



## Analysis of Medical and Social Causes of Obstructed Labour

Tahmina Hossain<sup>1\*</sup>, Nasima Akter<sup>2</sup>, Ruma Akter<sup>3</sup>

<sup>1</sup>Assistant Professor, Department of obstetrics and gynecology, Kurmitola General Hospital, Dhaka, Bangladesh. Email: [hossain.tahmina@gmail.com](mailto:hossain.tahmina@gmail.com), Orcid ID: 0000-0002-1608-2579

<sup>2</sup>Assistant Professor, Department of obstetrics and gynecology, Colonel Malek Medical College, Manikganj, Bangladesh.

Email: [nasima3970@gmail.com](mailto:nasima3970@gmail.com), Orcid ID: 0000-0001-8599-3707

<sup>3</sup>Senior Consultant, Department of obstetrics and gynecology, 250 Bed District Hospital, Manikganj, Bangladesh.

Email: [rumadr9@gmail.com](mailto:rumadr9@gmail.com), Orcid ID: 0000-0002-8488-3415

\*Corresponding author

Received: 11 January 2022

Revised: 17 February 2022

Accepted: 25 February 2022

Published: 22 April 2022

### Abstract

**Background:** Obstructed labour is one of the major causes of maternal mortality (8%) in Bangladesh. It is also responsible for high rate of maternal and fetal morbidity. If we can identify the medical and social causes of obstructed labour in our country it may be helpful to find out the way to prevent this disease. **Objectives:** This study was to find out the medical and social causes of obstructed labour in our country. It also finds out the cause of delay in seeking care. **Material & Methods:** This study is a prospective observational study has been done in Dhaka Medical College Hospital, Dhaka from August 2004 to December 2005. One hundred patients who were admitted with obstructed labour during study period were included in this study. **Results:** In this study prevalence of obstructed labour was 3.59%. Among the patients who were admitted with obstructed labour 52% were within 20 to 25 years of age, 55% were primigravida, only 30% were on regular antenatal checkup. The medical causes of obstructed labour were cephalopelvic disproportion in 30%, malposition and malpresentation in 69% and cervical fibroid in 1%. In this study 72% of study population had monthly income below 3,000 BDT, 27% had 3,001 - 5,000 BDT and only 1% had above 5,000 BDT. Among them 8% patient had crossed the primary level of education and 35% were illiterate. The patients who were admitted with obstructed labour could not utilize the health facility in time and they had to go for trial of home delivery first. In 25% cases their husband and family members did not agree to bring them to hospital, 31.3% was because of ignorance, 14% was due to economic constraints, 13.3% wanted to avoid operative delivery, 9.4% patient herself did not agree to come to hospital because it would disrupt house hold work and the rest 7% could not come due to long distance between home and health center and tertiary hospital. Modes of delivery were LSCS in 85%, craniotomy in 9% and evisceration in 4%. Maternal outcome was WF in 7% and puerperial sepsis in 18%. Perinatal death was 45%, MMR was 3% due to obstructed labour. **Conclusions:** The causes of obstructed labour are not only due to medical causes but also have social causes. The social causes depend on the socio-economic status and the level of education.

**Keywords:-** Obstructed labour, cephalopelvic disproportion, prenatal morbidity.

## INTRODUCTION

In almost all developing countries, maternal mortality remains one of the five leading

causes of death among reproductive age women. It is an important public health problem not only because of the large number of such mortality, but also because of the



traumatic effect of such an event on the family and the community as a whole. In Bangladesh maternal mortality rate is still very high, about 3.2 per thousand live births.<sup>[1]</sup> Even in 21<sup>st</sup> century, obstructed labour still remains- life threatening catastrophe all over the world mostly in the developing countries like Bangladesh. Obstructed labour is one of the major causes of maternal death in our country (8%).<sup>[1]</sup> This entirely preventable labour complication carrying a very high maternal and neonatal morbidity and mortality is an indicator of the inadequacy and poor quality of obstetric care. Obstructed labour is a particular problem in Bangladesh where birth rate is too high, number of trained medical personnel is short, communication and transport is underdeveloped in some part and 40% population live below poverty line. At present, most women in Bangladesh do not have timely access to emergency obstetric care (EOC) and only about 5% of expected complications reach the medical facilities. The three-delay model illustrated the different phase of delay, which affects the patient in reaching the EOC. Phase-1 is delaying in decision to seek care. Phase-2 is delay to reach the health care center. Phase-3 is delay to receive adequate treatment. In our country 80% people live in rural areas where most deliveries (90%) are conducted at home. TBAs conduct 63% of deliveries of which 38% are conducted by untrained TBAs and 25% by trained ones (BIRPFRHT 1995).<sup>[2]</sup> The effect of these deliveries is reflected in the form of high maternal and foetal mortality and morbidity in our country. In Dhaka Medical College Hospital, about 2-3 patient are admitted with obstructed labour everyday. The number is relatively high as it is tertiary level hospital and patient from different areas with labour

