THREE DELAYS RELATED TO MATERNAL MORTALITY IN MYANMAR: A CASE STUDY FROM MATERNAL DEATH REVIEW, 2013

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ABSTRACT:

Background: Maternal mortality is not only due to medical causes but also due to the underlying social causes which create delays to get timely and appropriate interventions. This study aimed to describe the Three Delays of maternal mortality; the First Delay: delay in decision to seek care, the Second Delay: delay in reaching health facility and the Third Delay: delay in receiving appropriate care at health facility and to identify the socio-demographic characteristics and accessibility factors that contribute to delays related to maternal mortality.

Method: The study used monthly reports of maternal death review from 330 Townships of 14 respective States and Regions from January to December 2013. This report is done by community-based verbal autopsy method. A total of 863 maternal deaths were reported and analyzed for description. Of those died from direct causes and who had one type of Delay, either the First Delay or the Second Delay, 434 cases were involved in bivariate analysis.

Result: More than half of women faced delay in decisions to seek care followed by delay in receiving appropriate care at health facilities and delay in reaching health facilities. Majority of mothers were 35-39 years. Only one fourth of them had higher level of education. More than half of the women had no income generating work and 82% lived in rural area. Although more than half of the mothers had received antenatal care one to four times, the majority of deceased mothers' first contacts were unskilled providers. Most of the mothers died during post-partum period due to direct causes. Although majority of mothers lived within 5 miles from health centre and could reach health center within 1 hour, nearly half of them took 1 to 2 hours or more to reach the nearest hospital. Bivariate analysis showed that among accessibility variables; duration to reach health centre and duration to reach hospital have significant negative association on the First Delay and positive association on Second Delay of maternal mortality ($p<0.05$ and $p<0.01$ respectively).

Conclusion: There was considerable gap in accessibility to adequate management of obstetric emergencies. Majority of mothers experienced the First Delay followed by the Third Delay and the Second Delay. Travel distance and travel time were actual obstacles that may have influence on the First Delay and the Second Delay of maternal mortality. Community support group should be formed to accelerate the maternal emergency referral process and transportation. Further studies are needed to explore factors contributing to the First delay such as recognition of obstetric complications, knowledge and attitude about maternal health care seeking and perception of local community on hospital care and quality of care. Need assessment should be conducted to determine the availability, utilization and quality of Emergency Obstetric Care services in existing hospitals and health centers (UHC/RHC). A comprehensive strategy for birth preparedness and complication readiness should be developed and implemented to reduce the delays related to maternal mortality.

Keywords: Three Delays of Maternal mortality, Socio-demographic characteristics, Accessibility factors

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INTRODUCTION

Globally every year about 289,000 women die as a result of pregnancy or childbirth and about 68,000 maternal deaths were in Southeast Asia [1]. Nearly two-thirds of maternal death worldwide are caused by direct causes such as haemorrhage, obstructed labour, eclampsia, sepsis and complications of unsafe abortion [2].

In addition, haemorrhage is the leading cause of death, probably indicative of delays in attaining emergency obstetric care. Hypertensive disorders contribute to about one in every six maternal deaths [3]. Nevertheless these causes are no longer cause of

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maternal death in developed countries. Delay in receiving timely and appropriate care during obstetrics emergency condition is a major contributor of maternal mortality in developing countries [4].

Thaddeus and Maine [5] proposed Three Delays Model that the social factors accountable for maternal mortality as three phases of delay from the beginning of maternal complication to receiving the appropriate treatment. The basic premise of the model is that there are three phases of delays that interrupt a woman from receiving appropriate maternal health care and become the pertinent factors contributing to maternal death. First Delay is delay in decisions to seek care by pregnant women, their husbands, or other decision makers in their families; Second Delay is delay in arriving at a health facility after a decision is made to seek care; and Third Delay is delay in receiving appropriate care after arriving at the health facility.

