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Foreword

The 2001 Bangladesh Maternal Health Services and Maternal Mortality Survey (BMMS) is the first nationally representative sample survey designed to provide information on the level of maternal mortality, causes of maternal and nonmaternal deaths, and perception, experience, and utilization of maternal health care in Bangladesh.

The 2001 BMMS provides a comprehensive look at levels of and differentials in maternal health parameters for policymakers and program managers. The survey estimates the maternal mortality ratio (MMR) in Bangladesh during the period 1998-2001 as in the range of 320 to 400 per 100,000 live births. The direct estimates show a 20 percent decline over a decade, from 514 in 1986-1991 to 400 in 1998-2001. In Bangladesh, two-thirds of maternal deaths occur after delivery, only one in ten occurs during delivery, and the remaining one in five occurs before delivery. The major causes of maternal deaths are retained placenta, postpartum/puerperal sepsis, and postpartum hemorrhage.

The information presented in this report will be instrumental in identifying strategic directions for the national Health and Family Planning Program in Bangladesh. Information from the survey will provide crucial indicators for evaluating policies and programs and for designing future program strategies. The survey will hopefully contribute to an increased global commitment to improving the lives of mothers and children worldwide.

The need for further detailed analysis of the BMMS data remains. It is hoped that researchers, academicians, and program personnel will carry out such analysis to provide in-depth information that will benefit the future direction and effective implementation of maternal health programs.

The contributors of this report deserve special thanks. I express my thanks to the National Institute of Population Research and Training (NIPORT) and ORC Macro for their sincere efforts in conducting the 2001 BMMS. I thank The Johns Hopkins University (USA) and the ICDDR,B for providing technical support. Special thanks also goes to Associates for Community and Population Research (ACPR) and Mitra and Associates for their sincere efforts in conducting the field survey. The U.S. Agency for International Development (USAID) deserves thanks for their financial support to accomplish the important survey.

A.F.M. Sarwar Kamal
Secretary
Ministry of Health and Family Welfare
Government of the People’s
Republic of Bangladesh
The Bangladesh Maternal Health Services and Maternal Mortality Survey (BMMS) carried out in 2001 is a nationally representative survey that was implemented for the first time in Bangladesh through a collaborative effort of the National Institute of Population Research and Training (NIPORT) and ORC Macro (USA). The Johns Hopkins University (USA) and the ICDDR,B provided technical assistance. Associates for Community and Population Research (ACPR) and Mitra and Associates, two Bangladeshi private research firms, collected the survey data. The financial support for the survey was provided by the United States Agency for International Development (USAID)/Dhaka. The BMMS 2001 provides updated estimates of levels of maternal mortality, causes of maternal deaths, and utilization of maternal health services in Bangladesh.

The information concerning maternal health services and maternal mortality at the national level will be instrumental in identifying new directions for the national health and family planning program in Bangladesh. The survey report will hopefully contribute to an increased commitment to improving the lives of mothers and children.

The members of the Technical Review Committee (TRC) included persons with professional expertise from government, nongovernmental, and international organizations, as well as researchers and professionals working for the maternal health program, who contributed valuable comments during major phases of the survey. In addition, a Technical Task Force (TTF) was formed with representatives from NIPORT, the Directorate of Family Planning, USAID, ICDDR,B, UNICEF, and ORC Macro for designing and implementing the survey. I would like to extend my deepest gratitude and appreciation to the members of the TRC and the TTF for their valuable contributions during different phases of the survey.

The preliminary results of the 2001 BMMS with its major findings were released in a dissemination seminar held in March 2002. The final report supplements the preliminary report released earlier. I hope the survey results will be useful for monitoring and implementation of the national maternal health program.

The contributors of the various chapters of this report deserve special thanks. I express also my heartfelt thanks to the professionals of the research unit of NIPORT, ORC Macro, The Johns Hopkins University, ICDDR,B, ACPR, Mitra and Associates, and USAID/Dhaka for their sincere efforts in the successful completion of the survey.

