MANOSHI
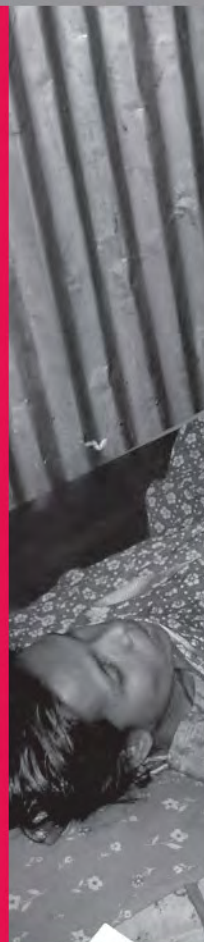## working paper

Causes of Maternal, Neonatal and Child Deaths

An Exploratory Study of Dhaka's Slum Dwellers

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EXECUTIVE SUMMARY

Maternal, neonatal and child mortality remain a major concern in Bangladesh. The major causes of maternal death include haemorrhage and eclampsia. The major causes of neonatal mortality include possible ARI and diarrhoea (33.2%), birth asphyxia (21.1%), and prematurity/LBW (10.9%), while the major causes of death for children under five (12 to 59 months) include possible serious infection (37.3%), injury (22.3%), and drowning (19.3%). In urban slums, health indicators are worse for the urban poor than the rural poor, despite being in close proximity to skilled care. The literature focuses on findings from rural areas; there is a dearth of information on causes of death from urban settings in Bangladesh or in other areas in South Asia. The objectives of this study were to a) identify medical causes of maternal, neonatal, and child deaths among slum dwellers; b) explain the socio-cultural and economic factors as perceived by caregivers to influence causes of death; and c) share findings with Manoshi programme staff to inform community-based intervention programme activities.

This study included both quantitative and qualitative methods. Verbal autopsies (structured interviews) were conducted with family members of deceased women, newborns and children to ascertain the medical causes of death. In-depth semi-structured interviews were conducted with family members of deceased women, newborns, children and health providers when needed.

Between January and December, 2008, a total of 287 deaths were identified: 116 neonates, 68 (post neonatal) infants, 30 from child age group, 48 were 15-49 years adult female (not due to maternal cause), and 25 were maternal deaths from the same age group. The programme missed some of the deaths, and the completeness of death information varies by area. This is caused by the workload, diversity of tasks and turn over of community health workers. The medical causes of death assigned by the programme and the research teams are similar, but there are some important differences, especially for neonatal deaths. By identifying maternal deaths rather than adult female deaths the programme may be missing important deaths in early pregnancy, particularly due to abortion. The socio-cultural factors vary by household, community, and facility levels. However, these factors are essential in the interventions efforts to decrease mortality. Various program recommendations were made based on the findings.

INTRODUCTION

Maternal, neonatal and child mortality remain a major concern in Bangladesh. The maternal mortality ratio is 322 per 100,000 live births (NIPORT et al, 2003), the neonatal mortality rate is 37 per 1000 live births, and under five-child mortality rate is 65 per 1000 live births (NIPORT et al, 2007). The major causes of maternal death include haemorrhage and eclampsia (NIPORT et al, 2003). The major causes of neonatal mortality include possible serious infection (possible ARI and diarrhoea) (33.2%), birth asphyxia (21.1%), and prematurity/LBW (10.9%), while the major causes of death for children under five (12 to 59 months) include possible serious infection (37.3%), injury (22.3%), and drowning (19.3%) (NIPORT et al, 2005). In urban slums, health indicators are worse for the urban poor than the rural poor (MOHFW, 2001), despite being in close proximity to skilled care. In urban slums, newborn and under-5 mortality rates are higher than national levels. According to the Urban Health Survey, in urban slum areas between 2002 and 2006, the neonatal mortality and under-5 mortality rates are 43.7 per 1000 live births and 80.7 per 1000 live births respectively (NIPORT et al, 2008).

A variety of complex factors affect care seeking behaviour for maternal, newborn and child illness, including lack of financial resources, lack of transportation, distrust of health providers, limited mobility of women, women's social status within the household, distance to health facilities, and perceived poor quality of care (Blanchet, 1984; Nahar & Costello, 1998; Afsana & Rashid, 2000; Rahman et al, 2003; Haider, 2000; Parkhurst & Rahman, 2007). In addition, local understandings of illnesses causation shape health seeking behaviours. Some literature indicates that it is common to attribute some pregnancy complications and infant illnesses to supernatural beings and the 'evil eye' with care sought from local traditional healers and hakims. These factors often lead to delayed decision-making in seeking appropriate care which can influence mortality.

The literature focuses on findings from rural areas; there is a dearth of information on causes of death from urban settings in Bangladesh or in other areas in South Asia. One study in urban slums of Lucknow, India found that among children 0 to 5 years, pneumonia was the leading cause of death (23%), followed by diarrhoea (21%), and malnutrition, anaemia (11%). Neonatal mortality accounted for 24% of all under-five deaths (Awasthi & Pande, 1998).

Information on the medical causes as well as the socio-cultural factors that lead to death is essential to develop effective interventions aimed at mortality reduction. Numerous methods are available to measure mortality including vital registration, review of medical records, and interviews with family members of the deceased (verbal autopsies). In Bangladesh, the majority of births and deaths take place at home, with limited information available from facility-based records. Verbal autopsies are therefore a cost-effective method to ascertain the causes of death (Mostafa & Rahman, 2006). They include retrospective interviews with respondents who were with the deceased at the time of death to elicit signs and symptoms of illness (es) that ultimately led to the death. These reports are reviewed by physicians to assign a medical cause of death. They reports also help identify delays in care seeking for illnesses/symptoms that cause death. These reports are excluded from medical records and provide rich information that can be used to strengthen interventions aimed at improving mortality.

The Manoshi programme aims to improve maternal, neonatal, and child health by implementing an integrated package of interventions in urban slum communities. Monitoring of medical causes of death as well as socio-cultural factors that influence these deaths is essential.

