use rates across the five years preceding interview;
4. To collect information on birth planning;
5. To assess the experience of and care seeking for maternal complications and changes in care seeking pattern during 2005-2009;

Implementation:

The survey was carried out in a national sample of 175,000 households, interviewing ever-married women 13 to 49, as well as investigating any deaths to women of reproductive ages, especially maternal and pregnancy-related deaths. Data collection for the survey was conducted from 18 January to 6 August, 2010.

Definitions:

Maternal Death: Death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes

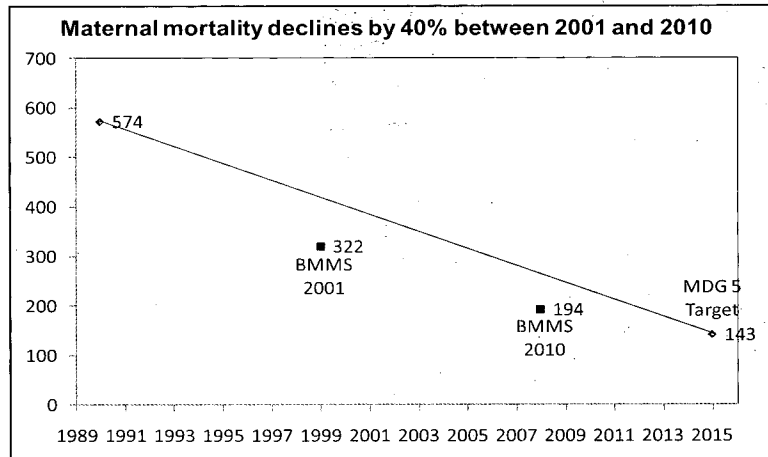
Pregnancy-related Death: Death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the cause of death

Direct obstetric death: Deaths resulting from obstetric complications of the pregnant state (pregnancy, labor and puerperium) from interventions, omissions, incorrect treatment, or from a chain of events resulting from any of the above

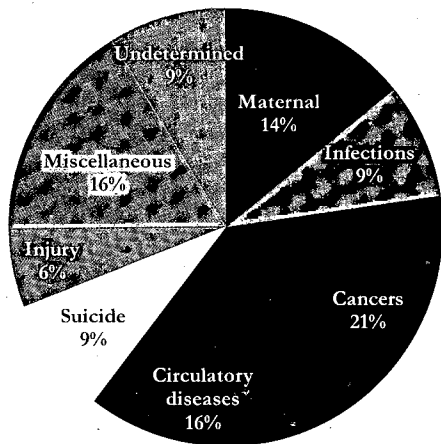
Indirect obstetric death: Deaths from previous existing disease or disease that developed during pregnancy and which was not due to direct obstetric causes, but which was aggravated by physiologic effects of pregnancy

Maternal Mortality Among Women in the Reproductive Ages: Levels, Trends and Causes

Maternal mortality declined from 322 in 2001 to 194 in 2010, a 40% decline in 9 years. The rate of decline was at an average of about 5.5% per year, compared to the average annual rate of reduction of 5.4% required for achieving MDG5. Bangladesh appears to be on track to achieving the primary target of MDG 5.



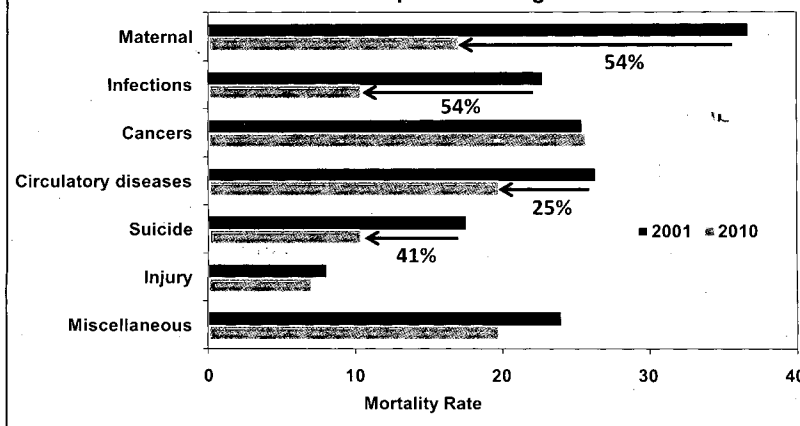
Causes of deaths among women of reproductive age