complication are referred here for proper management. The causes of obstructed labour are not only the medical causes but also have some social causes. The medical causes are mainly Cephalopelvic disproportion, malposition, maipresentation, big pelvic tumor, congenital malformations of the fetus (hydrocephalus). Poverty, social and cultural prejudices, gender based violence, lack of education and less access to essential health care facilities also contribute to obstructed labour. In Bangladesh, a majority of women (300/0 for each death) who escaped from death due to obstructed labour suffer from very distressing morbidities. Obstructed labour is an important cause of obstetric fistula like V.V.F, R.V.F, ruptured uterus and vaginal stenosis. Obstructed labour accounts for a quite number of perinatal mortality and morbidity as well. The sequence of perinatal asphyxia is cerebral palsy, mental retardation and neonatal death. To decrease this unfortunate and mostly preventable obstetric complication, restructuring of MCH services should be done with particular attention to • increasing community awareness. • Decentralization of maternity service. • Effective health care planning starting from grassroots levels to tertiary levels. • Establishment of streamlined and effective referral system. During my working period in DMCH I had observed that some social factors were also responsible for obstructed labour besides the medical causes. This observation stimulated me to do this research. From this idea future study could be done to find out the medical as well as social causes of obstructed labour elaborately. It would help as to prevent this obstetrical complication by upgraded the socioeconomic status & educational level.

## MATERIAL AND METHODS

This study was a prospective observational study has been done in Dhaka medical college Hospital, Dhaka from August 2004 to December 2005. The patients who were admitted with obstructed labour during this period, among them 100 patients were included in this study.

### Inclusion criteria:

Women with term pregnancy with clinical diagnosis of obstructed labour had following features, which were included in this study: a) History of prolonged labour inspite of good uterine contraction. b) Arrest of progressive descends of presenting part. c) Distended urinary bladder. d) Presence of Bandle's ring. e) Fully dilated cervix or incompletely dilated cervix with oedematous thick cervical rim. f) Presence of marked moulding, g) Presence of large caput over presenting part.

### Exclusion criteria:

Patients having other complications like pregnancy induced hypertension, convulsion, ante partum heamorrhage and other medical disease were excluded from this study. After admission of patient, history was taken and clinical examination was done. Patient and baby were followed up during delivery and postpartum period upto discharge. All the

information was noted in pre-designed history sheet. Finally, the findings were compiled and results were analyzed carefully by using SPSS system.

## RESULTS

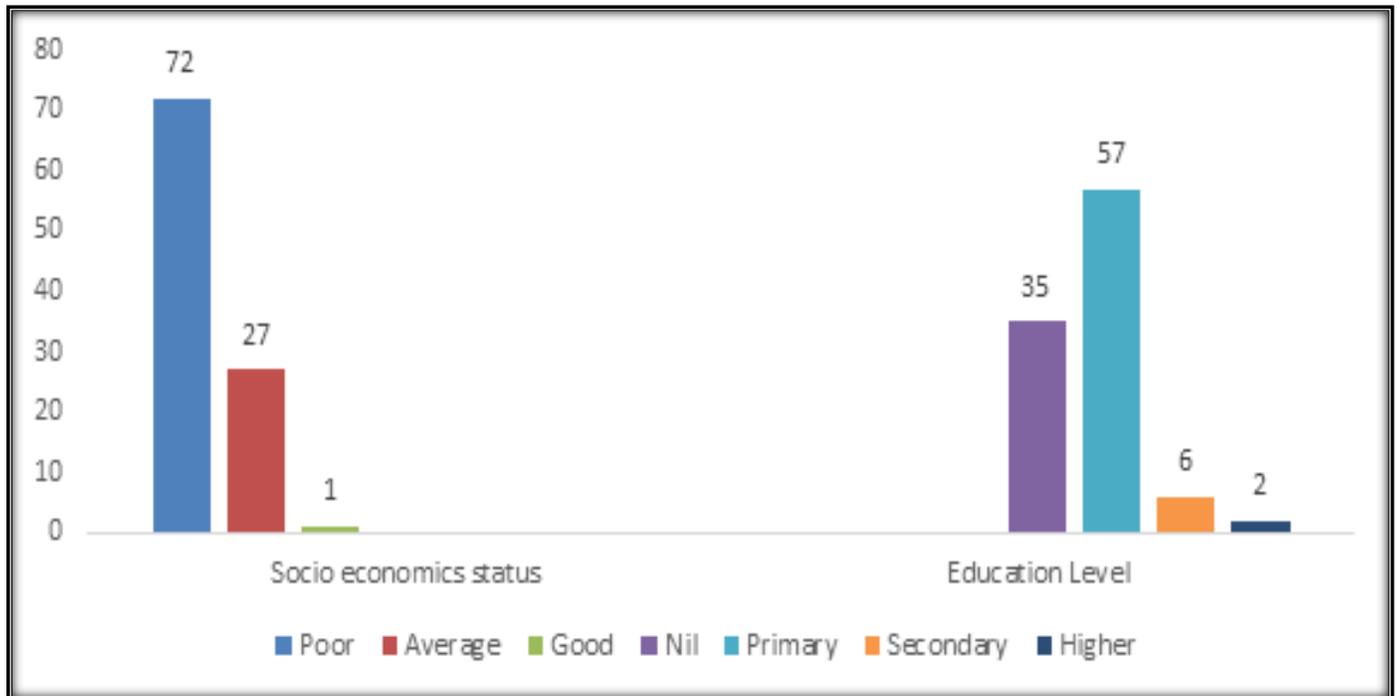
[Table 1] showed that majority of the Age Distribution (52%) belonged to 20 years to 25 years, mean age of the patient was 24.09 years. SD is  $\pm 5.41$  years. [Figure 1] relevant that maximum study population i.e. 72% were poor and relevant that 92% study population did not cross primary education level. [Table 2] showed that most of patients were housewife (71%), [Table 3] showed almost half of study population's husbands were daily laborers. [Figure 2] showed that most of study patients were Primigravida (55%). [Table 4] revealed that 60% of study population had no history of difficult labour. [Table 5] showed that only 30% patients were regular antenatal checkup. [Figure 3] showed that most of the patients were referred by TBA (62%) and revealed that 84% of the study population came to hospital within 12-24 hours of labour pain.