OBJECTIVES

- Identify medical causes of maternal, neonatal, and child deaths among slum dwellers in the Manoshi programme.
- Explain the socio-cultural and economic factors as perceived by caregivers to influence causes of death among slum dwellers in the Manoshi programme.
- Share findings with Manoshi programme staff to inform community-based intervention programme activities.

METHODOLOGY

This study included both quantitative and qualitative methods. Verbal autopsies (structured interviews) were conducted with family members of deceased women, newborns and children to ascertain medical causes of death. In-depth semi-structured interviews were conducted with family members of deceased women, newborns, children and health providers, if necessary, to understand the sociocultural and economic factors surrounding the deaths.

Identification of Deaths

This study aimed to identify all adult female (aged 15-49 years), newborn (aged 0-28 days), infant (29 days to 11 months), and child deaths (12 months – 59 months) in the Manoshi programme areas of Uttara, Gulshan (Korail and Shaitola), and Kamrangir Char from January to December 2008. Study team members worked closely with Manoshi staff to identify deaths using Manoshi programme data conducting meetings with programme staff and review of Shasthya Kormi (SK) registers at the beginning of every month. In addition, field research officers identified deaths through discussions with Urban Birth Attendants at the Manoshi Birthing Huts and review of UBA registers, discussions with Manoshi community health workers (Shasthya Shebika (SS) and others), tea stalls, BRAC and other NGO schools, and religious leaders. All deaths identified were from Manoshi households. Interviewers ensured that each death included in the study was from a household with a Manoshi identification number. Based on all the information, a complete list was compiled and interviews were conducted.

Medical Causes of Deaths

Once deaths were identified, a trained interviewer conducted a verbal autopsy using a standardized form. The forms were adapted from the 2003 Matlab Verbal Autopsy forms and the BRAC rural Verbal Autopsy form. These forms have not been validated in an urban setting, but are based on the WHO tools and have been extensively used in rural settings. The questionnaire included sections on identification of respondent, background information, an open ended section on events leading to the death, signs and symptoms of illness(es) leading to the death, pregnancy history (where appropriate), and care seeking behaviours. Each

interview took approximately 30 minutes for newborns and 45 minutes to 1 hour for adult female and child deaths.

Each completed questionnaire was reviewed by medical officers to assign a cause of death. Medical officers were trained on the cause of death assignment procedure and assigned immediate and underlying cause of death based on the International Classification of Diseases version 10 (ICD-10). Maternal deaths were defined as any 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.[1] Due to time constraints and staffing shortages, the majority of questionnaires were only reviewed by one medical officer.

Sociocultural Factors related to Deaths

To determine the sociocultural factors related to the deaths, in-depth semi-structured interviews were conducted. Interviews were completed with all maternal deaths and with a sample of neonatal and child deaths (ten newborn and five child deaths per slum area). Ideally, two respondents were interviewed for each death case, one person who cared for the deceased during his/her last illness and one health care provider. Trained interviewers with social science background conducted in-depth semi-structured interviews at the family's home. This interview focused on the social factors that contributed to the death and included a more in-depth look at care seeking behaviours, barriers and facilitators to seeking timely care, and decision-making. Guidelines included various topics related to maternal, neonatal, and child deaths including: background information, care seeking behaviours, delays, social support and women's status within the household and economic factors. Questions were open-ended allowing the respondents opportunity to give a detailed description of events preceding the death. Each interview was tape recorded and took approximately between 1 and 1.5 hours. After completion of the interview, the interviewer transcribed the interview in Bangla and developed a summary of the case in English. The summary includes a matrix of delays and suggestions for how to improve the Manoshi programme.

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[1] World Health Organization. 1999. Maternal Death. Glossary of terms. Reproductive health in refugee situations: An inter-agency field manual p. 132.

RESULTS

Identification of Deaths

Between January 2008 and December 2008, a total of 287 deaths were identified. Out of them, 121 were from Kamrangir Char and 83 each from other two areas. There were 116 deaths from neonatal age group, 68 from (post neonatal) infant age group, 30 from child age group, 48 were from 15-49 years adult female (not due to maternal cause) age group and 25 were maternal death from same age group. We found very large number of adult female deaths at reproductive age.

Table 1: Deaths identified (n=287)

Type of Death	Uttara % (n)	Kamrangir Char % (n)	Gulshan % (n)	Total % (n)
Newborn	12 (32)	18 (51)	12 (33)	42 (116)
Infant	07 (19)	10 (30)	07 (19)	24 (68)
Child	03 (10)	05 (13)	02 (07)	10 (30)
Adult Female	06 (18)	06 (18)	04 (12)	16 (48)
Maternal	01 (04)	03 (09)	04 (12)	09 (25)
Total	29.0	42.0	29.0	100.0
N	83	121	83	287

Of the 287 deaths, the majority were identified by the research team (73%) from sources outside of Manoshi programme.

Table 2: Source of Death information (n=287)[2]

Type of Death	Uttara		Kamrangir Char		Gulshan		Total		Total % (n)
	Programme {P} % (n)	Research {R} % (n)	Programme {P} % (n)	Research {R} % (n)	Programme {P} % (n)	Research {R} % (n)	Programme {P} % (n)	Research {R} % (n)	
Newborn	07 (20)	04 (12)	08 (23)	10 (28)	03 (09)	09 (24)	19 (52)	23 (64)	42 (116)
Infant	01 (03)	05 (16)	01 (04)	09 (26)	01 (02)	06 (17)	03 (09)	20 (59)	24 (68)
Child	01 (03)	02 (07)	00 (00)	04 (13)	00 (00)	03 (07)	01 (03)	09 (27)	10 (30)
Adult *female*	01 (02)	06 (16)	01 (01)	05 (17)	00 (00)	04 (11)	01 (03)	15 (45)	16 (48)
Maternal	01 (02)	01 (02)	01 (04)	02 (05)	01 (03)	03 (09)	03 (09)	06 (16)	09 (25)
Total % N	11 (30)	18 (53)	11 (32)	30 (89)	05 (14)	24 (68)	27 (76)	73 (211)	100% (287)

[2] {P} Programme refers to Manoshi Programme findings; {R} Research refers to ICDDR,B and BRAC (Research and Evaluation Division, Health Programme) findings

Table 3: Deaths identified by slum (n=287)

Type of Death	Uttara % (n)	Kamrangir Char % (n)	Gulshan % (n)
Newborn	40 (32)	44 (51)	40 (33)
Infant	22 (19)	25 (30)	23 (19)
Child	11 (10)	10 (13)	08 (07)
Adult Female	22 (18)	12 (18)	15 (12)
Maternal	05 (04)	08 (09)	15 (12)
Total %	100.0	100.0	100.0
N	83	121	83

Of the 287 deaths, the majority was first identified by the research team and only 27% of the death information was first given by the Manoshi programme. In Uttara 63%, Kamrangir Char 72% and Gulshan 82% deaths were first identified by the research team.

