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Original Article

Factors Related to 'Third delay' in a Tertiary level Health Care Facility

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ABSTRACT

***Introduction**: The third delay in receiving adequate treatment after reaching a healthcare facility significantly impacts maternal and emergency healthcare outcomes in low- and middle-income countries. This study investigates the factors contributing to this delay at Sher-e-Bangla Medical College Hospital in Barisal, Bangladesh. **Methods & Materials**: This cross-sectional study was conducted over six months, from January to June 2014, involving 200 women admitted to the Obstetrics and Gynaecology department. Data were collected using a semi-structured data collection sheet and analyzed using SPSS software, with descriptive statistics and bivariate analysis applied to present the findings. **Results**: The study found that the majority of participants were Muslim (87.50%), with an average age of 25.3 years and a mean monthly family income of 9420 Bdt. More than half (54.50%) received antenatal care. The average duration of treatment was 6.59 days. Timely medical decisions were made for 67.50% of participants, while 32.50% experienced delays. Referrals were necessary for 34.50% of participants, and 44.00% reported high workload. Staff shortages and absenteeism were reported by 12.00% and 2.00% of participants, respectively. Lack of equipment and unavailability of blood were concerns for 19.00% and 42.00% of participants, respectively. **Conclusion**: The study underscores the need for targeted interventions to address socio-economic disparities, infrastructural deficiencies, and systemic inefficiencies to reduce delays and improve healthcare outcomes. These findings can guide policymakers and healthcare administrators in implementing effective strategies to enhance the quality of healthcare services in similar settings.*

***Keywords**: Third Delay, Maternal Health, Emergency Care, Socio-Economic Disparities, Healthcare Infrastructure, Bangladesh.*

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INTRODUCTION

The healthcare delivery system in low- and middle-income countries (LMICs) faces numerous challenges, including overcrowding, under-resourcing, and infrastructural issues, which significantly impact the timeliness and quality of care provided to patients. The "three delays" model is a well-established framework used to understand and address these barriers in maternal health. This model delineates three critical delays: delay in the decision to seek care, delay in reaching a healthcare facility, and delay in receiving adequate and appropriate treatment upon arrival at the facility. The third delay, which occurs after reaching a healthcare facility, is particularly problematic in LMICs and can lead to adverse outcomes, including increased mortality and morbidity rates among patients, especially in maternal and emergency healthcare settings. Studies have shown that the third delay is a major contributor to maternal mortality in many developing countries. For instance, research conducted in Malawi found that type 3 delays, which occur within healthcare facilities, contributed to 96.8% of maternal deaths, with factors such as long waiting times, staff shortages, and lack of essential supplies being significant contributors to these delays [1]. Similarly, a systematic review by Knight et al. (2013) identified facility-level barriers such as inadequate training, drug shortages, and staff shortages as primary contributors to the third delay in developing countries [2]. These findings underscore the critical need for interventions targeted at reducing the third delay to improve maternal and overall healthcare outcomes. In Bangladesh, the healthcare system faces significant challenges that exacerbate the third delay. The structure of tertiary healthcare facilities in Bangladesh, which includes major public hospitals and specialized institutions, is often characterized by overcrowding and insufficient resources. A study on the barriers to accessing

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maternal healthcare services in Northern Bangladesh highlighted social, organizational, and physical barriers that significantly impact maternal health outcomes [3]. Moreover, the healthcare referral networks in urban areas like Sylhet City Corporation are often inefficient, leading to increased burdens on major tertiary hospitals and delays in patient care [4]. The maternal mortality rate in Bangladesh remains a critical concern despite efforts to improve healthcare services. The maternal mortality ratio (MMR) in Faridpur Medical College Hospital, a tertiary public healthcare center in Bangladesh, was found to be alarmingly high at 2010.5 per 100,000 deliveries, with institutional factors such as delayed blood transfusions, lack of operative interventions, and nonavailability of ICU facilities contributing significantly to maternal deaths [5]. Furthermore, the availability and quality of emergency obstetric care (EmOC) and emergency newborn care (EmNC) services in Bangladesh are often inadequate, with significant disparities in service provision between urban and rural areas [6]. Several studies have explored the specific factors contributing to the third delay in Bangladesh. For instance, a study on the treatment delay for acute coronary syndrome patients identified significant factors such as patient's age, residence, education, and employment status, as well as the location of symptom onset and mode of transportation, as contributors to prehospital delay [7]. Additionally, the application of the Three Delays Model in rural Bangladesh revealed that delays in decision-making and timely receipt of care upon reaching a health facility were influenced by factors such as ability to recognize symptoms, decision-making power, and staff and resource shortages [8]. Addressing the third delay in Bangladesh requires a multifaceted approach that includes improving healthcare infrastructure, increasing the availability of trained healthcare providers, and enhancing referral systems. The findings from these studies highlight the need for targeted interventions to reduce delays and improve patient outcomes in tertiary healthcare facilities. By focusing on these critical areas, it is possible to develop strategies that can effectively mitigate the third delay and contribute to the overall improvement of healthcare delivery in Bangladesh.