These Three Delays can occur at each level and the First Delay and Second Delay could directly related to the issue of accessibility, encompassing factors in the family and the community, including transportation. The Third Delay, delay in receiving care at health facilities, relates to quality of care and other factors in the health facility. Low socio-economic status of women, illiteracy and residing in the rural areas may be the main factors answerable for delays in decision and reaching to facility during delivery. Safe motherhood program could not be achieved if the program interventions didn't address on Three Delays [2]. Because maternal mortality is not only due to medical causes but also due to the underlying social causes which create delays to get timely and appropriate interventions [6].

The maternal mortality ratio (MMR) of Myanmar was estimated as 580 deaths per 100,000 live births in 1990 and 360 in 2000 by WHO, UNICEF and UNFPA [7]. In 2004-2005, there were 316 maternal deaths for every 100,000 live births found in the Nationwide Cause-Specific Maternal Mortality Survey (NCSMMS) [8] and the UN estimated that MMR as 200 per 100,000 live births in the year 2010 [7] . Reaching the national MDG5 target of a MMR less than 145 per 100,000 live births by the year 2015 remains an on-going challenge [7]. Because the annual rate of decline of MMR for Indonesia, Philippines and Myanmar are notably slow among Southeast Asia regional countries [3]. The underlying factors regarding Delays of maternal mortality is needed to find out to get the strategies for reduction of maternal mortality.

Although proper antenatal care and safe delivery can prevent maternal deaths, there are many factors that make high maternal mortality ratio and proportion of pregnant women who are inaccessible to proper care. Myanmar women face Three major Delays to seek medical care for reproductive health and deliveries. These are common and reflect the vicious cycle of poverty, inadequate transportation, infrastructure in remote areas, and lack of quality care [9]. According to the maternal death review by verbal autopsy during the year 2011 from January to August, among 211 maternal death, First Delay, constituted in 73.5% of maternal deaths and 8.5% of them were related to Second Delay. Nearly one third of respondents (34.1%) complained about delay in receiving adequate care contributes to their cases, Third Delay. In this report, some maternal death cases had more than one type of delay [10]. It is necessary to explore the factors contributed to Delays of maternal mortality which can be avoidable or remediable. Answering the important questions about why women die during pregnancy and childbirth will assist as good input for maternal mortality reduction strategies.

The objectives of this study are to describe the Three Delays of maternal mortality; the First Delay: delay in decision to seek care, the Second Delay: delay in reaching health facility and the Third Delay: delay in receiving appropriate care at health facility and to identify the socio-demographic characteristics and accessibility factors that are contributed to Delays of maternal mortality.

METHODOLOGY

This study used secondary data from reported maternal death review by community-based verbal autopsy method. Maternal death review is intended to discover the medical causes of death as well as the personal, family and/or community factors that may have contributed to the deaths of women from 330 Townships of respective States and Regions. It covers maternal deaths which occurred either inside or outside the medical facilities.

Township Health department has responsibility to find out maternal mortality by monthly basis. When a case of maternal death had been happened, township maternal death review team which consists of Township Medical Officer (TMO), Township Health Nurse (THN), Township Health Officer (THO) and/or maternal and child health (MCH) medical officer have to conduct maternal death review. Informed oral consent was received from respondents after explaining the purpose of which is to identify the basic problems in local context, to design the action plan for prevention of maternal death in the future. The findings from maternal death review are reported to the central office of MCH section, Department of Health, through the respective states and regional health departments.

Table 1 Distribution of socio-demographic characteristics of women

Characteristics	Number	Percent
Age group (years) (N=843*)		
15-20	48	5.7
20-24	158	18.7
25-29	144	17
30-34	189	22.4
35-39	197	23.4
≥ 40	107	12.7
Education of women (N=749*)		
No formal education	132	17.6
Primary education	436	58.2
Secondary education and above	181	24.2
Occupation (N= 724*)		
Dependent mothers	412	57
Working mothers	312	43
Residence (N= 816*)		
Rural	668	82
Urban	148	18

* = Different from total sample due to missing values

The maternal death review form consists of information on socio-demographic, medical history, past and present obstetric history, history of illness, signs and symptoms, treatments at various level, referral and narrative history of circumstances before death. In that data, Delays of maternal mortality, the First Delay, the Second Delay and the Third Delay, had been categorized by responsible persons from respective states and regional health departments. This categorization was based on the history of the deceased mothers narrated by the respondents such as family members or traditional birth attendants or neighbours. For example, the First Delay, delay in decision making, was determined from the moment they realized that there were maternal complications until the decisions to seek care were made.