Table 4: Source of Death information by slum (n=287)[3]

Type of Death	Uttara		Kamrangir Char		Gulshan		Total	
	P %	R %	P %	R %	P %	R %	P n	R n
Newborn	62	38	45	55	27	73	52	64
Infant	17	83	14	86	11	89	09	59
Child	33	67	0	100	0	100	03	27
Adult Female	11	89	7	93	7	93	03	45
Maternal	50	50	44	56	25	75	09	16
Total %	37	63	28	72	18	82	27	73
N	30	51	32	83	15	68	76	211

Interviewed

Total 279 death (98%) cases were interviewed. Total 8 death cases could not be interviewed. Causes of not doing interviews were: 1) refusal (one) and 2) non availability of the respondents (seven).

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[3] (P) Programme refers to Manoshi Programme findings; (R) Research refers to ICDDR,B and BRAC (Research and Evaluation Division, Health   Programme) findings

Table 5: Interviewed (n=279)

Type of Death	Uttara % (n)	Kamrangir Char % (n)	Gulshan % (n)	Total % (n)
Newborn	12 (32)	18 (51)	12 (33)	42 (116)
Infant	06 (18)	10 (29)	07 (19)	24 (66)
Child	03 (09)	04 (12)	03 (07)	10 (28)
Adult Female	07 (18)	05 (14)	04 (12)	16 (44)
Maternal	01 (04)	03 (09)	04 (12)	09 (25)
Total	29.0	41.0	30.0	100.0
N	81	115	83	279

Table 6: Not Interviewed (n=8)

Type of Death	Uttara (n)	Kamrangir Char (n)	Gulshan (n)	Total (n)
Newborn	0	0	0	0
Infant	1	1	0	2
Child	1	1	0	2
Adult Female	0	4	0	4
Maternal	0	0	0	0
Total	2	6	0	8

Medical Causes of Deaths

Medical causes of deaths have been assigned for all the interviewed cases (100%). The majority of deaths were neonatal, followed by infants and adult females. Highest neonatal, infant and child deaths were found in Kamrangir Char. In Uttara, more adult female deaths but fewer maternal and infant deaths and in Gulshan, there were more maternal deaths, but fewer child and adult female deaths were found.

Table 7: Cause assigned (n=279)

Type of Death	Uttara % (n)	Kamrangir Char % (n)	Gulshan % (n)	Total % (n)
Newborn	12 (32)	18 (51)	12 (33)	42 (116)
Infant	06 (18)	10 (29)	07 (19)	24 (66)
Child	03 (09)	04 (12)	03 (07)	10 (28)
Adult Female	07 (18)	05 (14)	04 (12)	16 (44)
Maternal	01 (04)	03 (09)	04 (12)	09 (25)
Total	29.0	41.0	30.0	100.0
N	81	115	83	279

Of the 279 deaths assigned a medical cause, we have compared 28 deaths, where cause of death was assigned by the Manoshi program. The majority of these deaths were newborn deaths and the remainder one was maternal death. Overall, the medical cause of death assigned matched in 42% of cases, with disagreement in 12 of the newborn deaths and one maternal death. These differences are outlined in Tables 8 and 9.

Table 8: Newborn cause of death by Programme and Research (n=12)[4]

SID	RESEARCH	PROGRAMME
10210040	Hypothermia	Sepsis
	Low birth weight	Low birth weight
10210052	Neonatal Jaundice	Sepsis
10210060	Low birth weight	Low birth weight
	Birth asphyxia	Sepsis
10210082	Low birth weight	Low birth weight
	Pneumonia	Birth asphyxia
10210093	Unknown	Birth asphyxia
10210095	Low birth weight	Low birth weight
	Sepsis	Pneumonia
10210135	Low birth weight	Low birth weight
	Birth asphyxia	
10210136	Low birth weight	Low birth weight
	Birth asphyxia	
10310055	Low birth weight	Low birth weight
	Respiratory distress of newborn	Pneumonia
10310180	Birth Asphyxia	Birth Asphyxia
	Low birth weight	
	Maternal Jaundice	
10310201	Neonatal sepsis	Neonatal sepsis
	Low birth weight	
10110218	Neonatal sepsis	
	Low birth weight	Low birth weight

Table 9: Maternal cause of death by BRAC and ICDDR,B (n=1)

SID	ICDDR,B	BRAC
10240083	Acute Renal Failure	Acute Renal Failure
	Eclampsia	Diabetes Mellitus
		Septicaemia

[4] Programme refers to Manoshi Programme findings; Research refers to ICDDR,B and BRAC (Research and Evaluation Division, Health Programme) findings

Of the 279 deaths a medical cause assigned, there were 116 newborn deaths (0 – 28 days) in all three slum areas. The most prevalent direct causes of death for newborns were birth asphyxia (42.2%), sepsis (14.6%), pneumonia (12.9%) and Birth trauma (6.8). Twenty-two percent of deaths were twin babies, and in one case the mother had also died. Nine days after delivery, one set of twins had chicken pox and ultimately died from pneumonia. Mother of these twins had been suffering from chicken pox during the delivery of the babies.