METHODS & MATERIALS

This cross-sectional study was conducted in the department of Obstetrics and Gynaecology at Sher-e-Bangla Medical College Hospital, Barisal, over a six-month period from January 2014 to June 2014. The study population included all women admitted to the Gynaecology and Obstetrics department for treatment during the study period. A total of 200 women were selected as the sample size for this study. Initially, data from 288 patients were considered; however, incomplete data led to the exclusion of some patients, resulting in a final sample size of 200. Inclusion criteria for this study comprised patients admitted to the obstetric ward at or after 28 weeks of gestation up to 42 days post-delivery. Exclusion criteria included gestational age less than 28 weeks, patients who did not consent to participate, patients in very poor general condition, and those who reported no history of delay in receiving appropriate care. The study utilized the "three delays" model as an operational framework. This model categorizes delays into three types: delay in making the decision to seek care (first delay), delay in arrival at a health facility (second delay), and delay in receiving adequate treatment (third delay). For data collection, a semi-structured data collection sheet was developed and pre-tested to ensure its suitability. The investigator personally administered this sheet, collecting detailed histories from patients regarding the third delay. Only those who reported delays beyond 30 minutes in receiving appropriate care were included in the final analysis, as delays of 30 minutes or less were considered normal. Data collection was meticulously conducted by the investigator at Sher-e-Bangla Medical College Hospital. Collected data were subsequently edited and verified for accuracy. The data analysis was performed using SPSS software, employing both descriptive statistics and bivariate analysis to present the findings in tables and graphs. A significance level of <0.05 was utilized for this study. Ethical considerations were rigorously adhered to throughout the study. Written permission was obtained from the concerned authority of the hospital, and informed written consent was obtained from each participant before data collection. Confidentiality of participant information was strictly maintained, with data accessible only to the researchers involved in the study. Participants were informed of their right to refuse to answer any question or withdraw from the study at any point. This study was conducted in accordance with the guidelines of the Bangladesh Medical Research Council (BMRC).

RESULTS

Table – I: Baseline characteristics among participants (*n*=200)

Variable	n	%
Religion		
Islam	175	87.50%
Hindu	24	12.00%
Christian	1	0.50%
Antenatal Care		
No	91	45.50%
Yes	109	54.50%
Age	25.3±4.65	
Monthly family income (Bdt)	9420±5774.106	
Years of schooling	7.52±3.561	

The baseline characteristics of the study participants (N=200) are presented in Table 1. The majority of the participants were Muslim, accounting for 87.50% (n=175) of the total, followed by Hindus at 12.00% (n=24), and a small fraction identified as Christian (0.50%, n=1). Regarding antenatal care, more than half of the participants (54.50%, n=109) reported receiving antenatal care, while the remaining 45.50% (n=91) did not receive any antenatal care during their pregnancy. The average age of the participants was 25.3 years with a standard deviation of 4.65 years. The mean monthly family income among the participants was 9420 Bangladeshi Taka (Bdt) with a standard deviation of 5774.106 BDT. In terms of education,

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the average number of years of schooling was 7.52 years, with a standard deviation of 3.561 years.

Table – II: Operative and Hospital related characteristics among participants (*n*=200)

Operative Characteristics	n	%
Duration of treatment (Mean±SD)	6.59± 7.81	
Timeliness of decision		
In time	135	67.50%
Delayed	65	32.50%
Referral		
No	131	65.50%
Yes	69	34.50%
Staff shortage		
No	176	88.00%
Yes	24	12.00%
High workload		
No	112	56.00%
Yes	88	44.00%
Absenteeism of staff		
No	196	98.00%
Yes	4	2.00%
High cost		
No	196	98.00%
Yes	4	2.00%
Lack of equipment		
No	162	81.00%
Yes	38	19.00%
Unavailability of blood		
No	116	58.00%
Yes	84	42.00%

The operative and hospital-related characteristics of the study participants (N=200) are detailed in Table 2. The average duration of treatment for the participants was 6.59 days with a standard deviation of 7.81 days. When examining the timeliness of medical decisions, 67.50% (n=135) of decisions were made in a timely manner, while 32.50% (n=65) experienced delays.