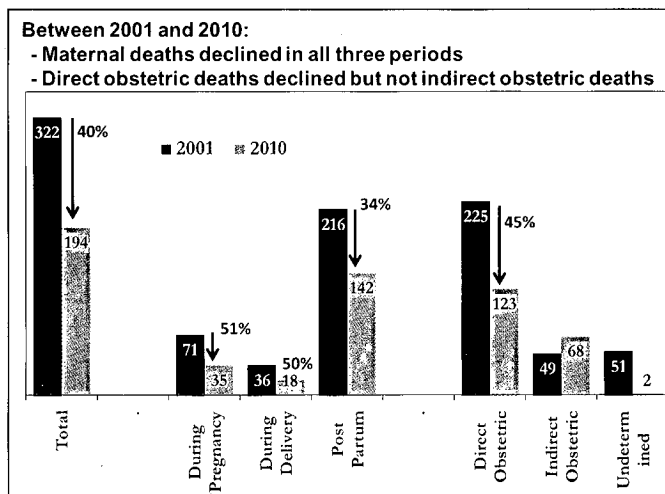
Comparing BMMS 2001 and 2010 show that overall mortality among women in the reproductive ages has consistently declined in all ages during these 9 years. Cancers (21%), circulatory diseases (16%) and maternal causes (14%) are responsible for more than half of all deaths among Bangladeshi women in the reproductive ages. While there have been large declines in deaths due to circulatory diseases and maternal causes, mortality rates due to cancers show no change. Deaths due to infections and suicides have

also declined, with the later now responsible for 9% of deaths among women in the Reproductive Ages.

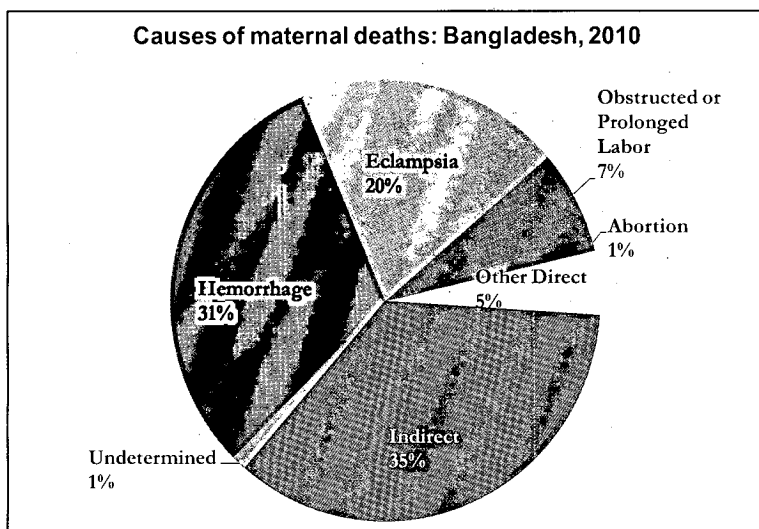
Most causes of deaths declined between 2001 and 2010 among women of reproductive age



Consistent with the trend in overall mortality among women in the reproductive ages, maternal mortality has also declined in almost all ages between the two surveys. The entire decline in MMR has been due to reductions in direct obstetric deaths. Mortality due to indirect obstetric causes have increased somewhat. Maternal mortality during pregnancy and during delivery has also declined, by 50%. In contrast, the reduction in post partum maternal deaths was only by a third.



We observed substantial declines in all causes of direct obstetric deaths between the 2001 and 2010 surveys. In BMMS 2010, hemorrhage and eclampsia are the dominant direct obstetric causes of deaths, together responsible for more than half of the MMR. Obstructed or prolonged labor (7%) and abortions (1%) are the other direct obstetric causes of deaths. We note that abortion-related deaths declined from 5% of MMR in 2001 to about 1% of MMR in 2010. The 2010 survey also did not identify any case of infection as an underlying maternal cause of death. Indirect obstetric causes of deaths account for about a third (35%) of maternal deaths.

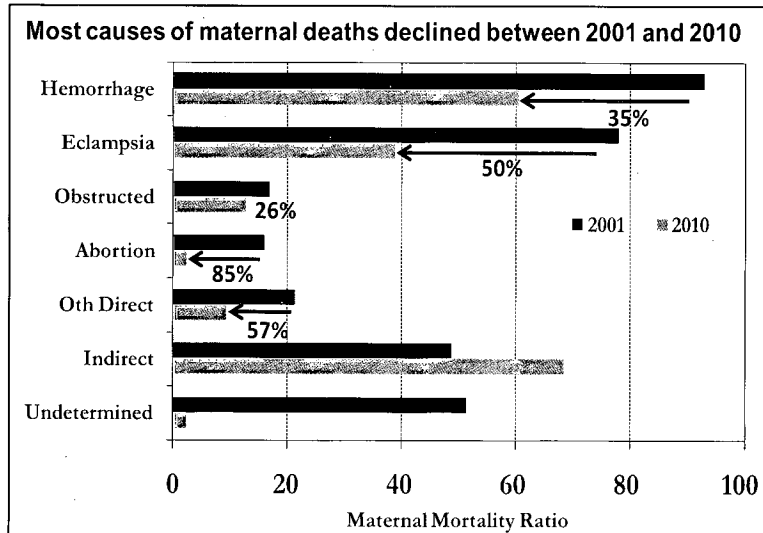


Data sources:

Household Deaths: Each household asked if any death occurred since October 2007. If yes, name, sex, age at death recorded. For deaths of women aged 13 to 49, additional questions to ascertain whether she was pregnant, delivering, or within two months of delivery at the time of death.