Table 10: Main Causes of Neonatal death (0-28 days)

Slno	Cause	Number	%
1.	Birth Asphyxia	49	42.2
2.	Neonatal sepsis	17	14.6
3.	Pneumonia	15	12.9
4.	Birth Trauma	8	6.8
5.	Low Birth Weight	7	6.0
6.	Hypothermia	4	3.4
7.	Congenital anomalies	3	2.5
8.	Sudden Infantile Death Syndrome (Cot death)	3	2.5
9.	Neonatal jaundice	3	2.4
10.	Respiratory distress of newborn	2	1.7
11.	Umbilical bleeding	2	1.7
12.	Chocking	1	0.8
13.	Congenital pneumonia	1	0.8
14.	Hemorrhagic disease of newborn	1	0.8
	Total	116	100

Seventy five newborns were also assigned an underlying cause of death (65%). Of these, 52 newborns (72.3%) were low birth weight (less than 2500g).

Table 11: Underlying Causes of Neonatal death (0-28 days)

Slno	Cause	Number	%
1.	Low Birth Weight	55	72.3
2.	Birth Asphyxia	8	10.5
3.	Birth Trauma	2	2.6
4.	Neonatal jaundice	2	2.6
5.	Umbilical bleeding	2	2.6
6.	Chicken pox	2	2.6
7.	Hypothermia	1	1.3
8.	Sudden Infantile Death Syndrome (Cot death)	1	1.3
9.	Congenital anomalies	1	1.3
10.	Cellulites	1	1.3
11.	Feeding mismanagement	1	1.3
	Total	76	100

There were 66 infant deaths (29 days to <12 months) in all three slum areas. The most common direct causes of death were pneumonia (36.3%), sepsis (15.1), diarrhoea (9.0%), meningitis (7.5%), SIDS /Cot death (6.0%) and malnutrition/kwashiorkor (4.5%). Almost 10 percent of these deaths were twin babies. Twin babies were also low birth weight.

Table 12: Main Causes of (Post-Neonatal) Infant death (29 days-<1year)

Slno	Cause	Number	%
1.	Pneumonia	24	36.3
2.	Septicaemia	10	15.1
3.	Diarrhoea	8	9.0
4.	Meningitis	5	7.5
5.	Sudden Infantile Death Syndrome (Cot death)	4	6.0
6.	Malnutrition	3	4.5
7.	Congenital heart disease	2	3.0
8.	Abscess	1	1.5
9.	Cerebral palsy	1	1.5
10.	Congenital hydrocephalus	1	1.5
11.	Congenital Meningo-myocele	1	1.5
12.	Epilepsy	1	1.5
13.	Hepatic Failure	1	1.5
14.	Septic Arthritis	1	1.5
15.	Septicaemia	1	1.5
16.	Shigellosis	1	1.5
17.	Viral hepatitis	1	1.5
	Total	66	100

Of the deaths, 41 were assigned an underlying cause of death (62%). Of these 41 deaths, 61.0% had nutritional deficiencies due to feeding mismanagement, malnutrition, Kwashiorkor or Marasmus. One infant died from septicaemia, whose underlying cause was Battered baby syndrome.

Table 13: Underlying Causes of Post-Neonatal Infant death (29 days-<1year)

Slno	Cause	Number	%
1.	Feeding mismanagement	15	36.6
2.	Malnutrition	10	24.4
3.	Low birth weight	4	9.8
4.	Sudden Infantile Death Syndrome (Cot death)	3	7.3
5.	Septicaemia	2	4.9
6.	Congenital heart disease	2	4.9
7.	Battered baby syndrome	1	2.4
8.	Diarrhoea	1	2.4
9.	Epilepsy	1	2.4
10.	Meningitis	1	2.4
11.	Viral hepatitis	1	2.4
	Total	41	100

There were 28 child deaths (1 - <5 years) identified in the three slum areas. The most common direct causes of death were due to injury/accidents (32.1%) pneumonia (28.6%), Meningitis (7.1), Cerebral palsy (7.1%) and malnutrition (7.1%).

Table 14: Main Causes of Child (1 -<5 years) death

Slno	Cause		Number	%
1.	Injury/ Accident		9	32.1
	• *Drowning*	*(6)*	9	
	• *Scald/Burn*	*(2)*		
	• *Transport accident*	*(1)*		
2.	Pneumonia		8	28.6
3.	Cerebral palsy		2	7.1
4.	Malnutrition		2	7.1
5.	Meningitis		2	7.1
6.	Acute renal failure		1	3.6
7.	Congenital heart disease		1	3.6
8.	Congenital hydrocephalus		1	3.6
9.	Diarrhoea		1	3.6
10.	Sudden Death		1	3.6
	Total		28	100

Of these deaths, 7 were assigned an underlying cause of which 42.9% was due to Marasmus or malnutrition.

Table 15: Underlying Causes of Child (1 -<5 years) death

Slno	Cause	Number	%
1.	Malnutrition	3	42.9
2.	Diarrhoea	2	28.6
3.	Congenital Meningo-myocele	1	14.3
4.	Septicaemia	1	14.3
	Total	7	100

There were 44 adult female (15-49 years) deaths due to non-maternal cause in the three slum areas. The most common direct non-maternal causes of death were hepatic failure (20.5%), stroke (15.9%), injury/accident (13.6%), cancer/malignancy (11.4%), tuberculosis (9.0%) and unknown (11.4%). Non communicable diseases and factors like Stroke, Injury, Malignancy,

Cardiomyopathy, Heart failure, acute and chronic Renal failure contribute to 50% of all non maternal adult female death of reproductive age group.