Lokman Hakim  
Director General  
National Institute of Population Research and Training
SUMMARY OF FINDINGS

The 2001 Bangladesh Maternal Health Services and Maternal Mortality Survey (BMMS) is a nationally representative survey that was implemented by Associates for Community and Population Research (ACPR) and Mitra and Associates under the authority of the National Institute of Population Research and Training (NIPORT) from January through June 2001. The Johns Hopkins University (JHU) in the U.S. and the International Center for Diarrheal Disease Research, Bangladesh (ICDDR,B) provided assistance in questionnaire design and data analysis. ORC Macro of Calverton, Maryland provided technical assistance in all phases of the project as part of its international MEASURE DHS+ program, while financial assistance was provided by the U.S. Agency for International Development (USAID)/Bangladesh.

The BMMS is intended to serve as a source of maternal health and maternal death data for policymakers and the research community. In general, the objectives of the BMMS were to (i) collect data at the national level that will facilitate an assessment of the level of maternal mortality in Bangladesh; (ii) identify specific causes of maternal and nonmaternal deaths among adult women; (iii) collect data on women's perceptions of and experience with antenatal, maternity, and emergency obstetrical care; and (iv) measure indicators of utilization of maternal health services in Bangladesh.

MATERNAL AND OTHER CAUSES OF ADULT MORTALITY

On the basis of deaths among women of reproductive age reported by households as occurring in the three years before the survey combined with a verbal autopsy to identify those deaths that are maternal, the maternal mortality ratio (MMR) for the approximate period 1998-2000 is estimated as 322 per 100,000 live births (95 percent confidence interval (CI) 253-391). Questions about timing of these deaths relative to pregnancy estimate the pregnancy-related mortality ratio (PRMR) as 400 (95% CI 337-462) for the same time period, and indicates a gradual decline in the PRMR over the recent past from 514 for the period 10-14 years before the survey. It is thus notable that the various methods give rather similar estimates. The survey does not find large differences in maternal mortality or pregnancy-related mortality by region or socioeconomic status, but does find very large differences in risk by age of mother.

A by-product of the methods used to estimate maternal mortality is estimates of overall adult mortality, both male and female. Data quality checks show these data to be satisfactory. Overall adult mortality in Bangladesh is estimated to be very similar to that found by the ICDDR,B Demographic and Health Surveillance System in Matlab Thana. The proportion of persons expected to die between age 15 and 60 is 18 percent for males and 15 percent for females. Data from household deaths and sibling histories are once again notably consistent. The sibling histories suggest a marked improvement in female adult survivorship during the 15 years preceding the survey, but a much smaller improvement among males.

MATERNAL HEALTH PROBLEMS AND TREATMENT-SEEKING BEHAVIOR

Knowledge of life-threatening maternal complications: Knowledge of life-threatening complications among Bangladeshi women is low, with fewer than half able to name most major complications. Knowledge of such conditions ranges from a high of 56 percent for tetanus, to 49 percent for prolonged or obstructed labor, to only 18 percent for vaginal bleeding. Knowledge levels for life-threatening conditions are low among all major demographic and socioeconomic subgroups.

Prevalence of maternal complications: Among live births and stillbirths that took place during the three years preceding the survey, 61 percent had at least one associated complication during pregnancy, delivery, or after delivery. The most
commonly reported complication was one or more symptoms of preeclampsia (41 percent), followed by malpresentation or prolonged/obstructed labor (22 percent). The importance of specific complications varied by stage of pregnancy, with one or more symptoms of preeclampsia (39 percent) the most commonly reported complication during pregnancy, malpresentation or prolonged/obstructed labor the most commonly reported complication during delivery (22 percent), and excessive vaginal bleeding the most commonly reported complication after delivery (10 percent). Among reported complications, almost one-half (46 percent) were perceived as potentially life threatening, with this proportion ranging from 75 percent for retained placenta to 55 percent for excessive vaginal bleeding to 31 percent for symptoms of preeclampsia.

Treatment-seeking behavior: Among the most recent reference complication, treatment was sought for 62 percent of those complications which were perceived as life threatening, compared to 42 percent of those perceived as non-life threatening. Considerable variation is evident in the propensity to seek treatment by the nature of the complication: among perceived life-threatening cases, treatment was sought for 77 percent of convulsions cases, 57 percent of cases of malpresentation or prolonged/obstructed labor, and 39 percent of cases of retained placenta. Treatment seeking for perceived life-threatening complications was associated with urban residence and higher socioeconomic status. Among women with perceived life-threatening complications who did seek treatment, only one in three women (32 percent) sought care from a facility or nonfacility-based qualified provider. In the remaining two-thirds of cases, either the woman failed to seek care (38 percent), or she sought care from an unqualified provider (29 percent). Among women who failed to seek treatment for perceived life-threatening complications, the most commonly cited reason was cost (44 percent), followed by perception that treatment was not necessary (39 percent).

