Orginal Article

Maternal mortality in hilly districts of Nepal

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Abstract

Background: Maternal mortality is a vital indicator and exhibits great disparity between developed and developing countries. The challenging nature of measuring maternal mortality has made it necessary to perform an action-oriented means of gathering information on where, how and why deaths are occurring; what kinds of action are needed and have been taken. A maternal death review is an in-depth investigation of the causes and circumstances surrounding maternal deaths. The objectives of the present study are to describe the socio-cultural and health service factors associated with maternal deaths in rural hill districts of Nepal.

Methods: We reviewed 33 maternal deaths of women who tried to reach or reached health care services in three remote districts of Nepal, namely Baglung, Dolakha and Ramechhap. A verbal autopsy technique was applied for 33 of the cases. Individuals who had witnessed any stage during the process leading to death were interviewed. Health care staffs who participated in the provision of care to the deceased were also interviewed. All interviews were tape recorded and analyzed using a grounded theory approach. The standard WHO definition of maternal deaths was used.

Results: The socioeconomic background of the cases including caste, ethnicity, geography, direct cause of death, place of death and care givers during delivery were included to analyze each cases. The following items evolved as important: underestimation of the severity of the complication, lack of family support, lack of transportation, prolonged transportation, seeking care at more than one medical facility and delay in receiving prompt, lack of money for transportation and health service, delay in reaching an appropriate medical facility, and lack of appropriate care after reaching the hospital.

Conclusion: Women in rural hill area faces variety of problems to access to care for obstetric emergencies, hence maternal mortality is prevalent among poor women. Lack of awareness and family support on safe birth preparedness, danger signs of pregnancy, delivery and post natal period, disorganized health care with lack of referral and support for transport and health service networking prompt response to emergencies with quality care are major factors contributing to a continued high mortality rate.

Background

The Tenth Revision of the International Classification of Diseases (ICD-10) defines a maternal death as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes. [1]

Maternal mortality remains unacceptably high across much of the developing world. Fully achieving the Goal 5 target of reducing it by three quarters, between 1990 and 2015, the maternal mortality ratio remains a challenging task. It is the area of least progress among all the Millennium development goals. Estimates for 2005 show that, every minute, a woman dies of complications related to pregnancy and childbirth. This adds up to more than 500,000 women annually from complications during pregnancy, childbirth, or the

postpartum period. Almost all of these women (99 %) live and die in developing countries. Nearly all of these deaths occur in developing countries, where fertility rates are higher and a woman's life time risk of dying during pregnancy and childbirth is over 400 times higher than in developed countries.[2]

The main direct causes of maternal death are severe bleeding, unsafe abortion, infection, eclampsia, and obstructed labor; the indirect causes include anemia, malaria, heart disease, and HIV. Pregnancy complications are the main cause of death for women aged 15-19. High maternal mortality rates in many countries result from poor reproductive health care, including not having access to skilled care during pregnancy and childbirth and access to safe abortion even where it is legal, especially for the poorest women. Risks of poor outcomes during pregnancy and childbirth are exacerbated by poverty, low status of women, lack of education, poor nutrition, heavy workloads and violence. [3]

Maternal mortality is difficult to measure for both conceptual and practical reasons. Maternal deaths are hard to identify precisely because this requires information about deaths among women of reproductive age, pregnancy status at or near the time of death, and the medical cause of death. [1]

The challenging nature of measuring maternal mortality necessitates to perform an action-oriented means of gathering information on where, how and why deaths are occurring; what kinds of action are needed and have been taken.[5] Assessing the impact of preventive measures demands exact knowledge about how many lives were saved. Often the search for the cause of death is not so simple. Death may occur as a result of a series of interconnected events rather than one single factor and identifying them thus requires a systematic review of each maternal death. A maternal death review is an in-depth investigation of the causes and circumstances surrounding maternal deaths such as problems in accessing care, mismanagement and inadequate routines.[6] The maternal mortality ratio is too high in Nepal as about 281 Nepali women per 100,000 live births die of complications during childbirth. This means on average, one woman dies from the complications related to childbirth every four hours. In order to reach the Millennium Development Goal of reducing maternal mortality, women's access to good quality health care embedded in a human rights framework is an important factor. Access to emergency obstetric care and better social status of women are two elements that may contribute significantly towards this goal. Skilled birth attendance is a key strategy for reducing maternal mortality as only 19 percent of women in Nepal are delivered by skilled birth attendants.[7]