There were 863 reported maternal death cases from January 2013 to December 2013.

RESULTS

Table 1 presents frequency and percent distribution of socio-demographic characteristics of maternal death cases. The majority of mothers who died were 35 to 39 years followed by 30 to 34 years. The deceased mothers' age ranged from 15-47 years, with the median age of 31 years and a standard deviation of 7.3 years. More than half of the women had received primary education. Only one fourth of them (24.2%) had higher level of education, secondary education and above. More than half of the women were not involved in income generating work, dependent mothers. Majority of maternal death cases (82%) were rural residents.

Among the deceased mothers whose respondents gave history about ante-natal care (ANC) (779 cases), more than half of the mothers (66%) had received ANC one to four times, but 17% of mothers did not take ANC. Majority of mothers (67.7%) received 2 doses of tetanus toxoid immunization. Nearly one third of the maternal mortality cases were primigravida, they died at the first time of their pregnancy. About 47.6% of deceased mothers are multigravida, they died between second and fourth times of their pregnancy. Grand multigravida mothers contribute to 23.4% of maternal death cases.

Nearly half of maternal mortality cases (48.9%) died in the post natal period, 26.3% died during delivery. One fourth of the cases died during antenatal period, prior to delivery. Out of 206 maternal death cases that died during delivery, majority of cases (60.5%) were delivered by unskilled attendants, traditional birth attendants and auxiliary midwives. Among deceased mothers whose respondents gave history about the place of death (820 cases), half of the pregnant mothers (52%) died at the hospital and 32% died at home. A few of them (16%) died on their way to health facility.

Direct causes were contributed to 79% of maternal deaths and the remaining 21% were due to indirect causes (Figure 1). The three most frequent causes are haemorrhage (45%) (ante-partum 7.5% and post-partum 37.5%) followed by eclampsia (23.2%), 11.3% of mortality were due to abortion related causes and 8.4% were due to septicaemia (Figure 2).