[Figure 4] showed 58.8% of the patients had pulse rate more than 100, 85% had dehydration. Almost half of the patients (47%) had haematuria and 99% had distended bladder.

**Table 1:** Age distribution of the study population (n=100)

Age Distribution (years)	n=100	(%)
15 years to 19 years	11	11.0
20 years to 25 years	52	52.0
25 years to 30 years	23	23.0
30 years to 35 years	12	12.0
More then 35	2	2.0

Total	100	100
-------	-----	-----



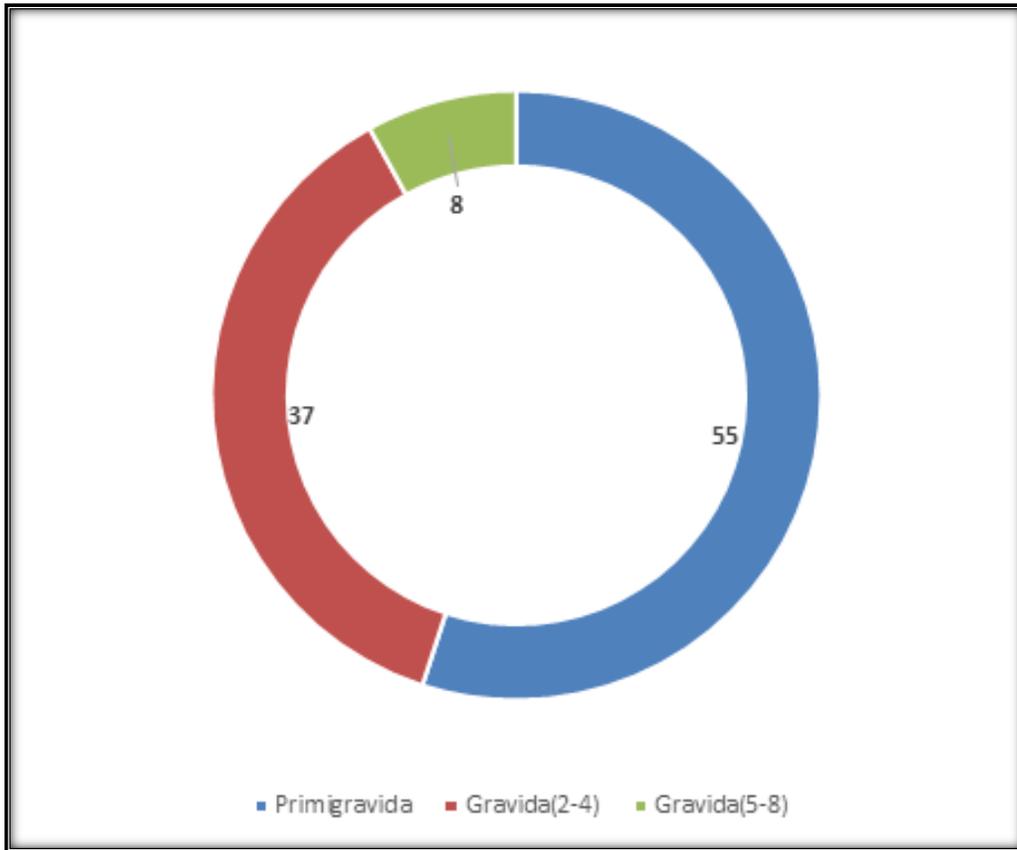
**Figure 1:** Socio Economics Status and Level of education of the Patient