Study Area

The research work has been carried out mainly in the three districts carefully selected to ensure that they reflect the overall problem areas and offer insights to the issues raised by this research. These districts are mostly mountainous regions where access has historically been very limited and the communities have had little exposure to external health services. The districts have relatively high mortality rates, which contribute to an overall high rate for the country. The districts have a significant proportion of poor communities; most people are from disadvantaged communities and the level of women's empowerment is still poor. They are undergoing a transformation process, which has started but is not yet complete, and therefore offer opportunities for maternal health improvement in the near future. They are also well known to the research team, enabling access to more detailed and accurate information from households. All are hill districts with the required level of road access and all have poor and disadvantaged groups within the community. Mothers in the districts have access to nearby referral hospital with the highest emergency obstetric care. Rural population in the district also has easy access to District Headquarters and to other settlements connecting community levels of health facilities.

Dolakha: It is located in the mid-hills and extends to high Himalayas. It has an area of 2,191sq km and a total population of 204,229. Despite its proximity to the capital of the country, it has high poverty incidence accompanied by a poor food security record. The overall literacy rate is 69.6%.

Ramechhap: It is located in the mid-hills and has an area of 1,546 sq km. It has a total population of 212,408 and has a high poverty incidence. The overall literacy rate is 56.6%.

Baglung: It is situated in the mid-hills. The area is 1,784 sq km and the population is 268,937. Overall literacy is higher than the other districts at 84%. Although the district centre is linked to the strategic road network and is easily accessible from the main regional centre, Pokhara, access is not easy for the interior of the district.[8]

Model

We used the standard WHO definition of maternal death.[1] Similar to most health problems, causes of maternal death can be viewed either narrowly or broadly. A broad view would take into account individual, community and health service factors that contributed to the deaths, not merely the medical cause. The "Three phases of Delay Model" was chosen to classify factors associated with the maternal deaths in the present study. [9] Delays in making decision

for health care are prominent factors contributing to maternal deaths. Lack of care can be related to three factors: a delay in making the decision to seek care when complications develop; a delay in reaching obstetric medical facility once the decision to seek care has been made or delay in receiving adequate and appropriate care once a medical facility has been reached.

Delay in the decision to seek medical care may be influenced by various factors such as the factors involved in decision-making process, illness characteristics and experience with the health system or distance to the health facility. Delay in reaching an appropriate medical facility is affected by the distribution of health facilities, availability of transportation, road conditions or cost of transportation. Delay in receiving adequate and appropriate care once the facility is reached is mainly due to operational difficulties in the health care delivery system. Such inadequacies may be characterized by shortages in supplies and equipments, lack of trained personnel, incompetence of the available staff or uncoordinated emergency services. The delay model helps to identify community and health services factors contributing to maternal deaths and as such it is useful in devising interventions and strategies for preventive measures.

Rationale of study

The model is based on Maternal Mortality and Morbidity Study, carried out in 1998 as it is the most recent detailed study of conditions surrounding maternal death in Nepal. It covers three districts and 132 maternal deaths. In this study, it was found that twenty one percent of all deaths among women of reproductive age were due to pregnancy related causes. Of these, seventy percent was due to obstetric emergencies. Nearly half of all maternal deaths were caused by postpartum hemorrhage followed by obstructed labor, preeclampsia and puerperal sepsis.[10.] Many of those deaths are direct consequences of under utilization of maternal health services and low quality of care, especially in remote areas. The reasons for such high maternal mortality ratio are difficult weather conditions and scarcity of roads. These challenges in the delivery of maternal health services are compounded by widespread poverty and lack of adequately trained human resources.