Delays in obtaining treatment: Among women with a perceived potentially life-threatening condition, recognition of the complication was generally timely, with 26 percent recognizing it within six hours of onset. Delays in the decision to seek treatment were also not lengthy, with 46 percent deciding to seek treatment immediately after recognizing the complication, and 64 percent seeking treatment within six hours. Among the subgroup of women who sought treatment outside the home, 73 percent reported that they were required to travel less than 60 minutes to the clinic or provider. Waiting time to be seen for treatment was similarly brief, with 85 percent reporting that they were seen by a staff member within one hour of reaching the facility.

**REPRODUCTIVE AND CHILD HEALTH**

**Fertility:** Like the 1993-1994, 1996-1997, and 1999-2000 Bangladesh Demographic and Health Surveys (BDHS), the BMMS results show that Bangladesh continues to experience a fairly rapid decline in fertility. However, the pace of fertility decline has slowed in the most recent period compared with the exceptionally rapid decline during the late 1980s and early 1990s. The total fertility rate dropped slightly from 3.4 for the period 1991-1993 to 3.3 in 1994-1996, remained constant during 1997-1999, and then edged lower again to 3.2 for the period 1998-2000. At current fertility levels, a Bangladeshi woman will have an average of 3.2 children during her reproductive years. The total fertility rate is higher in rural areas (3.4 children per woman) than in urban areas (2.7 children per woman). Fertility is lowest in Khulna (2.6) and Rajshahi (2.9) divisions, and highest in Sylhet (4.3) and Chittagong (3.7) divisions. Dhaka and Barisal divisions have intermediate levels of fertility, with total fertility rates of about 3.2 children per woman. Women with no formal education and women in poorer households have more children than their counterparts. With a TFR of 4.2, women in the poorest households are likely to bear about two children more than women in the wealthiest households (2.4).

In Bangladesh, 90 percent of pregnancies result in a live birth, and 5 percent in a miscarriage or abortion. Stillbirths and menstrual regulations (MRs) comprise another 5 percent of pregnancy outcomes. Miscarriages and abortions are higher among younger women and older women.

The data show that birth intervals are generally long in Bangladesh. Among nonfirst births, nearly one in six children (16 percent) is born after a “too short” interval (less than 24 months). More than
half (57 percent) of nonfirst births occur three or more years after the previous birth, and 27 percent of such births take place 24 to 35 months after the previous birth. The overall median birth interval length is 38.8 months, the same as that found in the 1999-2000 BDHS survey. Childbearing begins early in Bangladesh, with the large majority of women becoming mothers before they reach the age of 20. The median age at first birth is 19 years women age 20-24.

Almost 30 percent of adolescent women in Bangladesh are already mothers with at least one child and 5 percent are currently pregnant, for a total of 34 percent who have started childbearing. The proportion who have begun childbearing increases rapidly with age. In rural areas, 35 percent of the adolescents have already begun childbearing, compared with 27 percent in urban areas. There are also variations by division.

**Fertility Regulation:** The 2001 BMMS indicates that 50 percent of currently married women in Bangladesh are using a method of family planning. Modern methods are more widely used (44 percent of married women) than traditional methods (6 percent). The increase in use of family planning from 8 percent of married women in the 1975 Bangladesh Fertility Survey to 54 percent in the 1999-2000 BDHS survey has declined to 50 percent in the 2001 BMMS. The decline in overall use is due to a decline in the use of traditional methods (from 10 to 6 percent). Use of modern methods has remained unchanged since 1999-2000.

Contraceptive use varies moderately by urban-rural residence but greatly by division. Contraceptive use is highest in Khulna division (62 percent), followed by Rajshahi (56 percent) and Dhaka divisions (52 percent), and lowest in Sylhet division (28 percent). Contraceptive prevalence ranges from 43 percent among women living in the poorest households to 58 percent among women living in the wealthiest households.