Table 16: Main Causes of Adult Female (15 -49 years) death

Slno	Cause		Number	%
1.	Hepatic Failure		9	20.5
2.	Stroke		7	15.9
3.	Injury/ Accident		6	13.6
	• *Suicidal Hanging*	*(2)*		
	• *Head Injury*	*(2)*		
	• *Electric Shock*	*(1)*		
	• *Transport Accident*	*(1)*		
4.	Cancer/Malignancy		5	11.4
	• *Acute myeloid leukemia*	*(1)*		
	• *Malignant neoplasm of brain*	*(2)*		
	• *Malignant neoplasm of throat*	*(1)*		
	• *Malignant neoplasm of lymph node*	*(1)*		
5.	Unknown		5	11.4
6.	Tuberculosis		4	9.1
7.	Chronic liver disease		2	4.5
8.	Acute renal failure		1	2.3
9.	Anaemic heart failure		1	2.3
10.	Cardiomyopathy		1	2.3
11.	Chronic renal failure		1	2.3
12.	Heart failure		1	2.3
13.	GBS		1	2.3
	Total		44	100

Of these 44 women, 20 (45.5%) were assigned an underlying cause of death, including viral hepatitis (40%), hypertension (10%), Sudden death (10%), diabetes mellitus (5%), and stroke (5%). In addition, there were three additional adult female deaths due to late complications of abortion. Due to contamination of supply water with sewerage, large number of women suffered from viral hepatitis; as a result, hepatic failure and viral hepatitis came up as most common direct and underlying causes of death in this group respectively.

Table 17: Underlying Causes of Adult Female (15 -49 years) death

Slno	Cause	Number	%
1.	Viral Hepatitis	8	40.0
2.	Complication of abortion	3	15.0
3.	Hypertension	2	10.0
4.	Sudden death	2	10.0
5.	Cholilithiasis	1	5.0
6.	Diabetes mellitus	1	5.0
7.	Homicide by husband	1	5.0
8.	Peptic ulcer	1	5.0
9.	Stroke	1	5.0
	Total	20	100

There were 25 adult female (15-49 years) deaths due to maternal causes. Of the 25 women with maternal deaths, the direct causes of death were postpartum haemorrhage (32.0%), Eclampsia (16%), hepatic failure (12.0%), and complication of Abortion/MR (12.0%).

Table 18: Main causes of maternal death (Adult Female, 15 -49 years)

Slno	Cause	Number	%
1.	Post Partum Haemorrhage	8	32.0
2.	Eclampsia	4	16.0
3.	Hepatic Failure	3	12.0
4.	Complications of Abortion/MR	3	12.0
5.	Complications of C/section	1	4.0
6.	Anaemic Heart Failure	1	4.0
7.	Puerperal sepsis	1	4.0
8.	Retained placenta	1	4.0
9.	Bronchial asthma	1	4.0
10.	Stroke	1	4.0
11.	Unknown	1	4.0
	Total	25	100

Of these 25 women, 11 (44%) were assigned an underlying cause of death, including viral hepatitis (36.4%), haemorrhage (18.2%), complication of C/section (9.1%), hypertension (9.1%), and obstructed labour (9.1%).

Table 19: Underlying Causes of maternal death (Adult Female, 15 -49 years)

Slno	Cause	Number	%
1.	Viral Hepatitis	4	36.4
2.	Post Partum Haemorrhage	2	18.2
3.	Complication of C/section	1	9.1
4.	Acute renal failure	1	9.1
5.	Hypertension	1	9.1
6.	Obstructed labour	1	9.1
7.	Stroke	1	9.1
	Total	11	100

Sociocultural Factors related to Deaths

In 2008, a total of 16 maternal deaths and 20 newborn and infant deaths were interviewed in all three slum areas. The following are several case studies that illustrate the social-cultural factors behind the deaths using the Three Delays Framework.

Case 1: Maternal death due to postpartum haemorrhage

Julie (35 years), a housewife, had been living in Kamrangir Char for about 17 years with her husband; she had three children. She had a normal pregnancy and had visited a nearby maternity clinic for antenatal care. She delivered her fourth child (a girl) at home with the assistance of a traditional birth attendant (TBA). Julie's water broke around 2 or 2:30 in the afternoon, but she was not experiencing strong labour pains. The TBA suggested calling a medicine seller to increase the labour pains, and the woman's husband went to a nearby shop and brought the provider to the home. The woman was given saline and other medicines to increase her labour pain. A few minutes later, the baby was born, and the doctor returned to his shop. The placenta was not delivered, so the TBA tried to remove it. There was a lot of bleeding, and two hours after delivery, the placenta was still not removed. The family called the doctor to come back to the house, but he refused. The family then called another TBA who was able to remove the placenta by creating pressure on the upper and lower abdomen and blowing on a bottle. The placenta was delivered at 7:00pm, more than three hours after the delivery of the baby. At that time, the bleeding decreased, but was continuous. Awhile later, the family noticed that the woman was not breathing. They took her to a hospital by rickshaw van where the doctor declared her dead.

Influential social-cultural factors

- The woman chose to give birth at home, since she had experience of three previous normal home deliveries.
- The neighbours reported that the woman's relationship with her husband was strained.
- The husband was jobless and the family was under financial stress – therefore making home delivery a more viable option as it is less expensive.
- Use of medicines to speed up labour without monitoring by a medically trained doctor may have been harmful.

In this case, the first delay led to the woman's death. There are several things that could have been done to decrease this delay.

Factor	How to improve Manoshi programme
- Family and TBA didn't recognize the extent of bleeding. - TBA practices to remove the placenta may have been harmful. - Belief that medicine seller can manage postpartum haemorrhage.	- TBA recognition of PPH - TBA practices in removal of placenta - Counselling by SS and SK to promote delivery in birthing hut - Counselling on appropriate care seeking for retained placenta

Case 2: Maternal death due to postpartum haemorrhage

Nazma, 34, was a house wife in Kamrangir Char slum. She and her husband were married for 17 tears and lived as a nuclear family. She had been pregnant four times previously, with three living children. Her previous two deliveries were by caesarean section. Nazma and her husband were not planning to have a fifth child. When she became pregnant, she wanted to abort the foetus. She visited a doctor, but he was not able to perform the abortion due to the advanced stage of her pregnancy (5 months). She had a normal pregnancy and visited Azimpur maternity clinic for antenatal care. During her eighth month of pregnancy, she felt pain in her abdomen and was admitted to Mitford hospital. After staying there for awhile, she was discharged because the neonatal incubators were not working. She was still feeling unwell, and she was admitted at a private clinic in Dhaka (Riverside Hospital). She received an injection to

improve her pain, saline, other medicine, and tests (X-ray, blood test, and ultra sonogram). Based on these tests, the doctors diagnosed that the baby was underweight and suggested injections. After 3 days, Nazma was feeling better and was discharged. She was at home for 17 days before she began to feel the pain again. At this time, her financial situation had worsened and she could not afford a private clinic. She went to Dhaka Medical College Hospital. The doctors did not find any complications with her pregnancy, and they planned a caesarean section within 7 days. The caesarean section was delayed for a week, and it was done on her 14th day at the hospital.   Nazma was given one bag of blood, and both mother and baby were fine. Later that evening, Nazma was not doing well. She was bleeding, and the doctors needed to do another caesarean section to remove the placenta. Nazma needed 10 more bags of blood and she was on an external oxygen system. The second caesarean section was never performed, and Nazma died the next morning.

