

Assessment of 'Three Delays Model': An Experience at Public Sector MCH Hospital

Asif Mahmood Mattoo¹, Saadia Hameed², Asif Maqsood Butt³

Aero Hospital¹, Hasanabdal, Holy Family Hospital², Department of Medical Education, Rawalpindi Medical University³, Rawalpindi.

Abstract

Background: Maternal Mortality is a strong indicator of human development that points towards health of the women, accessibility and the quality of the health services. Nearly two third of the maternal deaths all over the world are due to direct causes e.g hemorrhage, sepsis and eclampsia.

Objective: To assess the role of three delays in maternal mortality at a public sector hospital.

Study type, settings and duration: A descriptive cross sectional study was carried out at Holy Family Hospital, Rawalpindi, from October to December 2016.

Methodology: Data concerning age, socio-economic, demographic, parity, booking, referral center and cause of the three delays was collected on a structured questionnaire from 200 respondents by interviewing them, their relatives and history files. Data was analyzed in SPSS version 20 and the results were presented in tabular form as frequencies and percentages.

Results: It was found that first delay was the most frequent one and faced by 70% respondents after the onset of labor pains. Total of 47% told that late decision of the husband to seek care was the reason for delay whereas 22% reported that midwives were responsible for this delay. For the second delay, the study reflected that almost 52% of respondents reached the facility within an hour while the remaining took longer because of distance, and volume of traffic. The third delay was faced by 35% because of heavy patient flow to the obstetrics emergency department where 83% were attended by doctors within 30 minutes after reaching the facility.

Conclusion: This study findings concluded that delay in decision making to seek out care and delay in reaching a suitable health facility in time were mainly the contributors to maternal morbidity and mortality. Lack of knowledge and poor socio-economic factors were also highlighted as the major reasons of these delays.

Key words: Socio-demographic characteristics, delays, maternal mortality.

Introduction

Maternal death is an important indicator of the status of women, access to care, acceptability and standard of healthcare in developing countries. Complications in pregnancy resulted in 10.7 million women deaths between 1990 and 2015 globally, the majority of which were preventable.¹ However, these reasons do not

usually cause maternal deaths in developed countries. Therefore, few other factors like delays in getting timely and suitable care in cause of a high risk pregnancy have been put forward as a major factor in maternal mortality. Thaddeus and Maine introduced the concept of delays which can occur at three different levels:

1. Delay in decision to seek out care.
2. Delay in reaching the suitable facility, and
3. Delay in receiving satisfactory care in the facility.

The reasons behind the first delay may be late recognition of the situation, the enormous hospital bills, fear of the hospital check-up or lack an appropriate decision maker. The second delay is usually initiated by difficulty in getting transport and distance within time to travel to reach health facility suitable to handle the situation. The third delay is often due to difficulty in getting availability of trained staff, doctor or nurse, blood supplies, proper equipment and operation theatre facility.² It is said

Corresponding Author:

Asif Maqsood Butt

Department of Medical Education
Rawalpindi Medical University, Rawalpindi.
Email: drasifrmc@gmail.com

Received: 31 May 2018, Accepted: 27 June 2019,

Published: 28 June 2019

Authors Contribution

AMM conceptualized the project & did the data collection, drafting, revision & writing of manuscript. AMB did the literature search. SH performed the statistical analysis.

that these three delays are interrelated and are among the major contributing factors of maternal mortality.³

The three delays model was studied and considered valuable for the identification of factors causing maternal mortality. This model describes that the first delay is to seek timely health care and it occurs mostly because of poor socio-cultural factors, the low status of women and previous bad experience at health facilities. The second delay results because of insufficient infrastructure or access to transportation, long distances and prolonged travelling time to a health facility where pregnant women can receive emergency treatment and management. The third delay is due to the delay in receiving care at the health care facility or hospital. This typically occurs when patient has to wait in the obstetric emergency because of rush, non-availability of doctor, wrong diagnosis or treatment, delay to arrange blood for transfusions or lifesaving medications.⁴

In most of the developing nations, death rates due to pregnancy and labor were frequently high and affect women of reproductive age. Nevertheless, these mortalities could be avoided in time.⁵ Women education, empowerment and family planning could result in significant lessening of maternal morbidity and mortality but that require long term health education and training of community.⁶ While comparing maternal mortality rates of developing and developed countries, it was seen that there was a huge difference between Maternal mortality rate (MMR) of these countries that depend upon the management of high risk pregnancies which if left untreated could lead to death.⁷ The importance of appropriate timings could not be ignored in medical practice. In gynecological emergencies, timely diagnosis and treatment was the only key to avoid maternal deaths.⁸