**Table 2:** Occupation of the patient

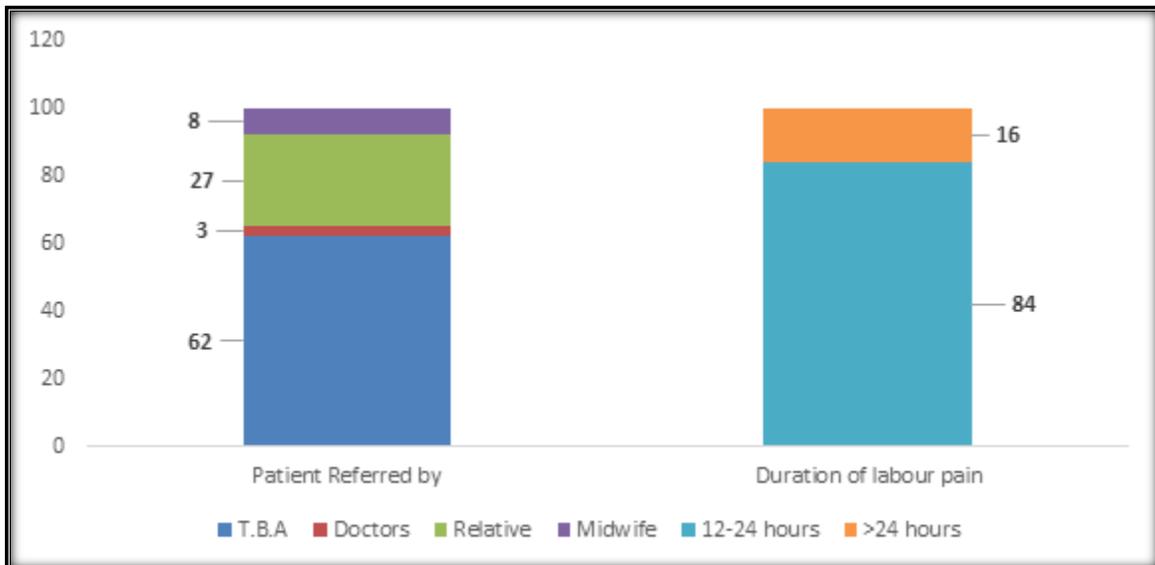
Occupation of Female	n=100	(%)
Housewife	71	71.0
Service Holder	10	10.0
Maid Servant	10	10.0
Day Labourer	9	9.0
Total	100	100

**Table 3:** Occupation of the patient's Husband

Occupation of Husband	n=100	(%)
Service Holder	24	24.0
Businessman	10	10.0
Day Labourer	47	47.0
Farmer	20	20.0
Total	100	100



**Figure 2:** Distribution of the patient's Parity



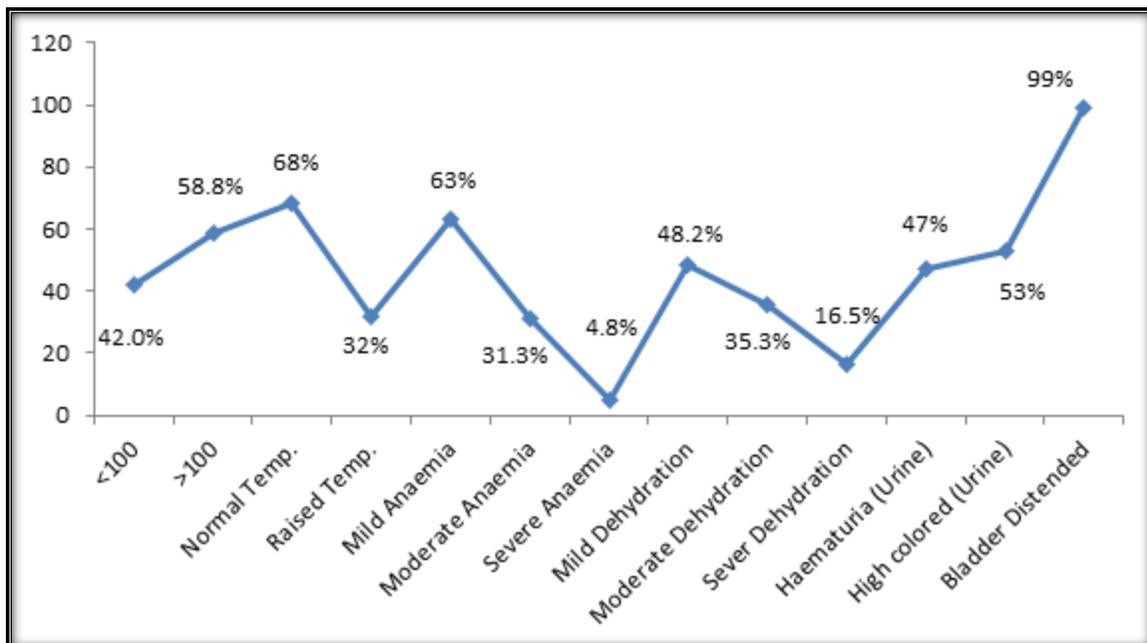
**Figure 3:** Distribution of Patient referred by and Duration of labour pain prior to admission