In this case, the third delay led to the woman's death. There are several factors that could be improved.

Factor	How to improve Manoshi programme
- Poor quality of care at Dhaka Medical College Hospital - Lack of manpower and delay in date of caesarean section - Young doctors performed the caesarean section and they were unable to successfully remove the placenta during the first operation. - Family supplied all blood and other supplies in a timely manner.	- Manoshi PO advocate for patients at Dhaka Medical College Hospital

Case 3: Maternal death due to postpartum haemorrhage
Saleha, 35, lived in Korail and worked in the garment industry. This was her fifth pregnancy, and she had three living children. She had no problems during her previous pregnancies, and the fifth pregnancy was also normal. She received antenatal care from the BRAC delivery centre, and went to the delivery centre as soon as her labour pain started. The baby was born normally at 5:15pm with the assistance of an urban birth attendant (UBA).   After 30 minutes, her husband

was informed that the placenta still was not delivered. The husband brought a local doctor (medicine seller) to the birthing hut, but the birthing hut staff did not allow him to provide any medications. The woman was referred to Dhaka Medical College Hospital. It was Ramadan, so it was difficult to arrange transport during *Iftar*. At the main road, they changed to a taxi cab and arrived at Dhaka Medical College Hospital within one hour. The Manoshi PO managed a visit with a doctor within 20 minutes, but Saleha had already died. Her baby died 7 days later.

This death was due to postpartum haemorrhage from a retained placenta. In this case, the second delay led to the woman's death. There are several factors that could be improved.

Factor	How to improve Manoshi programme
- Medical back-up at the birthing hut - Arranging transport for the woman	- There was no medical back-up at the birthing hut. The FWV was not available or not called – she could have helped to remove the placenta. - Help family find transport and SS or SK accompanies the woman to Dhaka Medical College Hospital.

Case 4: Maternal death due to jaundice

Shirin, 22, lived in Tongi (Uttara slum) and was a housewife. She was recently married, and this was her first pregnancy. Her husband was a policeman, and they had a happy life together. There was a severe water shortage in their area, and they used to bring water in from other areas to use for cooking, drinking, and bathing. During her 6th month of pregnancy, Shirin noticed that her eyes and urine were dark yellow. She had difficulty eating and had a lot of vomiting. Her family took her to a private clinic, where she was diagnosed with severe jaundice. She stayed in the hospital for the night and was given tests and saline, but the baby had already died. The next die, she was referred to Dhaka Medical College Hospital, but her family took her to a private hospital. During the night, her situation became very serious, but the doctors didn't see her until the next morning, when they referred her to PG hospital. However, the referral was delayed while waiting for payment, and Shirin did not arrive at PG hospital until 4pm. PG refused to admit her and she went to Dhaka Medical College Hospital

and was admitted at 5pm. She was given 6 bags of blood and saline. She gave birth to the baby and died that evening.

This death was due to jaundice. In this case, the third delay led to the woman's death. There are several factors that could be improved.

Factor	How to improve Manoshi programme
- Going to many hospitals before appropriate care was given	- Ensure help in getting to an appropriate facility

Case 5: Neonatal death due to pneumonia and low birth weight

This baby was from Korail slum. This was her mother's second pregnancy. Her mother had previously suffered from eclampsia and her first baby died soon after birth. During this pregnancy, the mother did not have any complications and received antenatal care visits from Manoshi health workers. In the eighth month of pregnancy, she had convulsions. The family notified Manoshi staff and she was referred to Dhaka Medical College Hospital. Her husband brought her to the hospital immediately, and the baby was born the next morning. It was a normal delivery, but the baby was born small – only 1300 grams. The baby had trouble drinking breast milk and was underweight. He was given a special cotton jacket from Manoshi to keep the baby warm. Around twenty days after birth, the baby developed respiratory problems. Due to the jacket, the family had difficulty identifying these breathing difficulties, and they did not recognize them until it was very serious. The family notified the BRAC delivery centre, and they were referred to the Urban Primary Health Care Centre (UPHC) at Mohakhali. They were given medicine and went back home. Within one hour of returning home, the family contacted the BRAC delivery centre and asked for a referral to Dhaka Medical College Hospital. BRAC staff instead referred them to the *Notun Bazaar Maa O Shishu Clinic*. The father of the baby immediately (within 5 hours) visited this clinic, and the baby was given additional medicine but not admitted due to the economic costs of admission. The family consulted with the BRAC managers, and BRAC suggested continuing the medications. The baby was given injections for 9 days, and then died.

This family went to many places and spent significant amount of money to try and save the baby. In this case, the first delay and second delays led to the

newborn's death. There are several things that could have been done to decrease these delays.

Factor	How to improve Manoshi programme
- Family could not recognize that the baby had trouble breathing. Once the problem was recognized, they acted quickly. - Difficult to receive care from facilities due to poor economic condition of the family.	- Manoshi messages should explain to check breathing, especially among low birth weight babies. - Manoshi staff were informed immediately but gave conflicting information as to where to go, and did not facilitate or help with financial support at Shishu hospital.