**Childhood Mortality:** Evidence of a decline in childhood mortality comes from comparing the BMMS data with the data from BDHS surveys. The estimate for under-five mortality calculated from the 1993-1994 BDHS data (for the period 1989-1993) is 133 deaths per 1,000, compared with 85 per 1,000 from the 2001 BMMS (for the period 1999-2000). This represents a 36 percent decline, or nearly 5 percent per year during the 1990s. The internal data from the BMMS show that under-five mortality decreased by one-third from the period 1986-1990 to 1996-2000. The variable most strongly associated with variation in under-five mortality is the length of the interval between births. As the birth interval gets shorter, the risk that a child will die increases sharply. For example, the neonatal mortality rate is twice as high for children born less than 24 months after a previous sibling as for children born 24 months or more after a previous sibling (72 and 35 percent, respectively). Differences are even larger for child mortality (between age 1 and 4). Sylhet division has extremely high mortality rates: Neonatal, postneonatal, infant, and under-five mortality in Sylhet is about 40 percent higher than the national average. Rajshahi and Dhaka divisions also have relatively high under-five mortality rates of about 100 per 1,000 live births.

The perinatal mortality rate in Bangladesh is estimated to be 59 perinatal deaths per 1,000 qualifying pregnancies. First pregnancies have a risk of 88 deaths per 1,000, and pregnancies with interpregnancy intervals of less than 15 months have a risk of 79 deaths per 1,000, compared with a risk of just 46 per 1,000 for pregnancies with interpregnancy intervals of 39 months or more. Perinatal mortality is higher in rural areas (60 deaths per 1,000 pregnancies) than in urban areas (52 per 1,000). Perinatal mortality is the highest in Sylhet Division (74 deaths per 1,000 pregnancies) and the lowest in Barisal and Chittagong divisions (48 per 1,000).

**MATERNITY CARE**

**Antenatal Care:** The data indicate that less than half of mothers in Bangladesh receive antenatal care from a trained or untrained provider. For births that occurred in the three years before the survey, only 48 percent of mothers received any antenatal care during pregnancy. The primary source of antenatal care is doctors (24 percent), followed by nurses, midwives, and female paramedical workers (15 percent). Among those who receive care, the median number of antenatal visits per live birth was less than two; women had three or more antenatal visits for only one in five births. Antenatal care is more common among younger women and low-parity women. The percentage of births for which mothers had one or more antenatal care checkups
was also significantly higher in urban areas than in rural areas (64 and 44 percent, respectively), with differences due largely to the percentage seeking care from a qualified doctor. The highest and lowest levels of antenatal care are found in Khulna division (57 percent) and Barisal division (33 percent), respectively. The use of antenatal care is strongly associated with level of education and household economic status. Among women who sought antenatal care, three in four sought care for a general checkup rather than for a specific problem. For all live births in which at least one antenatal visit took place, an abdominal examination or measurement of blood pressure was common but not universal (75 percent). For two-thirds of live births, measurement of maternal weight and/or height was reported. Blood or urine tests were less commonly reported (30 and 37 percent, respectively).

**Delivery Care:** Delivery at home remains almost universal in Bangladesh. Use of health facilities for delivery is more common in urban areas (22 percent of births), among mothers with some secondary education (23 percent), and among women in wealthier households (30 percent). For women who deliver at a health facility, more than half said that the reason they did so was to ensure a safe delivery. Three-fourths of births in Bangladesh are assisted by a traditional birth attendant, and only 12 percent of births are assisted by a trained medical professional. Low-parity women, urban women, and women with more education or who live in wealthier households are associated with greater likelihood that the delivery is assisted by a trained medical professional. Caesarean section is reported in fewer than 3 percent of deliveries.

**Postnatal Care:** Less than one in five women with recent deliveries reported having a postnatal checkup for themselves, with most reporting being seen by a qualified doctor (9 percent) or an unqualified doctor (5 percent). The proportions of women seeking postnatal care for their babies was also low (24 percent). Women whose pregnancy resulted in a stillbirth, or who had their first birth, and those who live in urban areas, have more education, or live in wealthier households were all more likely to have had a postnatal checkup. The primary reason for not having a postnatal checkup was the perceived absence of need (56 percent). Concern about cost (22 percent) was the second most commonly cited reason for not having a postnatal checkup.