Household Deaths with Verbal Autopsy: For all household deaths of women aged 13 to 49, a verbal autopsy was applied. Maternal deaths identified on basis of review by 2 (or 3) physicians.

Sisterhood: Each married woman asked about her sisters' age if still alive, age at death and year of death if dead. For any sister who died between the ages of 10 and 49, additional questions to ascertain whether she was pregnant, delivering, or within two months of delivery at the time of death.



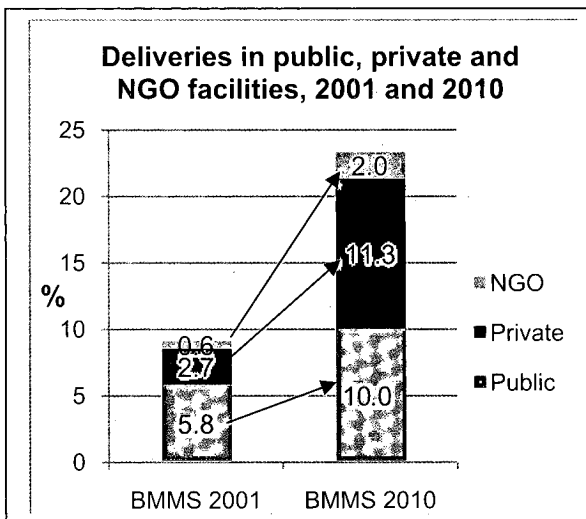
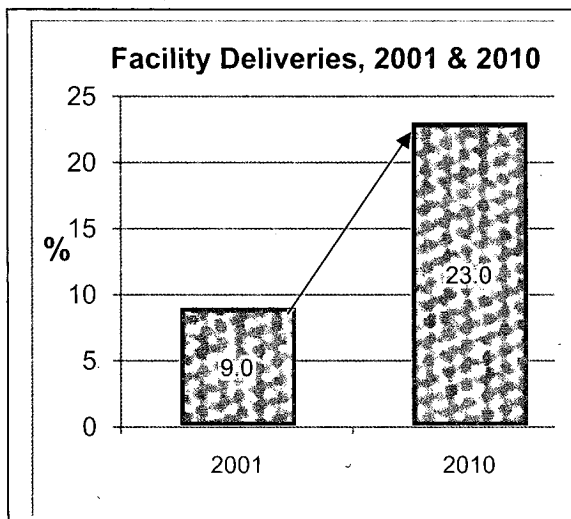
Why has maternal mortality (MMR) declined by 40% between 2001 and 2010?

The risk of a maternal death is now down to 1 in 500 births, and thus a rare event. However our ability to predict which women may experience potentially fatal obstetric complications is poor. Thus we encourage all pregnant women to minimize risk by delivering with a skilled birth attendant, preferably in a facility, and under certain circumstances, to have a C-section. Irrespective of whether or not a pregnant woman plans to deliver in a facility, considerable effort has gone into promoting prompt treatment seeking for obstetric complications if they arise.

In the BMMS 2001 the two major causes, accounting for over half of maternal deaths, were hemorrhage (29%) and eclampsia (24%). Both of these normally require management at facility by a medically trained provider. In BMMS 2010 it is seen that very substantial declines have occurred in both these causes – a 35% reduction in hemorrhage and a 50% reduction in eclampsia. This implies greater use of facilities for delivery, and for management of obstetric complications. Does the evidence support this?

1. Behavior Change in Seeking Health Care:

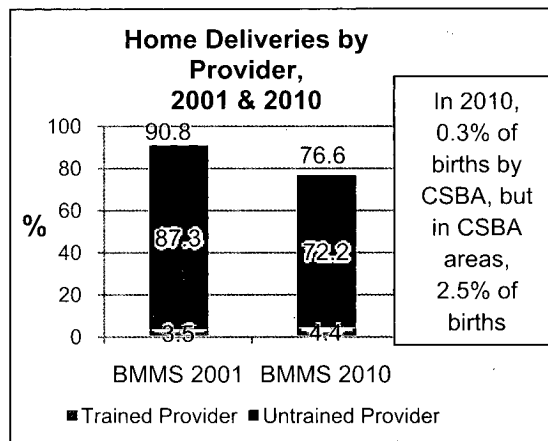
Facility Delivery: After persisting at historically low levels, the proportion of women delivering in a facility has finally begun to rise in the past decade, from 9% in 2001 more than doubling to 23% in 2010. Much of that increase has come through the private sector (2.7% to 11.3%), although the public sector has seen some increase from a higher base (5.8% to 10.0%). NGOs remain a minor contributor for deliveries (0.6% to 2.0%), though more important for ANC.