**Table 4:** Past obstetric history of multiparous patient's

History of Difficult labor (Still Birth)	n=100	(%)
Yes	18	40.0
No	27	60.0
Total	45	100

**Table 5:** Antenatal check up

Antenatal check up	n=100	(%)
Yes	Regular	30
	Irregular	18
No	52	52.0
Total	100	100.0



**Figure 4:** Patient's general condition on admission

## DISCUSSION

At the beginning of new millennium modern obstetrics has developed a great but in developing countries like Bangladesh obstructed labour still remains a great challenge.<sup>[3]</sup> Obstructed labour is one of the important causes of maternal and perinatal mortality and morbidity in our country. It is a

tragic consequence of pregnancy resulting from ignorance and negligence. Worldwide, obstructed labour occurs in an estimated 5%, of pregnancies and accounts 8%, of maternal death.<sup>[4]</sup> In developing countries, the incidence of obstructed labour is difficult to estimate because most of the reported studies are based on data from tertiary hospital. In India its incidence was found 2.5%.<sup>[5]</sup> In Eastern Nigeria



study over a period of five years (1985-89) revealed the incidence was 4.7%.<sup>[6]</sup> A hospital based study of S.Khan & M Roohi between 1993-94 found the incidence in Pakistan was 4%.<sup>[7]</sup> Nazia's study in Bangladesh (2002) & Mala's study (2000) showed that the incidence 5.22%, & 8.46% respectively.<sup>[8,9]</sup> In my study the incidence was found 3.59%, which was statistically consistent with the above mentioned studies. This study revealed that more vulnerable age group for obstructed labour was 20- 25 years in 52°A, and 11 % of study population within teenager group. It is almost similar to the study of Nazia 56% and Mala 57.47%.<sup>[10,11]</sup> In my study 55% patient were primigravida, 8% were grand multipara & 37 % were para 1-4. It was statistically close to Nazia's study in which primigravida was 54% grand multipara 7% & 38% were para 1-4. In the study of Mala (2000) and Khairun (1998) primigravida were 42% and 42.53%, grand multipara were 14% & 11.5 % respectively.<sup>[12,13]</sup> Generally obstructed labour is seen in primi gravida. A study in Nigeria (1985- 1989) was done where the incidence of obstructed labour among primi gravida were 59%.<sup>[14]</sup> The socioeconomic condition, educational level and occupation of the patient had a significant relationship with their health awareness, which was reflected by their attendance to the antenatal clinic. The status of antenatal check up in my study was very poor. 52% of the responder had no antenatal check up at all, 35% had irregular & 13% had regular antenatal check up which was statistically consistent with the study of Nazia (2002) where 66% had no antenatal check up, 34% had irregular checkup.

However in India & Pakistan, booked cases were 11.45 % and 7% respectively.<sup>[15]</sup> A study in Nigeria where the incidence of obstructed labour was much higher for the unbooked patients (33%) than for the booked cases (1.78%). This study regarding utilization of antenatal care showed among all respondents 14.8% never had antenatal care during their last pregnancy. Over 42% reported two visits and 20% reported 3 visits whereas 2.3% reported four visits.<sup>[8]</sup> 72% of the patient in my study came from low socioeconomic class. 27% came from average and 1% from good socioeconomic class. 47% patients' husbands were daily laborer, 20% were farmer and the rest were small businessmen and service holders. The educational status of the patient was very low, illiterate 35%, primary & secondary level were 57% and 6% respectively and only 2% patient went to college. In the study of Gupta et al (1991), and Mala (2000) 1.43% and 1.5 % patient were from high socioeconomic condition. 71% of the patient was housewife in my study and others were maid servants, day laborer & service holder.<sup>[16,17]</sup> In Nazia's study 88% was housewife which was close to Gupta's study 85%.<sup>[12]</sup> In this study most of the deliveries were conducted at home. Patient was referred to hospital by T.B.As (skilled/unskilled) 62% and by relatives' 27%. The persons attending childbirth were not aware of the dangers of delay in obstructed labour and in most cases they referred the patient only when the mother and the baby were jeopardized. In only 3% cases patient was consulted by medical person and referred to referral hospital. Most patient 84% came within 24 hours of labour pain, 16% of the patient got admitted themselves after neglected and uncared labour with duration of