Case 6: Neonatal death due to pneumonia, chicken pox, and low birthweight

Shohidul and his wife Shilpi have been married for 7 years and live in Kamrangir Char slum. They have one daughter. Shilpi had a normal pregnancy. A few days before her delivery, she became ill with chicken pox. She visited the BRAC delivery centre, but she was not given any medication and asked to return when she went into labour. Four days later, she returned and gave birth to twins, both weighing over 2000g. Nine days after delivery, the twins developed chicken pox. The family thought that the twins had swollen sweat glands. The family was referred to Dhaka Medical College Hospital by the staff at the BRAC delivery centre. From Dhaka Medical, they were referred to Mohakhali infectious disease hospital. The babies were given oxygen and prescribed medicine and injections. That evening, one of the twins died. Shohidul took the baby back home to arrange for burial, and Shilpi stayed in the hospital with the other twin. That day, the twin removed the medicine tube from his nose inadvertently, and the nurse did not replace it. That evening, the doctor was not available to attend to the baby. He died the next day.

In this case, the first delay and third delays led to the newborns' death. There are several things that could have been done to decrease these delays.

Factor	How to improve Manoshi programme
- Delayed recognition of chicken pox - Poor care from doctors and nurses (may be due to economic condition of family) - Husband not at facility with woman and grandmother – delay in purchasing medicines for first twin; Husband didn't visit 2nd twin for 3 days – woman had to manage money, purchasing medicines, and assuring quality care alone.	- Support family at hospital

Case 7: Neonatal death due to low birthweight

Sobuj and Nurjahan live in Uttara slum. This was Nurjahan's second pregnancy. Her first baby was born premature and died within three days of birth. She had a normal pregnancy. She did not attend antenatal care and was not visited by BRAC health workers during her pregnancy. Her husband learned of the BRAC delivery centre from neighbours, and when her labour pains started in her 7th month of pregnancy, he brought her to the delivery centre. Nurjahan had a normal delivery attended by an urban birth attendant (UBA). The baby was low birth weight – 900 grams – and had difficulty breathing. They were referred to Dhaka Medical College, but they could not go until the next morning due to difficulties in arranging transport. There were no beds available at Dhaka Medical College Hospital, so the Manoshi PO referred them to Azimpur maternity clinic. The newborn was immediately put in an incubator, given medication and oxygen. The baby died 10-12 hours after being admitted to Azimpur clinic, within 24 hours of birth.

In this case, the first and second delays led to the newborns' death. There are several things that could have been done to decrease these delays.

Factor	How to improve Manoshi programme
- The family recognized the problem, but delayed care seeking because delivery occurred at night - Cause of prematurity perceived to be because of wife's behaviour. - Difficult to arrange transport at night to DMCH.	- Delivery centre staff could facilitate transport arrangement, especially at night. - Messages on causes of prematurity. - Woman not aware of Manoshi programme – no home ANC visits and not aware of the birthing centre.

Case 8: Neonatal death due to birth asphyxia, low birth weight and prematurity
Maloti and Arun lived in Shaitola slum in the Gulshan area. They have been married for 11 years and have two children living in the village with their parents. This was Maloti's third pregnancy. It was a normal pregnancy, although Maloti had vomiting and weakness and had to leave her work at the garment factory during her second month of pregnancy. She had one antenatal care visit at the BRAC delivery centre and was in close communication with the UBA at the delivery centre. The family moved during her seventh month of pregnancy to a location far from the BRAC delivery centre, and Maloti lost contact with BRAC staff. She suffered from abdominal pain and jaundice before delivery. She sought treatment from traditional providers for the jaundice (*Pani Pora (*blowing water*), dab pora* (blowing green coconut water), *jhar fuk (*cure dieses by means of exorcism or religious rites), and medicine from a local pharmacy shop. Maloti's water broke at night, and they waited until the next morning to go to Addin private hospital. The baby was born premature (8 months of gestation) and very low birth weight, with respiratory problems. The doctor requested Maloti and Arun to admit the baby for treatment, but Arun refused due to financial constraints. They were referred to Dhaka Medical College Hospital. Maloti, Arun, and the baby went back home to borrow money and 4 hours later, they went to Dhaka Medical College Hospital. The trip took 1.5 hours by CNG. A doctor saw them within 30 minutes, but the baby had already died.

In this case, the first and second delays led to the newborns' death. There are several things that could have been done to decrease these delays.

Factor	How to improve Manoshi programme
- The mother did not seek care from BRAC or a medically trained provider for jaundice. - The family waited until the morning to seek care at Addin Hospital for delivery. - Financial constraints and delayed care seeking at Dhaka Medical College Hospital. - Long transport time to Dhaka Medical College Hospital.	- Manoshi staff could track pregnant women in the slums, even if they move houses (this is common in the urban slum setting).

Case 9: Neonatal death due to birth asphyxia, low birthweight and prematurity

Rubina, 19, a housewife, lives in *Korail* slum with her husband (Shumon). Before meeting him, Rubina worked in a garment factory and lived with her parents. She contributed to the household expenses by bearing the house rents and partial food costs. After marriage, Rubina and Shumon continued living with her parents, and Rubina stopped working. This created tension, and Rubina's mother tried to end the marriage. After three months, Rubina was pregnant and her mother brought her to their village, arguing both mother and baby would be in better health in the village. In the village, Rubina's mother tried to abort the foetus by giving Rubina *mehendi* leaf juice and a full one strip of crushed oral contraceptive pills. After returning to Dhaka, Rubina realized that her mother had tried to abort her foetus after discussions with neighbours, and she consulted with her husband and a doctor. The doctor suggested aborting the foetus as the leaves and contraceptive pills may have already caused harm. But Shumon wanted to keep the baby, as it was their first child.