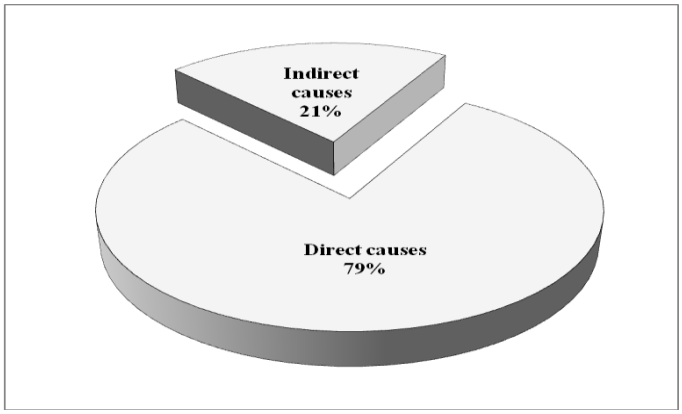

Figure 1 Distribution of maternal deaths by cause of death

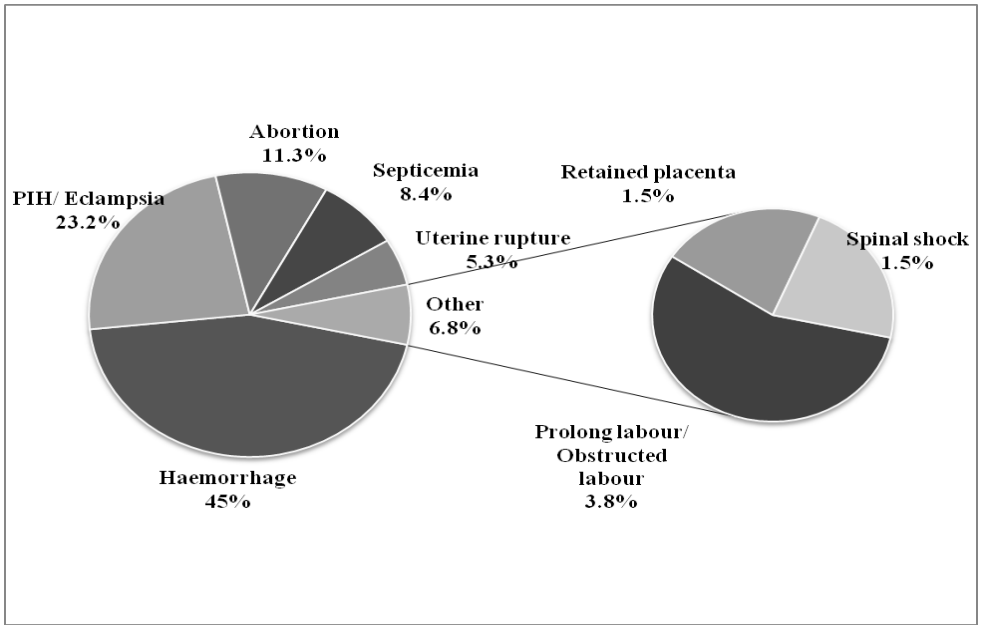

Figure 2 Distribution of maternal death by direct causes

In this study, distance between the house of women and nearest health facility and travel time to reach health facility are used to measure as proxy indicators for accessibility to services. Based on the availability of services of basic emergency obstetric care and comprehensive emergency obstetric care, two types of health facilities are considered; nearest health centre, urban health centre/ rural health centre (UHC/RHC) and nearest public hospital. Because of limitation of data, some variables such as distance from health center (UHC/RHC) and distance from hospital have large number of missing values and therefore those missing values are considered as one group, distance not known, in this study.

Most of the deceased mothers (73.5%) lived within 5 miles distance from health centre, urban health centre/ rural health centre (UHC/ RHC). Only (9.7%) lived more than 5 miles distance from health centre. Most of mothers (74%) could reach health center within 1 hour. One fifth of the deceased women (21%) took 1 to 2 hours to reach nearest health center and 5% of them took more than 2 hours to reach nearest health centre (UHC/ RHC).

Residences of 43.5% of women were situated within 5 miles distance from the nearest hospital. Nearly the same number of women (41.1%) lived more than 5 miles distance from the nearest hospital. Although, half of the women (51%) could reach the nearest hospital within 1 hour, the rest of them took 1 to 2 hours onwards to reach the nearest hospital (Table 2).

Three types of Delays were categorized according to the history of circumstances narrated by respondents who were knowledgeable about the events before deaths of women such as family members, neighbours or traditional birth attendants.

Table 2 Distribution of accessibility to health facilities

Characteristics	Number	Percent
Distance to UHC/ RHC		
0 - 5 miles	634	73.5
Above 5 miles	84	9.7
Distance not known	145	16.8
Total	863	100.0
Duration to UHC/RHC		
0 - 60 minutes	608	73.8
61 - 120 minutes	172	20.9
More than 120 minutes	44	5.3
Total	824*	100.0
Distance to hospital		
0 - 5 miles	375	43.5
Above 5 miles	355	41.1
Distance not known	133	15.4
Total	863	100.0
Duration to hospital		
0 - 60 minutes	422	51.1
61 - 120 minutes	249	30.2
More than 120 minutes	154	18.7
Total	825*	100.0