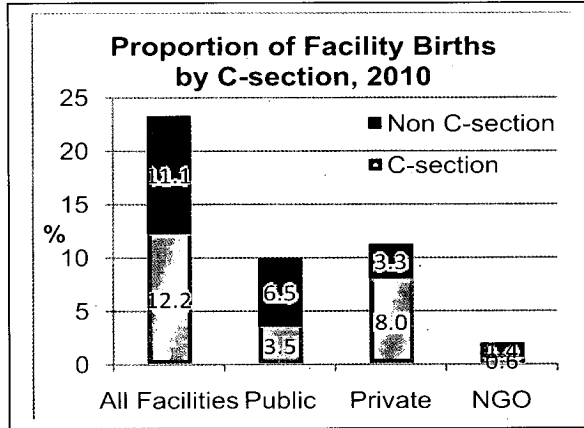
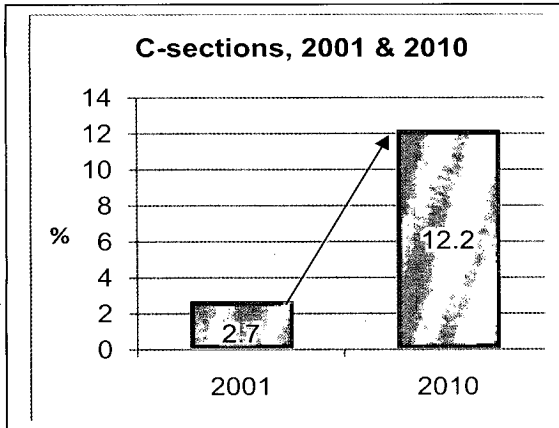
Skilled Birth Attendant at Delivery(SBA): As facility delivery has increased, it would be expected that births with SBA would increase, and it has doubled (12.2% to 26.5%). Only a small proportion of women use a medically trained provider to attend deliveries at home (4.3%) which has changed little since 2001 (3.5%). Almost the entire increase in skilled attendance at delivery has been through facility deliveries – which suggests that strategic investments in improving services at health facilities may provide the greatest and quickest returns in terms of skilled attendance at delivery. The CSBA program cannot be expected to show a marked increase in attendance at delivery by CSBA (0.3% women report CSBA assisting, although in areas with a CSBA, this is higher at 2.5%). However, it is highly unlikely that even a strengthened CSBA program can contribute substantially towards the 50% MDG 5 target for skilled birth attendance. CSBAs will likely have a continued role in serving communities with difficult access.

While the rise in facility delivery is welcome, it still leaves some 2.4 million births at home annually. But the decline in maternal deaths suggests that many pregnancies with complications may now be selectively going to facilities, as is intended.

Some hemorrhage cases can be avoided by proper management of the placenta (e.g., use of oxytocics to expel it rather than pulling on the umbilicus; avoiding excessive use of oxytocics which may rupture the uterus), but eclampsia cannot always be managed with magnesium sulphate (or diazepam). Where complications arise, C-section may be needed to avoid fatal consequences.



C-section: There has been a 5 fold increase in use of C-section (2.6% to 12.2%), with much of the increase occurring in the private sector, which has implications for access for the poor.