These deaths could be prevented if women had access to good quality emergency obstetric care services. However, the utilization of emergency obstetric care services in Nepal is extremely low at only five percent, reflecting huge unmet need. [11] Location of most maternal deaths in Nepal reflects the fact that most births take place at home and families do not have the capacity to react effectively to an emergency. The maternal Mortality and Morbidity Study found that most deaths occurred at home (68%) with 11 % on the way to a health facility (primary health care center, hospital or private clinic) and 21 % occurring in one of these health facilities. [10]

Maternal health issues are more critical and services more absent in poorer areas, leading to higher rates of maternal death. [12.] Nepal is a predominantly mountainous country bordered by China in the north and by India at the other borders. These regions differ significantly in their ethnic composition, population density and harshness of terrain. Nepal essentially has a large rural population with 84.7% people living in rural areas. Overall poverty in Nepal is around 31% (2003/04), which has reduced from 42% in 1995/96. Incidence of poverty is generally spread throughout the country, but there are discernible pockets in certain regions of the country where it is more severe. These areas are often characterized by a) their remoteness from road heads; b) severity of climatic and geographic conditions and c) larger concentration of 'dalits' (so called lower castes) and disadvantaged communities. Poverty and the maternal health issues are inextricably linked in a multicultural and ethnically diverse country as Nepal.

The main objectives are to find out the maternal death cases in study districts during last three years and to find out the factors associated with maternal death including medical causes (direct causes) and access barriers for emergency obstetric care.

Materials and Methods

Ethical approval: Before start up of the study objectives and process of the study were shared with all local governance authority and health facility in-charges. Verbal consent was taken from each participant of the study.

Data Collection: The main bulk of maternal mortality studies in the three study districts cover about 24 VDCs of Baglung, Ramechhap and Dolakha districts of Nepal between December 2005 to February 2006.[12] In the chosen time period, cases of maternal deaths were identified by using different community and health facility case finding strategies. The District hospital, Health post, Sub-Health Post (SHP) and Primary Health Care Center (PHCC) of study districts and Village Development Committees (VDC) were visited and health workers were interviewed. Key informant interview was conducted with health care staff (total 44 from 20 health facility) who participated in the provision of care and referral of the deceased. Other people interviewed were the community members and neighbors of the family (Table 1) In the Community, verbal autopsy technique was

Table 1. Health facilities visited

District	VDC/municipality	Type of Health Facility	Total Health facility
Dolakha	4 VDCs	Sub Health Post	4
	Jiri	District Hospital	1
	PHECT hospital Charikot	NGO hospital	1
	Fasko	Health Post	1
	Helmenth project	Research project working for 11 years	1
	Charikot	Primary Health Care Centre	1
Ramechhap	Manthali	Primary Health Care Centre	1
	Bamti	Health Post	1
	Sangutar	Health Post	1
	Tilpung	Sub Health Post	1
	Nagdaha	Sub Health Post	1
	Manthali	NGO based health clinic	1
	Ramechhap	District hospital	1
Baglung	Malma	Sub Health Post	1
	Bhurtibhang	Primary Health Care Centre	1
	Kushmishera	Primary Health Care Centre	1
	Baglung Municipality	District hospital	1
		Total	**20**

performed for the women who died.[13] In group interviews, whole family, Community members, Female Community Health Volunteers (FCHV), Trained Birth Attendants (TBA) numbering 128 from 10 VDC covering 77 wards of the study area participated in revealing their versions of the context of death by giving a verbatim account on final illness leading to death. Specific issues such as the time taken to decide to seek care; places where care was sought; financial constraints; cultural factors influencing care seeking process; means of transportation and time to reach a medical facility were explored and recorded.