* = Different from total sample due to missing values

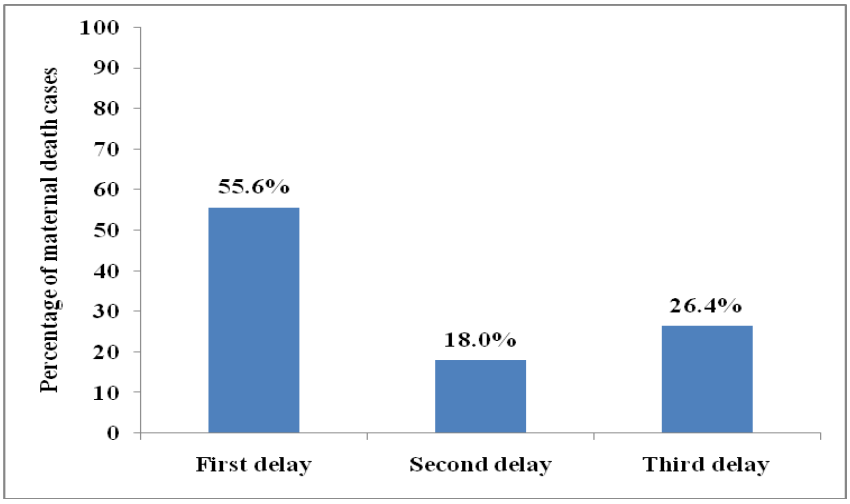

Figure 3 Distributions of three delays experienced by maternal death cases

Out of 863 maternal death cases, only 760 (88.1%) of the respondents gave the history of events. In this study, the First Delay, Delay in decision making to seek care was found in 55.6% of deaths and 26.4% of respondents gave their opinions that their women were died due to delay in receiving appropriate care after arriving health facilities. The Second Delay which is delay in reaching health facility was found in 18% of maternal death cases (Figure 3).

According to the Thaddeus and Maine's Three Delays Model, it is mainly focuses on the gap between onset of complications and timely adequate treatment for obstetric complications. Based on that facts and availability of information from community based maternal death review, this study identify the contributing factors to the First Delay and Second Delay of those cases who died from direct causes (434 cases). Because of limitation of data, some variables such as distance from health center (UHC/RHC) and distance from hospital have large number of missing values. Therefore missing values are considered as one group in analysis of Chi-square.

Statistically significant association between accessibility to health services and the First and Second Delay of maternal deaths were found in this study. Among those who faced the First Delay, majority of them (78.2%) lived within 5 miles distance from the nearest health center (UHC/RHC) and some of them lived far away from health centre,

Table 3 Relationship between accessibility factors and delays of maternal mortality

Accessibility factors	First delay (N)	Second delay (N)
Distance from UHC/RHC (N=434)		
χ^2 = 7.7994, p = 0.020		
0-5 miles	78.2 (255)	21.8 (71)
Above 5 miles	64.1 (41)	35.9 (23)
Distance not known	65.9 (29)	34.1 (15)
Duration to reach UHC/RHC (N=434)		
χ^2 = 8.9597, p = 0.030		
0-60 minutes	78.8 (242)	21.2 (65)
61-120 minutes	65.1 (56)	34.9 (30)
More than 120 minutes	66.7 (26)	33.3 (13)
Distance from hospital (N=434)		
χ^2 = 8.4539, p = 0.015		
0-5 miles	82.4 (140)	17.6 (30)
Above 5 miles	70.5 (158)	29.5 (66)
Distance not known	67.5 (27)	32.5 (13)
Duration to reach hospital (N=434)		
χ^2 = 15.8050, p = 0.001		
0-60 minutes	82.7 (153)	17.3 (32)
61-120 minutes	74.8 (101)	25.2 (34)
More than 120 minutes	62.5 (70)	37.5 (42)

more than 5 miles. Majority of maternal death cases who faced the Second Delay (35.9%) lived more than 5 miles from the nearest health center. Distance between residence and health center (UHC/RHC) showed statistically significant association with the First and Second Delays of maternal mortality.

Mothers who could reach nearest health center (UHC/RHC) within 1 hour had higher percentage of the First Delay (78.8%) followed by mothers who could reach more than 2 hours (66.7%). One third of them who faced the Second Delay (35%) took 1 hour to 2 hours to reach the nearest health centre and (33.3%) took more than 2 hours to reach there. The differences in the First Delay and the Second Delay of maternal mortality among groups are significant ($p<0.05$).