Maternal mortality occurs as a result of a complex and long events of delays. In the obstetric emergency women try to reach medical center, but the delays happens because of many obstacles. Every postponement could be deadly to women with high risk pregnancy. Rural women appear to abstain from heading off to the doctor's due to dread of discrimination, regional and financial obstructions and diverse understanding of threat signs. However, a woman at first planned for home delivery tries to get help when complication develops. These issues lead to many problems in reaching to proper care within time. Absence of public transportation in rural regions causes delays for the transportation of pregnant and then deficiency in medical services might be because of one or a sequence of events as inadequate medical supplies, lack of proper equipment, untrained health workers and ineptitude of the accessible staff.⁹

According to the three-delay model, the traditional concept of broad emergency services was similar to obstetric emergencies, in terms of service provision, time etc. Timely action is also important in general emergency services besides providing medical interventions. The delay factors such as access to hospital, distance travelled, and access to timely patient care were applicable to all sorts of emergency care. It was an acceptable fact that time taken for a pregnant woman to reach medical care or health facility was affected by the travelling distance from home to the facility and quality of provision of services at that facility.

Efficient emergency service has a lot of factors on which it depends. One of the prime factor was seen as the ability of the patient's or health caretaker where he/she could identify the occurrence of any abnormal condition, which in turn affects the health of the patient. An effective treatment was required to cope with the condition. In situations, where a delay occurs in the recognition of a potentially serious condition, an appropriate care would not be available in time. In emergency situations the economic factor was of least importance when compared to the utilization of services.¹⁰

Poor planning and delay in recognition of serious conditions in the basic health centers and homes results in complications. These could only be reduced if provided with basic treatment before reaching a hospital. If delays in patients care were to be avoided, the persons who provide pre hospital services must be trained to recognize the level of care required by the patient and to shift the patient directly to the health facility that provides that level of required care.¹¹

The three delays model was designed to understand the ways that create hindrances a women health care. This model identifies and highlights the importance of all the three delays, instead of focusing on only one. It has been recognized as a well-established tool for the measurement of causes of maternal and child mortality because of delays around the world. It further makes it possible to get actual data for the guidance to work for actual impact in the improvement of maternal and infant mortality rates. Pre-eclampsia or eclampsia, obstructed labor, hemorrhage, ruptured uterus and postpartum sepsis are the most important factor of maternal mortality related to delays. These could be prevented with health promotion, family education, decision making, and improving socio-economic factors. The high maternal mortality ratio (178 deaths/100,000 live births) could be reduced in Pakistan by the application of this model at Primary and Secondary Health levels and aiming to improve the health promotion.

Methodology

A descriptive cross sectional study was carried out in a tertiary care teaching hospital from October to December 2016 with a sample size of 200 respondents. The study was conducted in Holy Family, a tertiary care teaching hospital, providing services as a referral center for the health facilities in and around Rawalpindi. Sample size was calculated at the confidence interval of 95% and prevalence of 50% and convenient sampling was used to enroll patients. .

Patients registered at any of the two units of the department of Obstetrics and Gynecology of Holy Family hospital outpatient department were defined as Booked. Three Delays were defined as by Thaddeus and Maine. Majority of the respondents admitted as emergency cases to the labor room were referred by different private or public hospitals.

A structured questionnaire was used to collect relevant information by means of both interviewing the respondents and their relatives regarding first and second delays whereas for third delay data was collected from the history files. The questionnaire was divided into four parts, the first

part comprised of demographic data whereas the other three parts constituted questions about the three delays. Socio-demographic characteristics, parity, status of booking, source of referral, and data on three delays were collected. The data was analyzed using SPSS version 20, and the results were presented in tabular form as frequencies and percentages.

The study was approved by Ethical Committee of Sarhad University, Peshawar. Departmental permission to conduct the study was obtained from Holy Family Hospital, Rawalpindi and informed written consent was obtained from all participants.

Results

The study was conducted on 200 post-natal ward respondents participated with a mean age of 26.1 ± 3.5 years. The minimum age of sample respondents was 16 and maximum 35 years. The sample variance was 12. Total of 99.5% of the respondents were

Table: Frequency distribution of respondents about causes of the three delays.