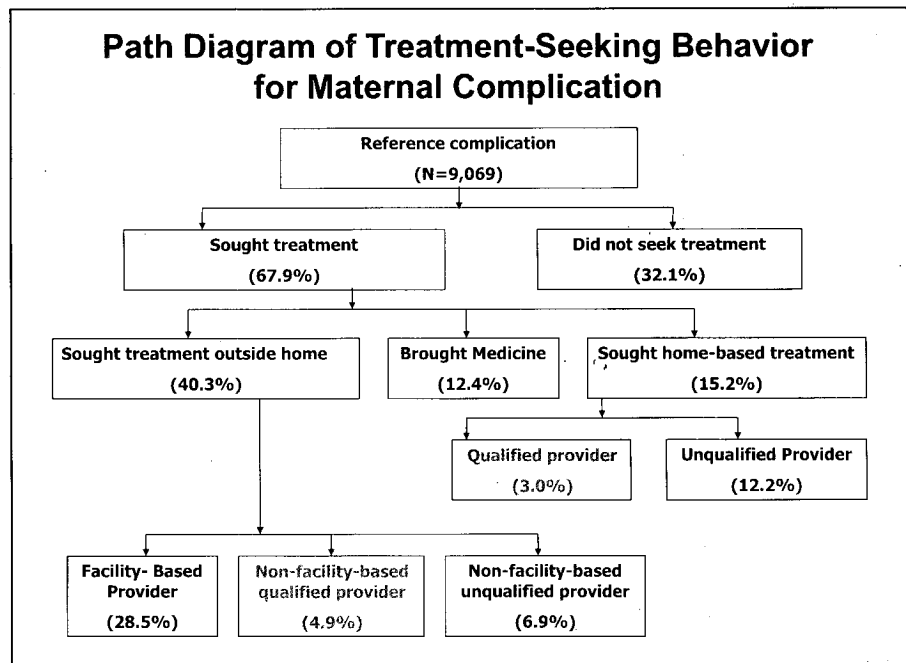


This intervention should reduce mortality from prolonged labor cases, and eclampsia where use of Magnesium Sulphate does not reduce the problem. Not all women who experienced these complications were managed through C-section, though 15% of those with convulsions did, and 26% of those with elevated blood pressure did.

There is a concern that while some women who need a C-section may not get it, also some women who do not need it are getting it unnecessarily. Among women who reported no complications, 9.4% had a C-section, presumably for the convenience of the women or the provider. The provision of C-sections generates income for many providers, two-thirds of which are done in the private sector, so care must be taken not to allow commercialization of this valuable procedure, to the exclusion of the poor. It is reassuring to note that the 5-fold increase among the poorest quintile was on a similar scale to the overall increase, but from a much lower base (0.5% of the poorest versus 2.7% overall).

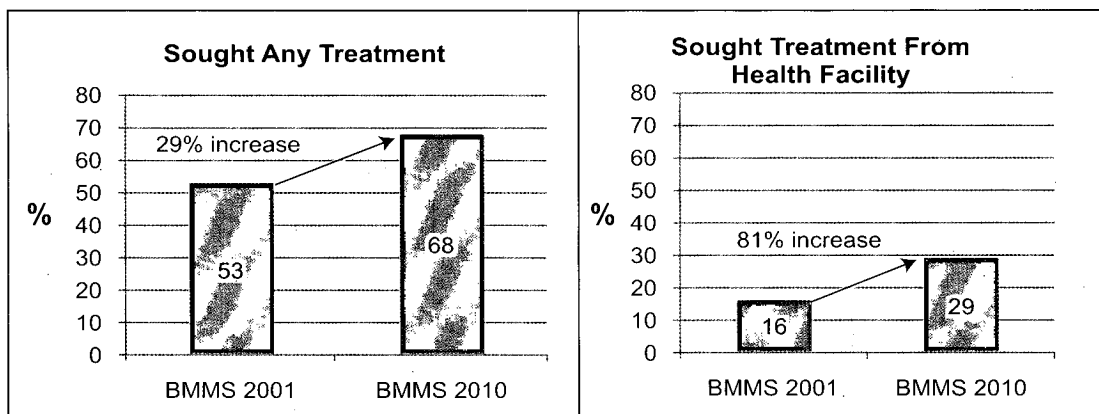
Apart from the welcome increase in facility deliveries, there is clear evidence that women suffering obstetric complications are increasingly seeking treatment, particularly outside the house.

Treatment Seeking for Complications: There has been a substantial increase in women experiencing obstetric complications seeking treatment (53% to 68%). This includes home based treatment, purchasing medicines from pharmacies, and treatment seeking outside the home. Seeking treatment from a facility has



greatly increased (16% to 29%) indicating that both awareness and referral systems are improving. This positive trend is consistent across the economic scale. However, not all treatment seeking is effective, as the qualitative study showed that many of the maternal death cases sought treatment at a non-CEmOC facility which could not manage their problem (e.g., hemorrhage).

A substantial proportion of women, particularly among the poor, seek treatment by having someone purchase medicine (presumably at a pharmacy). This may not be a negative trend, as the survey shows a major decline in deaths from infections to women of reproductive age (down 54% from 2001 to 2010). This parallels the dramatic decline in the past decade in child mortality, part of which may be explained by greater availability of, and effective use of antibiotics for infections.