labour pain more than 24 hours which was similar to the study of Nazia 57%.<sup>[12]</sup> However Khairun's study (1998) 33 showed different result where 80% came after 24 hours of labour pain. The study showed 44% patient came with moderate to severe dehydration and bladder distended in 99% cases. Urine was high colored in 53% case, haematuria in 47% cases. In Nazia's study 88% had bladder distension on admission. Foetal heart sound was absent in 27%, cases, caput formation due to obstruction in 92% & muconium passed due to distress in 55% of the cases. In Nazia's series 35% case were admitted with absent foetal heart sound, had similarity with my study. But in Hiralal (1982) series 57% and Mala's series 45.95% had absent foetal heart sound.<sup>[18,19]</sup> The medical causes of obstructed labour in my study population were cephalo pelvic disproportion was 30%, 69% cases were due to malposition and malpresentation; among them occipitoposterior position was 37%, deep transverse arrest was 25%. Shoulder presentation was the commonest malpresentation (5%), face presentation was 2%, cervical fibroid was 1%. In the study of Nazia cephalopelvic disproportion was 33% malposition 41°, and malpresentation 26%. In Kaniz's (2002) study cephalo pelvic disproportion was 48%, malposition & malpresentation 49%; among them occipitoposterior position 29%, deep transverse arrest 11%.<sup>[20]</sup> Obstructed labour is usually results from ignorance and negligence of the family and sometimes of the society to a pregnant woman. Maternal death can be avoided significantly if women have access to emergency obstetric care. To obtain obstetric care women with obstetric complications face a variety of barriers. Some of these barriers are

cultural, geographic and gender inequality. As the women don't have autonomy and economic power, they don't have any influence on their family to make a decision in favour of her. In my study it was observed that the patient had to go for the trial of home delivery first because their husband and family member did not give permission in 25% cases. Due to economic constraints 14% patient did not come to hospital, 13.3% women could not realize the fate & same percentage patient tried to avoid operative delivery. A good number (18%) patient stayed at home as their previous delivery were uneventful. 7% of the entire numbers could not come to hospital due to long distance between home to health center and tertiary hospital. 9.4% patient herself did not agree to come to hospital-because it would disrupt house hold work, there might be none to take care of her older children and husband. These results had the statistical consistence with those of Nazia's study.<sup>[12]</sup> In her study 44% was because of ignorance, 18% wanted to avoid operative delivery. In 16% cases their husband and family members did not agree to bring them to hospital, 11% patient herself did not agree to come to hospital because it would disrupt house hold work. 6% was due to economic constraints and the rest 5% could not come due to long distance between home and health center and tertiary hospital. In this study the modes of delivery were LSCS 85%, craniotomy 9% and evisceration at 4%. In the study of Nazia and Dilruba (2003) the rate of LSCS was found similar; 92%, and 90% respectively.<sup>[12,21]</sup> In a study of Nigeria (1985-1989)<sup>30</sup> it was found that main method of delivery was LSCS (85%) due to obstructed labour. Craniotomy cases were similar to Nazia's study 7%.<sup>[12]</sup> But the rate varied with