First delay	n (%)	Second delay	n (%)	Third delay	n (%)
First Delay	140 (70)	Second Delay	25 (12)	Third Delay	35 (18)
Preparation of antenatal cards for regular check up		Delay due to Transportation		First check-up after reaching hospital by	
Booked	125 (63)	Car	83 (42)	Doctor	195 (98)
Non Booked	75 (37)	Rickshaw	69 (35)	Aya	5 (03)
		Bus	12 (06)		
		Wagon	36 (18)		
Number of females decided late for checkup		Delay due to distance		Delay for late checkup	
Delayed	95 (48)	1 hour or less	103 (52)	Doctor non-availability	18 (09)
Not delayed	105 (52)	1 to 2 hours	44 (22)	Rush in ER	110 (55)
		2 to 3hours	41 (21)	Blood arrangement	72 (36)
		3 hours or more	12 (06)		
Reason for late checkup because of				Time taken of checkup	
Husband	93 (47)			Within 15-mins	109 (55)
Midwife delay	44 (22)			16-30 minutes	56 (28)
or poor counseling				31-60 minutes	15 (08)
Lack of self-awareness	30 (15)			More than 1hour	20 (10)
Lack of health facility	19 (10)				
Lack of finances	14 (07)			Complications due to delay arrival and	
Advice to go to hospital				initiation of treatment	
Self-	74 (37)			Yes	60 (30)
Husband	16 (08)			No	140 (70)
Family	41 (21)				
Midwife	21 (11)			Nature of complication	
Private doctor	33 (17)			Fetal Distress	29 (48)
Government doctor	15 (08)			Baby breathing problem	13 (22)
Checked-up before getting referral				Hemorrhage	18 (30)
Yes	107 (54)			Baby Death	2 (03)
No	93 (47)				
Respondent brought to hospital by					
Husband	134 (67)				
Family	66 (33)				

house wives and 0.5% were working women and majority belonging to a lower and few to middle socioeconomic class. Among all, 13% were illiterate and had never received any formal education, 13% studied up to middle classes, 11% were under matric, 32% matric and 33% above matric. Out of all, 54% respondents were booked and had received regular antenatal care throughout pregnancy, 63% from private setups, 29% from midwives and only 8% from government health care center.

Table shows the reasons for the three delays. First delay was most frequent and was faced by 70% respondents after the onset of labor pains while 47% told that late decision of the husband for seeking care was the reason for delay and in 22% of cases midwife was held responsible for this delayed decision. For the second delay, the study reflected that almost 52% of respondents reached the facility within an hour and remaining had a longer travelling time because of distance, rush in traffic causing delay in reaching the facility. The third delay was faced by 35% because of rush in the obstetrics emergency department and 83% were attended by doctors within 30 minutes after reaching the facility.

Discussion

To best of our knowledge, this study on the 'three delays model' is the first study conducted in the region of Rawalpindi and also among the few studies conducted on this subject in Pakistan. It was found in this study that the most common delay was first (70%), then third (18%) and least was the second (12%). The decision to seek out mother's healthcare was seen mostly because of socioeconomic factors, culture and low education of women. Lack of awareness and limited knowledge about antenatal checkup played a key role in delay in timely recognition of complications of pregnancy.

Literacy in both husband and wife played a key role in making quick decisions and getting early medical advices during pregnancy was also noted. Education of women empowers to make decision for the health and wellbeing of their families. However it was revealed in the study that most of the decisions were made by the relatives without asking the women. It was also supported by the results of the study that literate males made better decisions for their families.

First delay was found as the major contributors of delays and it was further strengthened by a similar study conducted in Karachi highlighting that the first delay was because

of two main reasons as was seen in this study too. Husband plays key role in all decision making and it depends upon his knowledge on this subject. The second factor highlighted was the advice of midwives in decision making.¹² A similar study of Lahore also highlighted first delay and major obstacle to seek out care was played by husband, mother in-law and midwife in making decisions.¹³

It was observed in this study that literacy rate played an important role irrespective of socio-cultural and demographic aspects. A similar study conducted in Nigeria concluded that formal education have a significant role and to reduce MMR adult women, literacy rate must be improved.¹⁴ A study conducted in Karachi also suggested that majority of women suffering from first and second delays were because of poor socio-demographic factors and was a major reason of high MMR in Pakistan.² A study from Egypt reported that there was a high prevalence of MMR because of delayed access to good quality health facilities of women. The study also revealed that there was a reduction of MMR because of improvements seen in the sociocultural factors of the country.¹⁵

Delay in reaching the suitable facility was the second delay and was due to lack of getting in time transport, long distance or late referrals. The study just like many other similar studies highlighted that majority of the respondents' hired or used a public transport to reach the hospital and wasting the precious time because of difficulty in getting proper transport and rush on the roads. A study conducted in Tigray, Ethiopia reported that poor system of transportation and preventable factors like hospital service delay of care seeking contributed as the leading cause of MMR. These could be avoided to reduce maternal deaths.¹⁶

Suitably equipped health facilities with fully trained available staff have a critical role to play when a patient arrives in serious condition. This was established from the study that increased work load and lesser number of duty doctors results in long waiting time in the obstetric emergency department results as third delay. The non-booked cases were other main factor that caused delay because of difficulty in getting the arrangement of blood and other medical supplies after reaching the hospital. Our study was supplemented by a Karachi based study highlighting un-booked and delayed referrals as major reasons for third delay. Similarly lack of management protocols, lack of medical audits, poor conditions of labor rooms, and non-availability of adequate blood in blood banks being the major factors for third delay were also generally noticed in both studies.¹⁷

In the light of the present study, the following recommendations have been compiled to minimize the factors affecting delays. Districts should compile detailed Information Education Communication (IEC) plans about health education and awareness on maternal health issues. It should be communicated through seminars, workshops, medical camps and media by health and community workers and social activists. Key objective of Information, Education, and Communication (IEC) campaigns should be to ensure that the community in need of awareness and communication behavior changes be aimed to improve health seeking.