Higher percentage of the First Delay (82.3%) is found in mothers who lived within 5 miles from hospital followed by those who lived more than 5 miles distance from hospital (70.5%). Nearly one third of mothers who faced the Second Delay lived more than 5 miles from hospital. There were some cases whose respondents could not mention about distance contributed in (32.5%) of the Second Delay. Distance to reach the nearest hospital showed statistically significant association with delay in decision to seek care and delay in reaching health facility [Table 3].

Mothers who could reach nearest hospital within 1 hour had higher percentage of the First Delay (82.7%) followed by mothers who could reach hospital within 1 hour to 2 hours (74.8%). Most of the cases with the Second Delay took more than 2 hours to reach the nearest hospital. The differences in the First Delay and the Second Delay of maternal mortality among groups were significant ($p<0.01$).

The delay in decision making to seek care was higher among the women age 35-39 years, mothers with primary education and those who were not involved in income-generating work. The delay in reaching health facility found in maternal mortality cases lived in rural area compare to those lived in urban. However, socio-demographic characteristics showed no significant findings (Table 3).

DISCUSSION

This study based on the Three Delays Model of maternal mortality which showed that maternal mortality is not only due to obstetric causes but also due to complex social factors which make them delay to get timely and appropriate care and consequently increase the possibility of dying after an obstetric complication develops. These three types of Delays are not independent and there might have more than one type of delay in maternal death cases. A retrospective study conducted in civil hospital, Karachi found that 94% of maternal death cases presented one or more delays [4]. Similarly, a study conducted in Malawi found that among 32 maternal death cases, 13 cases (41%) had more than one type of delays [11].

Delay in decision to seek care is one of the important contributing factors for accessibility to emergency obstetric care. This study results showed that more than half of maternal mortality cases had

history of delay in decision making to seek care at proper health facility. This was similar with the findings of study in Kassala State of Easten Sudan, 73.4% of cases had delay in decision to seek care because of waiting for decision maker, poor and no nearby health facility [12] and cross-sectional prospective study on maternal near miss and mortality conducted in Pakistan [13]. There may have some reasons for delay in decision to seek care such as poor recognition of obstetric emergency complications, economic status, and knowledge and attitude about the use of health facility. Moreover, decision making is a complex behavior related to perception of needs and health seeking behavior is also related with the illness perceived by the individuals [5].

In this study, one fourth of the cases were reported about delay in receiving adequate care at health facility. However, it is limitation of community based data to assess the relevant factors for quality of care at health facilities such as adequacy of supplies and equipments, trained personnel and competence of available personnel. Poor quality of services in turn influence on decision to seek care and under such circumstances, it makes sense that people's decision of not to use health facility [5].

The Second Delay was found in 18% of maternal death cases and it showed that there were obstacles in accessibility to health facilities which might be influenced by distribution of health facilities, distance, transport and costs. However, in this study, maternal death review could not cover the detail information of means of transportation, transportation cost and condition of roads. The obstacles in reaching health facility may act as a disincentive to seek care and influence on people's decision making to seek care [5].

Bivariate analysis found that accessibility variables; distance form UHC/RHC, duration to reach UHC/RHC, distance from hospital and duration to reach hospital showed significant differences in maternal death cases with the First Delay and the Second Delay. Majority of maternal deaths were from rural areas and therefore distance and time taken to reach the nearest health centre and hospital showed significant association with the First Delay and the Second Delay. In some setting, there are not sufficient conditions to give adequate care for emergency obstetric complications at health centre and they have been referred to well-equipped hospitals. Therefore, it made their travelling time prolong to reach the health facilities. There may have some other factors that influence on the First Delay such as recognition of obstetric complications, perceived severity, women's status, economic status of family, cultural factors, perception of local community on hospital care and quality of care. Obstacles in transportation and poor quality of care at the nearest health facility could influence the decision to seek care.