11% and 18.1% in Khairun's (1998) and Hiralal (1882) study respectively. In my study 2% of total cases required subtotal hysterectomy due to ruptured uterus similar to Dilruba's (2003) study 1%. In study of Nazia, Khairun, Hiralal this rate were 7%, 1.5% & 11.5% respectively.<sup>[22]</sup> Immediate foetal outcome in my study showed only 24% healthy baby, 53% asphyxiated and 23% still born baby. The incidence of still born consistent with Gupta's study (24.29%).<sup>[13]</sup> But remarkably varied from Hiralal (56%)<sup>14</sup> and Mala's (51.74%) study.<sup>[23]</sup> In this study neonatal death was 22% out of 53% asphyxiated baby. In Kaniz's study it was 8% and 14% in Gupta's study.<sup>[13,24]</sup> In present study maternal outcome showed that post operative and puerperial period were uneventful in 23%, puerperial sepsis in 18%, postpartum haemorrhage in 17%, paralytic ilius in 14%, burst abdomen in 15%, rupture uterus in 3%, WF in 7% & wound dehiscence in 3%. In Kaniz's study postpartum haemorrhage was found 28%, paralytic ilius 42%, wound infection 40%, burst abdomen 2%.<sup>[25]</sup> In Khairun's study postpartum haemorrhage was 28%, puerperia I sepsis 16%, wound infection 2% which were similar to my study. A study in Nigeria where complications of obstructed labour were ruptured uterus was found 19% and 20% for puerperial sepsis. In this study maternal mortality rate was 3%, which was close to Nazia's study (4%). In other study in Bangladesh MMR was 7% in Khairun's study and 13.79% in Mala's study. Craniotomy cases were similar to Nazia's 12 study 7%. But the rate varied with 11% and 18.1% in Khairun's (1998) and Hiralal (1882) study respectively. In my study 2% of total cases required subtotal hysterectomy due to ruptured uterus similar to Dilruba's (2003) study %. In study of Nazia, Khairun, Hiralal

these rates were 7%, 1.5% & 11.5% respectively. Immediate foetal outcome in my study showed only 24% healthy baby, 53% asphyxiated and 23% still born baby. The incidence of still born consistent with Gupta's study (24.29%). But remarkably varied from Hiralal (56%)<sup>14</sup> and Mala's (51.74%) study. In this study neonatal death was 22% out of 53% asphyxiated baby. In Kaniz's study it was 8% and 14% in Gupta's study. In present study maternal outcome showed that post operative and puerperial period were uneventful in 23%, puerperial sepsis in 18%, postpartum haemorrhage in 17%, paralytic ilius in 14%, burst abdomen in 15%, rupture uterus in 3%, WF in 7% & wound dehiscence in 3%. In Kaniz's study postpartum haemorrhage was found 28%, paralytic ilius 42% wound infection 40%, burst abdomen 2% In Khairun's study postpartum haemorrhage was 28%, puerperial sepsis 16%, wound infection 2% which were similar to my study. A study in Nigeria<sup>30</sup> where complications of obstructed labour were ruptured uterus was found 19% and 20% for puerperial sepsis. In this study maternal mortality rate was 3%, which was close to Nazia's study (4%). In other study in Bangladesh MMR was 7% in Khairun's study and 13.79% in Mala's study.

## CONCLUSIONS

In Bangladesh 90% deliveries are conducted at home.<sup>[2]</sup> Until we could ensure institutional delivery and group workforce is needed to cover the skilled care at birth at home. Our SBAs (Skilled Birth Attendant) could do the job but need to have enough number for adequate coverage care at birth, both in hospital and home, need use of pantograph for early detection of prolonged labour and prevention



of obstructed labour with all its associated complications. Building awareness about obstructed labour and its consequences among people is very important. Both Government and NGO's need to work and should in collaboration. To decrease this unfortunate and mostly preventable obstetric complication, restructuring of MCH services should be done

with particular attention to- Increasing community awareness. Decentralization of maternity service. Effective health care planning starting from grassroots levels to tertiary levels. Establishment of streamlined and effective referral system. Momentum has started, many improvements have been made but much more needs to be done.