Rubina received antenatal care visits from Manoshi staff. Other than the poisoning in early pregnancy, her pregnancy was normal, but she went into premature labour, during her eighth month of pregnancy. When the labour pain started, Rubina immediately informed her aunt (her mother's sister). Her aunt called a traditional birth attendant (TBA) who lived nearby. It was night and difficult to take Rubina to the BRAC delivery centre. The TBA came and waited till morning, but her labour pain was prolonged. Her neighbour took her to the delivery centre very early in the morning. Upon arrival, she had a high fever, and the UBA referred Rubina to Dhaka Medical College Hospital. The SS, Shumon, and a neighbour brought Rubina to DMCH by auto rickshaw within one hour. At 1.00 AM Rubina had a normal delivery at DMCH. The baby was small (1900 grams), but had no problem and was released from the hospital. On the third day after birth, the baby made some noise in her throat and chest when it was being breastfed. Observing this condition, Rubina got nervous and sent a neighbour to call the SS of the delivery centre. The SS came and told that she would come again at 5:00 PM to bring the baby to a doctor. But a few minutes after her departure, the baby became blue and died.

This death was influenced by the social context. The marriage was not accepted by Rubina's family because it resulted in decreased financial contribution to her natal household. Rubina's mother did not accept the pregnancy because the

pregnancy and subsequent childbirth would sustain the marriage. So Rubina's mother attempted to terminate the pregnancy. She also forced her daughter to separate from her husband for some time and took her to the village. The daughter was finally able to reunite with her husband, but the relationship between the couple and the mother was never warm at all.

Case 10: Infant death due to pneumonia

Parul and her husband lived in Kamrangir Char slum. Parul was 25 years old, and when she became pregnant, her husband left her. Parul worked as a daily labourer in a factory. She gave birth in a BRAC delivery centre and developed post-partum haemorrhage. She was referred to Dhaka Medical College Hospital where she died a few days after the birth of her daughter. After Parul's death, Parul's mother and grandmother cared for the baby. The baby developed a cold, and was given barley with saline water. The baby became thin and yellow in colour. They took the baby to Azimpur maternity and purchased medicines. They also visited a religious healer to relieve the baby's cold. Thirty-two days after her birth, the baby's cold became worse. She stopped defecation and urination and her stomach swelled. That night, her grandmother again called the religious healer, but the baby died at 11pm.

In this case, the first delay led to the infant's death. The mother's death also had an influence on the child's death.

Factor	How to improve Manoshi programme
- The family recognized the problem, but did not seek care from a skilled provider	- Manoshi staff provide extra follow up to this baby since the mother died - Provide counselling on infant feeding

PROGRAMME RECOMMENDATIONS

This report highlights several important findings that would be helpful to improve the Manoshi programme.

Identification of Deaths

The programme is missing some of the deaths, and the completeness of death information varies by slum area. In Kamrangir Char, Manoshi is identifying the

majority of the deaths, but fewer deaths are identified in Gulshan. This may be due to several reasons. Shasthya Kormis have many things to do at the same time. Due to their work load, they cannot finish their assigned tasks. In Gulshan, there is high turnover of community health workers. Most of the SS have other work during the day and therefore do work for Manoshi in the evenings or weekends. As a result, they miss some deaths. The area officers and managers have many visitors and do not have enough time for routine programme activities, including monitoring deaths.

Recommendations

- Shasthya Kormis should be given the appropriate work load.

- Provide incentives to SS and SK for deaths identified. In Gulshan area, it might be useful to train additional SS or allow SS to work in teams so that they can complete work around their other work schedules.

- Limit visitors to Korail, so managers can focus on programme activities.

- There should be regular monthly visits to all pregnant women and infants. Any case of missing pregnant women and infant should be carefully searched to avoid mishap. Register of pregnant women and infant should be monthly updated.

- The research team is using many methods to identify all deaths. They meet with the Branch Managers at the beginning of each month and share information about deaths that they have found.

Medical Causes of Deaths

The medical causes of death assigned by the programme and the research teams are similar, but there are some important differences, especially for neonatal deaths. In addition, the research team identified two maternal deaths and two additional other adult female deaths possibly due to failed abortion. By only identifying maternal deaths, and not all adult female deaths, the programme may be missing important deaths in early pregnancy, particularly due to abortion.

Recommendations

- The research team needs to meet with the programme team to resolve differences in the newborn deaths. It is very difficult to assign newborn

causes of death, as they are often overlapping. However, there are different programme implications for deaths caused by neonatal sepsis and those caused by birth asphyxia, so it is important to agree on a cause and work together to improve interventions.

- Manoshi should consider tracking all adult female deaths to ensure capturing deaths due to abortion or MR.

- Many maternal deaths are due to postpartum haemorrhage, often caused by retained placenta. It may be helpful to teach TBAs/ UBAs about harmful practices to remove the placenta. In addition, ICDDR,B has developed a delivery mat. These validated mats absorb 450 ml of blood (+/- 50 ml of blood) and facilitate recognition of when to seek care from an EmOC facility.[5] It may be useful to include these delivery mats for both home deliveries and in the BRAC delivery centres.

- Hepatitis is a leading cause of adult female death, so this issue needs to be addressed through additional research.

- Many neonatal deaths could be prevented by proper neonatal support. Hospital beds are limited and incubators are in inadequate in number. More public hospital and more beds in neonatology ward are needed.

- BRAC delivery centres should be equipped and manned with birth asphyxia management capacity.

Sociocultural Factors related to Deaths

The sociocultural factors vary by household, community, and facility levels. These factors are essential in the interventions efforts to decrease mortality.

Recommendations
- In Gulshan slum area, residents frequently move within the slum. Manoshi should track pregnant women and follow up even after the

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[5] These delivery mats were developed by ICDDR,B and have been used to measure post partum blood loss in a study to assess feasibility and safety of using misoprostol for home births. These mats are now available for use in other studies and other projects.

family has moved, to ensure communication and support from the delivery centres.

- Improve transport options from the delivery centres to Dhaka Medical College Hospitals and other facilities.

- If families are referred to a facility other than Dhaka Medical College Hospital, ensure that programme staff accompanies the family or help to ensure that the family receives quality care.

Sharing Results with *MANOSHI* Programme

We need to develop a better mechanism to share results with Manoshi programme staff.

Recommendations
- At monthly Branch meetings, the research team will share medical cause of death information with programme staff (started in December 2008).
- Quarterly, share social-cultural factors information with programme staff.
- Biannually, share all findings with Manoshi Technical Committee.

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