All booked pregnant women visiting public or private hospitals should be given separate educational lectures and handouts, so that they understand the hazards, risks and vulnerabilities that they will face if prompt actions are not taken.

Quality of health services and facilities should be ensured through regular and efficient monitoring system.

Pregnant females should be encouraged on at least three routine antenatal check-ups during a pregnancy.

Early recognition of complications of pregnant women should be done at each level and health workers should rule out high risk pregnancies timely so that timely referral to facilities offering specialized health services.

This study findings concluded that delay in decision making to seek out care and delay in reaching a suitable health facility in time were the main contributors to maternal morbidity and mortality in the study area. Lack of knowledge and poor socio-economic factors were also highlighted as the major reasons of these delays.

Conflict of interest: None declared.

References

1. WHO, UNICEF, UNFPA, World Bank Group, United Nations Population Division. Trends in maternal mortality: 1990 to 2015. Geneva, Switzerland: WHO Document Production Services; 2015. (Accessed on 22nd May 2019) Available from URL: <https://www.afro.who.int/sites/default/files/2017-05/trends-in-maternal-mortality-1990-to-2015.pdf>.
2. Shah N, Hossain N, Shoaib R, Hussain A, Gillani R, Khan NH. Socio-demographic characteristics and the three delays of maternal mortality. *J Coll Physicians Surg Pak* 2009; 19(2): 95-8.
3. Nawal MN, An Introduction to Maternal Mortality. *Reviews in Obstet Gynaecol* 2008; 1(2): 77-81.
4. Ellis C, Schummers L, Rostoker M. Reducing maternal mortality in Uganda: Applying the "three delays" framework. *IJCB* 2011; 1(4): 218-26.
5. Ken IS. Maternal Mortality and Its Correlates: Practical Implications of Data Analysis Across Multiple Countries. *J Obstet Gynaecol Can* 2013; 35(7): 612-9.
6. Judith RB, Barbara JS, Adetokunbo OL. Improving Birth Outcomes: Meeting the Challenge in the Developing World. 2th ed. Washington (DC): National Academies Press; 2003. (Accessed on 22nd May 2019) Available from URL: <https://www.ncbi.nlm.nih.gov/pubmed/25057689>
7. Rodolfo CP, José GC, Mary APi, Maria HS, Samira MH, Maria LC, et al. Delays in receiving obstetric care and poor maternal outcomes: results from a national multicentre cross-sectional study. *BMC Pregnancy Childbirth* 2014; 14: 159.
8. Gabrysch S, Campbell OM. Still too far to walk: Literature review of the determinants of delivery service use. *BMC Pregnancy Childbirth*. 2009; 9: 34.
9. Cham M, Sundby J, Vangen S. Maternal mortality in the rural Gambia, a qualitative study on access to emergency obstetric care. *Reproductive Health* 2005; 2(3): 8.
10. Thaddeus S, Maine D. Too far to walk: maternal mortality in context. *Soc Sci Med* 1994 ; 38(8): 1091-1110.
11. Monitoring emergency obstetric care. Geneva, Switzerland: World Health Organization; 2009; 28-9. (Accessed on 22nd May 2019) Available from URL: https://apps.who.int/iris/bitstream/handle/10665/44121/9789241547734_eng.pdf
12. Safdar S, Inam SN, Omair A, Ahmed ST. Maternal Health Care in a rural area of Pakistan. *J Pak Med Assoc* 2002; 52: 308.
13. Shah N, Khan NH. Third delay of Maternal Mortality in a tertiary hospital. *J South Asian Foundation Obstet Gynaecol* 2013; 5(2): 57-9.
14. Ikeako LC, Onah HE, Iloabachie GC. Influence of formal maternal education on the use of maternity services in Enugu, Nigeria. *J Obstet Gynaecol* 2006; 26: 30-4.
15. Gelany SE, Mansour MG, Hassan MM. The Three Delays of Maternal Mortality in a Public-Sector Tertiary Teaching Hospital: Is There a Paradigm Shift?. *Gynecol Obstet Res* 2015; 2(2): 52-6
16. Hailu SEF, Berhane Y. Health facility-based maternal death audit in Tigray, Ethiopia. *Ethiopian J Health Develop* 2009; 23: 115-9.
17. Shah N, Khan N H. Third delay of Maternal Mortality in a tertiary hospital. *Rawal Med J* 2007; 32: 163-7.