Regarding referrals, 34.50% (n=69) of the participants were referred to other facilities, whereas 65.50% (n=131) were treated without the need for referral. A significant majority of the participants (88.00%, n=176) did not report staff shortages during their treatment, while 12.00% (n=24) experienced staff shortages.

High workload was reported by 44.00% (n=88) of the participants, with 56.00% (n=112) indicating that workload was not an issue. Absenteeism of staff was a rare occurrence, reported by only 2.00% (n=4) of participants, with 98.00% (n=196) experiencing no absenteeism. Similarly, high treatment costs were reported by just 2.00% (n=4) of participants, with the overwhelming majority (98.00%, n=196) indicating that high costs were not an issue.

Lack of equipment was a concern for 19.00% (n=38) of participants, while 81.00% (n=162) did not face this issue. The unavailability of blood was reported by 42.00% (n=84) of participants, whereas 58.00% (n=116) did not encounter this problem during their treatment.

Table – III: Pattern of ante-natal care among participants (*n*=200)

Variables	Ante natal care	
	No (91)	Yes (109)
Age of the patient	26.22±4.69	24.53±4.48
Monthly family income	7835.16±2805.80	10743.12±7140.65
Years of schooling	6.02±3.49	8.77±3.11
Durations to reach hospital in hours	2.30±1.29	1.57±1.04
Duration to treatment in hours	6.63±8.25	6.54±7.45

The pattern of ante-natal care among the participants (N=200) is presented in Table 3. Out of the 200 participants, 91 did not receive ante-natal care, while 109 did. There are notable differences between these two groups in several characteristics. Participants who did not receive ante-natal care had an average age of 26.22 years (±4.69), whereas those who received ante-natal care were slightly younger, with an average age of 24.53 years (±4.48). The average monthly family income for participants without ante-natal care was 7835.16 Bangladeshi Taka (±2805.80), significantly lower than the average income of 10743.12 Bdt (±7140.65) for those who did receive ante-natal care. Education levels also differed between the two groups. Participants without ante-natal care had an average of 6.02 years of schooling (±3.49), compared to 8.77 years (±3.11) for those with ante-natal care. The time taken to reach the hospital showed that participants without ante-natal care took longer, averaging 2.30 hours (±1.29), compared to 1.57 hours (±1.04) for those with ante-natal care. However, the duration to receive treatment once at the hospital was similar for both groups, with those without ante-natal care averaging 6.63 hours (±8.25) and those with ante-natal care averaging 6.54 hours (±7.45).

Table – IV: Pattern of timeliness of decision (*n*=200)

Variable	Timeliness of decision	
	In time (135)	Delayed (65)
Age of the patient	25.10±4.51	25.72±4.92
Monthly family income	10140.74±6599.59	7923.08±3017.17
Years of schooling	8.43±3.25	5.63±3.45
Durations to reach hospital in hours	1.69±1.14	2.34±1.25
Duration to treatment in hours	7.09±8.77	5.53±5.17

The pattern of timeliness of medical decision-making among the participants (N=200) is detailed in Table 4. Among the participants, 135 experienced timely decisions regarding their treatment, while 65 faced delays in decision-making. Participants who received timely decisions had an average age of 25.10 years (±4.51), whereas those who experienced delays were slightly older, with an average age of 25.72 years

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(±4.92). The average monthly family income for those with timely decisions was significantly higher at 10140.74 Bangladeshi Taka (±6599.59), compared to 7923.08 Bdt (±3017.17) for those who experienced delays. In terms of education, participants with timely decisions had more years of schooling, averaging 8.43 years (±3.25), compared to 5.63 years (±3.45) for those with delayed decisions. The time taken to reach the hospital was shorter for participants with timely decisions, averaging 1.69 hours (±1.14), whereas those with delayed decisions took an average of 2.34 hours (±1.25). Interestingly, the duration to receive treatment once at the hospital was slightly longer for those with timely decisions, averaging 7.09 hours (±8.77), compared to 5.53 hours (±5.17) for those who experienced delays in decision-making.