## REFERENCES

1. Chowdhury ME, Ahmed A, Kalim N, Koblinsky M. Causes of maternal mortality decline in Matlab, Bangladesh. *J Health Popul Nutr.* 2009;27(2):108-123. doi:10.3329/jhpn.v27i2.3325
2. Ahmed S, Hill K. Maternal mortality estimation at the subnational level: a model-based method with an application to Bangladesh. *Bull World Health Organ.* 2011;89(1):12-21. doi:10.2471/BLT.10.076851
3. Graham WJ, Ahmed S, Stanton C, Abou-Zahr C, Campbell OM. Measuring maternal mortality: an overview of opportunities and options for developing countries. *BMC Med.* 2008;6:12. doi: 10.1186/1741-7015-6-12.
4. Nour NM. An introduction to maternal mortality. *Rev Obstet Gynecol.* 2008;1(2):77-81.
5. Wagaarachchi PT, Graham WJ, Penney GC, McCaw-Binns A, Yeboah Antwi K, Hall MH. Holding up a mirror: changing obstetric practice through criterion-based clinical audit in developing countries. *Int J Gynaecol Obstet.* 2001;74(2):119-30. doi: 10.1016/s0020-7292(01)00427-1.
6. Fantu S, Segni H, Alemseged F. Incidence, causes and outcome of obstructed labor in jimma university specialized hospital. *Ethiop J Health Sci.* 2010;20(3):145-151. doi:10.4314/ejhs.v20i3.69443
7. Khan AR, Jahan FA, Begum SF. Maternal mortality in rural Bangladesh: the Jamalpur District. *Stud Fam Plann.* 1986;17(1):7-12.
8. Jahan R. Securing maternal health through comprehensive reproductive health services: lessons from Bangladesh. *Am J Public Health.* 2007;97(7):1186-1190. doi:10.2105/AJPH.2005.081737
9. Orach CG. Maternal mortality estimated using the Sisterhood method in Gulu district, Uganda. *Trop Doct.* 2000;30(2):72-4. doi: 10.1177/004947550003000205.
10. Gaym A. Obstructed labor at a district hospital. *Ethiop Med J.* 2002;40(1):11-8.
11. Naeye RL, Dozor A, Tafari N, Ross SM. Epidemiological features of perinatal death due to obstructed labour in Addis Ababa. *Br J Obstet Gynaecol.* 1977;84(10):747-50. doi: 10.1111/j.1471-0528.1977.tb12485.x.
12. Neilson JP, Lavender T, Quenby S, Wray S. Obstructed labour. *Br Med Bull.* 2003;67:191-204. doi: 10.1093/bmb/ldg018.
13. Roa L, Caddell L, Ganyaglo G, et al. Toward a complete estimate of physical and psychosocial morbidity from prolonged obstructed labour: a modelling study based on clinician survey. *BMJ Glob Health.* 2020;5(7):e002520. doi:10.1136/bmjgh-2020-002520
14. Konar H, Agarwal L, Priyanka P, Chaudhuri S. Posterior Reversible Encephalopathy Syndrome in Women with Eclampsia-Report of Three Cases. *J Obstet Gynaecol India.* 2021;71(3):318-321. doi: 10.1007/s13224-020-01399-1.
15. Bohren MA, Hofmeyr GJ, Sakala C, Fukuzawa RK, Cuthbert A. Continuous support for women during childbirth. *Cochrane Database Syst Rev.* 2017;7(7):CD003766. doi:10.1002/14651858.CD003766.pub6
16. Ozumba BC, Uchegbu H. Incidence and management of obstructed labour in eastern Nigeria. *Aust N Z J Obstet Gynaecol.* 1991;31(3):213-6. doi: 10.1111/j.1479-828x.1991.tb02783.x.
17. Becker S, Peters DH, Gray RH, Gultiano C, Black RE. The determinants of use of maternal and child health services in Metro Cebu, the Philippines. *Health Transit Rev.* 1993;3(1):77-89.



18. Hussain F, Bhuiyan AB, Haque YA, Flora MS. Verbal autopsy for maternal death. *Bangladesh Med Res Counc Bull.* 2002;28(1):45-53.
19. Vora KS, Mavalankar DV, Ramani KV, et al. Maternal health situation in India: a case study. *J Health Popul Nutr.* 2009;27(2):184-201. doi:10.3329/jhpn.v27i2.3363
20. Killewo J, Anwar I, Bashir I, Yunus M, Chakraborty J. Perceived delay in healthcare-seeking for episodes of serious illness and its implications for safe motherhood interventions in rural Bangladesh. *J Health Popul Nutr.* 2006;24(4):403-412.
21. Abedin S, Arunachalam D. Maternal autonomy and high-risk pregnancy in Bangladesh: the mediating influences of childbearing practices and antenatal care. *BMC Pregnancy Childbirth.* 2020;20(1):555. doi:10.1186/s12884-020-03260-9
22. Sarker BK, Rahman M, Rahman T, Hossain J, Reichenbach L, Mitra DK. Reasons for Preference of Home Delivery with Traditional Birth Attendants (TBAs) in Rural Bangladesh: A Qualitative Exploration. *PLoS One.* 2016;11(1):e0146161. doi:10.1371/journal.pone.0146161
23. Najafizada SAM, Bourgeault IL, Labonté R. Social Determinants of Maternal Health in Afghanistan: A Review. *Cent Asian J Glob Health.* 2017;6(1):240. doi:10.5195/cajgh.2017.240
24. Koenig MA, Fauveau V, Chowdhury AI, Chakraborty J, Khan MA. Maternal mortality in Matlab, Bangladesh: 1976-85. *Stud Fam Plann.* 1988;19(2):69-80.
25. Renaudin P, Prual A, Vangeenderhuysen C, Ould Abdelkader M, Ould Mohamed Vall M, Ould El Joud D. Ensuring financial access to emergency obstetric care: three years of experience with Obstetric Risk Insurance in Nouakchott, Mauritania. *Int J Gynaecol Obstet.* 2007;99(2):183-90. doi: 10.1016/j.ijgo.2007.07.006.

Source of Support: Nil, Conflict of Interest: None declared