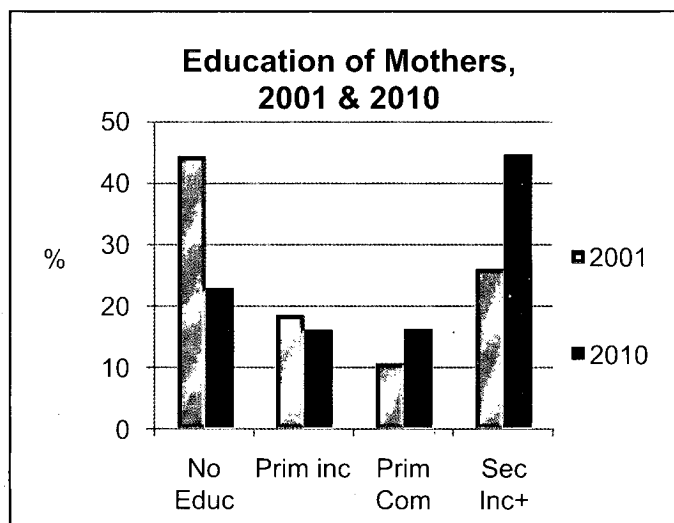


What accounts for these behavioral changes?

(a) Improved Access to Health Programs:

Up to 2000 there was a major effort to upgrade for comprehensive EmOC some 59 District Hospitals (DH) and 60 MCWCs, many of which are located at district headquarters. At the time of the 2001 BMMS, three Upazila Health Centres (UHC) were also offering CEmOC. By 2010, the number of UHCs offering CEmOC had increased to 132, and MOHFW was upgrading 1,500 Health and Family Welfare Centers. This definitely improved availability outside the District headquarters (Sadar) Upazilas where the DHs and MCWCs were concentrated. Further analysis is needed to determine if this wider availability translated into greater use of CEmOC facilities.

There is evidence from the qualitative study that better communications, particularly the wide spread availability of mobile phones, has contributed to more rapid contact with



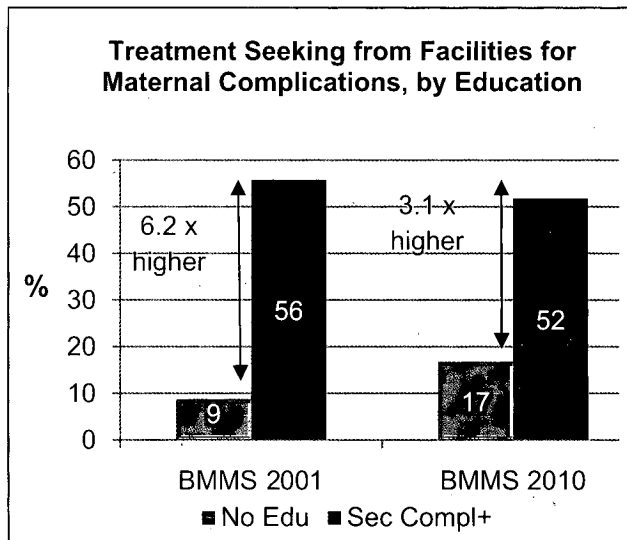
service providers, though not always the desired medically qualified providers, but sometimes village doctors who are unable to resolve obstetric complications. Overall improvements in road communications seems to have increased use of facilities, though further spatial analysis of travel times, etc., will be needed to confirm this. Health behaviors are not simply determined by availability of facilities and services, but are also influenced by socio-economic factors.

(b) Higher Education levels:

Globally higher female education is associated with behaviors which reduce risk of maternal (and child) mortality. The investments by the Government (and some NGOs) over the past several decades in female primary and secondary education are starting to show positive impacts on risk behaviors.

The levels of education of recent mothers have risen dramatically in the past decade as well educated young women enter the childbearing years.

The proportion of mothers with no education has halved since 2001, and the proportion with secondary schooling has nearly doubled. It is estimated that this trend alone has contributed to the impressive increases in facility delivery (25% of the increase), and in use of medically trained attendants at delivery (33%), and in treatment seeking for obstetric complications.

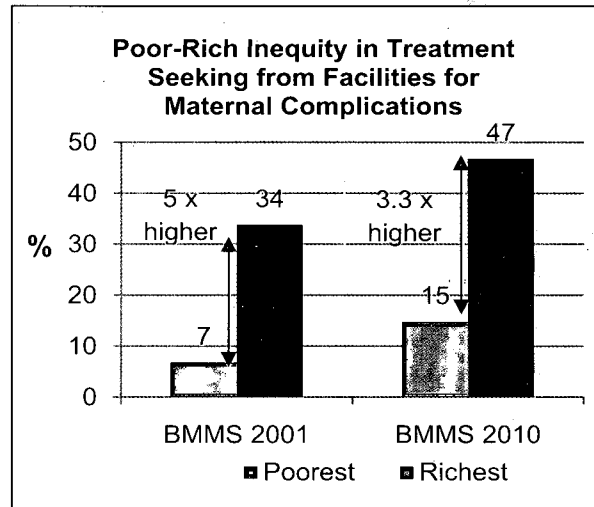
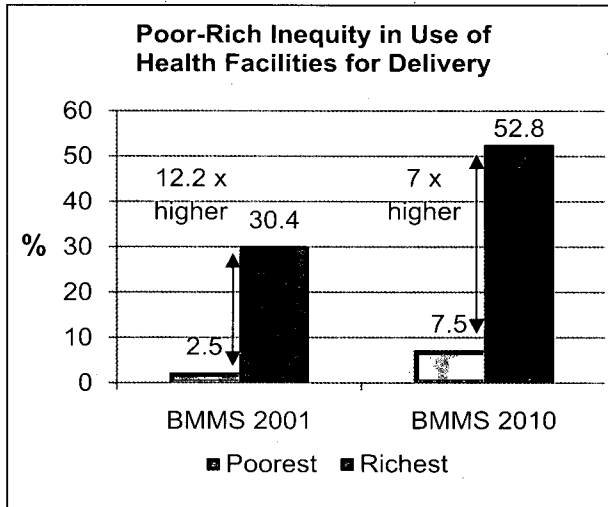