DISCUSSION

The current study sheds light on critical factors influencing the third delay in maternal and emergency healthcare at Sher-e-Bangla Medical College Hospital in Barisal, Bangladesh. The findings underscore the multifaceted challenges that contribute to delays in receiving adequate treatment upon arrival at a healthcare facility, which is consistent with existing literature on healthcare delays in low- and middle-income countries (LMICs). A significant proportion of the study participants were Muslim (87.50%), with the remaining being Hindus (12.00%) and Christians (0.50%). This religious distribution reflects the broader demographic patterns in Bangladesh, similar to findings in other regional studies, such as those on antenatal care utilization in various socio-religious contexts (9,10). More than half of the participants (54.50%) received antenatal care, highlighting a moderately high uptake of maternal health services, which aligns with findings from Karim (2020), who reported variability in antenatal care usage among different socio-economic groups [11]. The average age of the participants was 25.3 years, and the mean monthly family income was 9420 Bangladeshi Taka. Participants had an average of 7.52 years of schooling, reflecting moderate educational attainment. These socio-economic indicators are crucial as they influence healthcare-seeking behavior and access to timely care. Similar socio-economic patterns were observed in studies by Arsenault et al. (2018) and Shahjahan et al. (2017), which emphasize the impact of education and income on maternal health service utilization [12,13]. The duration to receive treatment was 6.59 days on average, with timely medical decisions observed in 67.50% of the cases. However, 32.50% experienced delays in decision-making, highlighting a significant gap in healthcare delivery efficiency. These findings resonate with studies on medical decision-making and treatment delays, such as those by Shurtz et al. (2018) and Nishio et al. (2018), which also report substantial delays in rural and resource-limited settings [14,15]. Referrals were necessary for 34.50% of the participants, while 65.50% were treated without referral. This indicates a reliance on tertiary care facilities due to inadequate primary and secondary healthcare infrastructure, as corroborated by Adams et al. (2020) in their study on healthcare referral inefficiencies [4]. Staff shortages were reported by 12.00% of participants, a relatively low figure compared to other LMICs, where staff shortages are more prevalent [16]. However, high workload was reported by 44.00% of participants, aligning with findings by Maestad et al. (2010) on the impact of high caseloads on healthcare delivery [17]. Absenteeism of staff and high treatment costs were reported by only 2.00% of participants, suggesting that these issues might not be as significant in this setting as in other studies. However, lack of equipment was a concern for 19.00% of participants, reflecting infrastructural deficiencies. This finding is consistent with the study by Muyodi et al. (2017) on the inadequacies in healthcare facilities in terms of essential equipment [18]. The unavailability of blood was reported by 42.00% of participants, a critical issue in emergency care, as highlighted by Dedey et al. (2016) in their study on breast cancer treatment delays due to resource limitations [19]. Participants without antenatal care were older, had lower family incomes, fewer years of schooling, and longer travel times to the hospital compared to those who received antenatal care. These disparities are similar to those reported by Kisuule et al. (2013) and Fagbamigbe & Idemudia (2015), who found that lower socio-economic status and education levels significantly impact healthcare access and utilization [20,21]. Participants who experienced timely medical decisions had higher average monthly family incomes and more years of schooling, underscoring the role of socio-economic status in accessing timely care. These findings are supported by studies like those of Ghosh (2015) and Marsh et al. (2021), which emphasize the influence of income and education on healthcare outcomes [22,23]. Interestingly, the duration to receive treatment was slightly longer for participants with timely decisions compared to those with delayed decisions, suggesting that while initial decision-making was prompt, subsequent treatment processes might still be subject to delays, a complexity also noted by Hamel et al. (1999) [24]. In conclusion, this study highlights significant factors contributing to the third delay in healthcare delivery at Sher-e-Bangla Medical College Hospital, including socio-economic disparities, infrastructural deficiencies, and systemic inefficiencies. Addressing these issues requires a multifaceted approach, including improving healthcare infrastructure, enhancing healthcare provider training, and strengthening referral systems. Comparative insights from other studies underscore the need for targeted interventions to mitigate delays and improve healthcare outcomes in similar LMIC settings.

Limitations of The Study

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

CONCLUSION

The findings of this study highlight significant factors contributing to the third delay in healthcare delivery at Sher-e-Bangla Medical College Hospital in Barisal, Bangladesh. The study reveals the critical impact of socio-economic disparities, infrastructural deficiencies, and systemic inefficiencies on the timeliness and quality of maternal and emergency care.

Addressing these issues requires targeted interventions to improve healthcare infrastructure, enhance the training and availability of healthcare providers, and streamline referral systems. These efforts are essential to mitigate delays and improve healthcare outcomes in similar low- and middle-income country settings. The insights from this study can inform policymakers and healthcare administrators to implement effective strategies that ensure timely and adequate treatment for all patients, ultimately enhancing the overall quality of healthcare services.

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