In this study, elder age groups (35-39 years) and (30-34 years) were found in large portion of maternal death cases. This finding was consistent with the findings from the study conducted in rural India of being age of 30-35 years and more than 35 years old mothers carried a higher risk of maternal death [14]. The majority of maternal death cases in this study were low socio-economic status women. Education level of deceased mothers showed that only one fourth of them had high level of education, secondary level and above. More than half of cases (57%) were not engaged in income generating work. Majority of maternal deaths (82%) occurred in the rural areas. Generally, high level of mother's education leads to more exposure to information about pregnancy and delivery care, danger signs and birth preparedness for themselves. A study in Thailand showed that mothers who had high education seek health care services significantly for delivery and postpartum complications [15]. Similarly, a study in Bangladesh found that women who had no formal education were three times more likely to die during pregnancy and child birth than those who had eight or more years of education [16].

Majority of cases received ANC which showed that ANC coverage was good. Nevertheless, this study was based on Three Delays Model which did not concentrate on primary prevention or early detection of pregnancy complications during ANC. The concept of Delays means between the onset of a complication and its adequate treatment and maternal outcome [17].

Direct causes contributed to majority of maternal death cases and it was the same as in South East Asia regional countries [3]. In most of the developing countries, common direct causes of maternal death were haemorrhage, hypertensive disorder, abortion and sepsis. In this study, it was the same as previous (NCSMMS) conducted in Myanmar [8]. These findings provide strong support for prioritization of strategies that should focus on emergency obstetric complications and timely access to adequate emergency obstetric care.

CONCLUSION

There was considerable gap in accessibility to adequate management of obstetric emergencies. Travel distance and travel time were actual obstacles that prevent mothers from reaching the health

facility. Although the travel distance can be measured as a straight line between two points (the house and the health facility), the nature of terrain and the condition of the roads often make the travel time to be longer and it needs specific means of transportation which will cost more. Consequently, the obstacles in reaching health facility may act as a disincentive to seek care and influence on people's decision making to seek care.

Provision of health services alone could not achieve to reduce MMR. Further qualitative studies are needed to explore the factors attributed to the First Delay such as recognition of danger signs, knowledge and attitude about seeking maternal health care, woman's status, economic status of family, cultural factors, perception of local community on hospital care and quality of care. Inadequacies within the health care system contribute to Third Delay, and conversely affecting the decision to seek care which is leading to maternal deaths. Therefore, nationwide need assessment for emergency obstetric care should be conducted to determine the availability, utilization and quality of EmOC services in existing hospitals and health centers (UHC/RHC). Because it would be useless to smooth the progress of accessibility to health facilities if they are not adequately well-staffed, well-equipped and providing poor quality care. Increase access to information to women and also directed to male involvement and family preparedness for possible emergencies during pregnancy and childbirth should be promoted through effective advocacy and Behavior Change Communication campaign. This study found that distance and travelling time to reach health facilities showed significant relationship with delay in decision to seek care and delay in reaching health facilities. Community support group should be formed to accelerate the maternal emergency referral process and transportation.

To reduce all Three Delays, a comprehensive strategy of "birth preparedness and complication readiness" should be developed and strengthened. It is needed to encourage institutional delivery or at least skilled person should assist at the time of delivery. As Delay in receiving adequate care at health facility is found to be second common delay, both skills of health care providers and availability of EmOC equipments should be high priority. It is recommended to improve quality of EmOC through training of health care personnel at different levels in life saving skills for their level and providing health facilities with necessary equipment, medical supplies and drugs.

This study focused only on the First and the Second Delay of the Three Delays Model since the information from maternal death review form was limited regarding assessment for quality of care which is related to the Third Delay. However, reaching a health facility does not necessarily mean the end of health seeking process. It would be useless to facilitate accessibility to health facilities if they are not adequately well-staffed, well-equipped and not providing good quality care. Unless the Third Delay is addressed, no safe motherhood program can succeed [2].

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