(c) Increased Awareness:

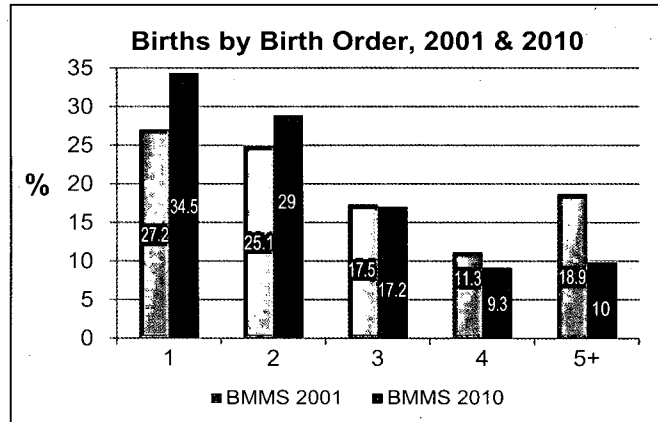
Not only are there fewer uneducated women giving birth, but among the uneducated, their awareness and behavior is changing positively. For example, seeking care for complications at a facility has doubled (8.6% to 16.9%) among uneducated women, while remaining unchanged among women with secondary plus education (56.1% to 52.2%). This differential improvement is reducing inequities by education.

(d) Better Economic Condition:

Bangladesh has undergone an improvement in overall economic wellbeing since 2001 (GNI pc up from \$350 in 2000 to \$550 in 2008), which is reflected in better housing, greater access to electricity, and presumably greater ability to mobilize funds for medical emergencies. This will be reflected in increases in many of the indicators among the poorest.



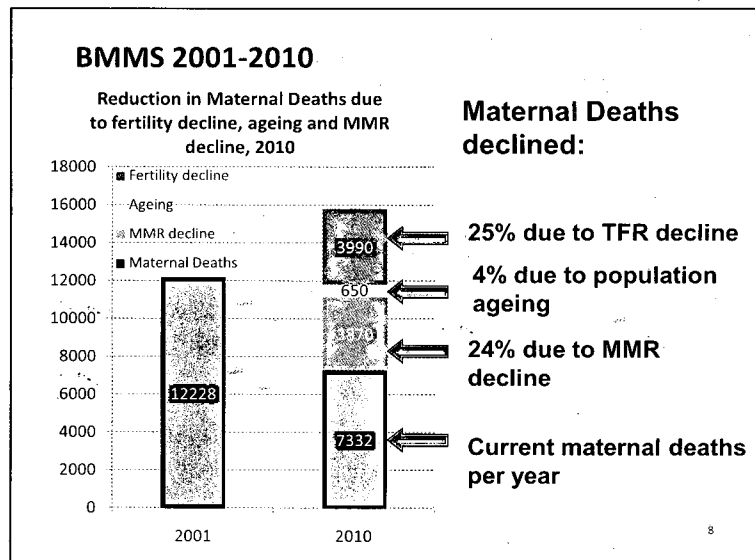
Virtually all indicators of use of health services by the poorest quintile show considerable improvement, and reductions in inequity between rich and poor. From a tripling of facility delivery (2.5% in 2001 to 7.5% in 2010 see figure above), to use of medically trained assistance at delivery (3.6% to 9.2%), to seeking care for complications (6.7% to 14.5%- see figure above). However we need to be cautious that while the Rich:Poor ratio has decreased from 5 to 3.3 (above), the absolute gap between rich and poor remains substantial (15% versus 47%).



2. Demographic factors:

Between BMMS 2001 and BMMS 2010 the Total Fertility Rate fell from 3.2 to 2.5, that is a 22% decline in 9 years. The fall in fertility has some implications on reductions of risks of maternal deaths. The risk of maternal mortality increases as maternal age and order of the pregnancy rise. As fertility has fallen, the proportion of births to women of higher parities has fallen: e.g., birth order 4+ down from 30% to 19%, etc (see figure). This shift away from high parity births, which are at high mortality risk, reduces the overall risk of maternal deaths.

In summary, compared to potential numbers of maternal



deaths, the reduced annual number of 7,332 has been attained by a 25% reduction due to fertility decline (see figure), mainly by a shift to low parity, lower risk births. Of course, the decline in MMR has also contributed to the overall reduction in numbers of maternal deaths, as discussed above.

Major Findings:

- Bangladesh appears to be on track to achieving MDG 5.
- Maternal mortality declines in Bangladesh by 40% in the last 9 years to 194 per 100,000 live births.
- The main reasons for this decline in maternal mortality are:
 - Fertility reductions reduced the proportion of higher risk high parity births
 - The use of facilities for deliveries increased from 9% to 23% and use of facilities for maternal complication increased from 16% to 29% between BMMS 2001 and 2010. This was a consequence of improved access to care, substantially better education among women, improved awareness and better economic conditions.

Where do we go from here?

Attaining MDG5 will require further efforts to achieve a further 25% reduction in MMR. What are the options?

- As fertility reduction has been as important as MMR reduction to this point, future gains in maternal mortality may be achieved by ensuring effective family planning to lower fertility to replacement level and below, which will shift births away from high parity higher risk births.
- The trend of rising education levels among young women can be expected to bring behavior changes which favour more use of skilled birth attendants, more facility deliveries, and more and quicker treatment seeking for complications.
- The decline in direct obstetric deaths is most likely the consequence of better care-seeking practices and improved access to higher level referral care. The higher proportion of maternal deaths now contributed by post-partum deaths (73%, up from 67% in 2001) suggest the need to prioritize the strengthening of access to treatment and improving referral systems and referral level care.
- On health interventions, the leading cause of maternal death in both surveys was hemorrhage, and eclampsia. Several interventions have been tested and are being made available to reduce this problem. MOHFW has approved distribution of Misoprostol tablets to all pregnant women shortly before delivery to minimize the risk of hemorrhage. In addition, the use of delivery mats have proved to be effective at aiding attendants in determining if blood loss is 'excessive' around delivery. There is increasing availability of Magnesium Sulphate for management of (pre-) eclampsia. Hopefully these interventions will become more widespread.
- It is necessary to understand the benefits of improved access to upgraded facilities at Upazila and Union levels. Plans are in place to expand such access, but staffing issues will need to be addressed, as well as essential logistics, including blood transfusion, being ensured. Finally, access for the poor is essential, and as relatively expensive interventions become more widely available, some kind of health insurance (possibly like Demand Side Financing or another model) may be needed to overcome the fear of heavy costs of life saving obstetric procedures.

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INDICATORS

	BMMS 2001	BMMS 2010
Maternal Mortality		
Maternal Mortality Ratio (estimated from verbal autopsy) Maternal deaths per 100,000 live births	322	194
Pregnancy related Maternal Mortality Ratio estimated from household deaths Pregnancy related deaths per 100,000 live births	382	201
Pregnancy Related Maternal Mortality Ratio estimated from sibling history	400	257
Proportion of adult female deaths due to maternal causes	20.2	14.2 ¹
Antenatal Care		
Percentage of last live births in the three years preceding the survey for which women received at least one ANC visit from any provider	47.6	71.2
Percentage of last live births in the three years preceding the survey for which women received at least one ANC visit from a medically trained provider	40.1	53.7
Percentage of last live births in the three years preceding the survey for which women received 4 or more ANC visits	11.6	23.4
Skilled Assistance at Delivery		
Percentage of births in the three years preceding the survey attended by medically trained provider	12.0	26.5
Percentage of births in the three years preceding the survey delivered at a health facility	9.2	23.4
Percentage of births in the three years preceding the survey delivered by C-section	2.6	12.2
Postnatal Care		
Percentage of last live births in the three years preceding the survey for which mother received postnatal care checkup within 2 days of delivery	10.6 ²	22.5
Complete Maternal Care		
Percentage of last live births in the three years preceding the survey for which mother received at least one ANC visit, delivery care and PNC visit from a medically trained provider ²	4.8	19.0
Care Seeking for Complications		
Percentage of last live births in the three years preceding the survey that had complications for which women sought any care	52.7	67.9
Percentage of last live births in the three years preceding the survey that had complications for which women sought care from a medically trained provider	24.9	36.4
Percentage of last live births in the three years preceding the survey that had complications for which women sought care in a health facility	15.6	28.5

¹ Includes one late maternal death

² PNC from a medically trained provider within 42 days of delivery