Analysis: The analysis aim to identify the various circumstances that contributed to the deaths; this involved family support, economic status, gender dimension, decision making process of health care seeking, transportation to visit health facilities where maternal health services were available in the districts. All in-depth interviews and group interview were tape recorded and transcribed in full text. The transcribed material was categorized and analyzed by using a grounded theory. Grounded theory is an interview text analysis method utilized for qualitative studies in the health sector, where the basis for the analysis is not a theoretical model per se, but the focus is rather on identified items of relevance to the studied topic.[14] Interpretation of the findings with a view to provide possible and plausible explanations was then performed.

Results

Altogether 33 cases of Maternal Mortality were reported from the three study districts during the last three years. There were 11 cases in Dolakha, 10 in Ramechhap and 12 in Baglung. The cases were all from the past three years. Maternal death case studies were collected using the verbal autopsy method. In four cases there was more than one cause of death. (Table 2)

Table 2. Maternal death case studies by cause of death

Symptoms / causes of death	Number of cases
Post delivery bleeding (PPH)	14 (multiple)
Retained placenta (PPH)	15 (multiple)
Post delivery infection (sepsis)	2
Obstructed labour (breech or transverse lie)	2
Others (Jaundice, PET)	4
TOTAL	**37 (includes multiple causes of death)**

Access barriers: Maternal death depends on multiple factors that are complex and interlinked (Table 3).

The respondents were asked as to what they thought was the main cause of death in terms of limited access. Poverty was the overwhelming response although it had broad definition. Eight respondents specifically mentioned lack of transport while distance was also a factor. Overall, mobility seems to have a significant effect on maternal mortality.

Table 3: Main access barriers and maternal mortality

Main access barrier	Maternal death cases
Cost of transport and/ or health service	13
Lack of transport services	8
Distance to health facility	4
Lack of family and community support	4
No health worker available	4
Total	**33**

Birth attendants: Case studies show that many births were not attended by a trained person. (Table 4) In two mortalities, retired peon of the health centre facilitated delivery. This had become common practice as there were no midwives or care givers in the vicinity. Although the sample size is small, it illustrates the necessity for trained personnel to be present when complications develop during birth.

Table 4: Birth attendants and maternal mortality

Type of Birth attendant	Maternal death Cases
Data not available	10
Relatives	11
FCHV	4
Husband	2
TBA	2
Retired peon of HP	2
MCHW / ANM	2
Total	**33**

Poverty: Caste / Ethnicity: Caste and ethnicity distribution of the deceased revealed eight to be from the 'Upper Caste' (Bramin/Chhetri/Newar), eight from disadvantaged (Hill Janjati) and thirteen from poor and socially suppressed groups (Dalit). Caste and ethnicity was not identified in four out of thirty amongst whom there was 3 maternal mortalities

The 'dalits' are more vulnerable when it comes to giving birth in remote areas. People from dalit and janajati communities are categorized as 'Disadvantaged group' because most of them lack opportunities in education, income generation and mobility. Hence they are compelled to practice traditional unsafe delivery. In one instance, the mother could not ask her neighbor for help as the neighbor was from a higher caste. Potentially this could be a problem with the health workers if they belong to a higher caste, although this was not specifically reported.

Gender and other Social and economic factors

During group discussions, barriers to the use of transport services were discovered. They were:

- Expensive travel fares or carrying charge (doko / stretcher)
- Lack of bridge to cross river during monsoon
- Health care facilities being too far (death on the way) and intermediate means of transport (doko etc.) being too time-consuming to reach health care facilities during emergency.
- Strikes due to political conflict.
- Social exclusion due to religious beliefs and castes.
- Delay in managing human resources necessary to carry the patient

Discussion

The first delay can be divided into two elements; delay in recognizing the need for medical care and delay in deciding to seek care. The later is influenced by low socioeconomic status of women, lack of decision making power and their inability to exercise reproductive rights. This is further compounded by lack of faith in the healthcare system and high cost of services. The second delay is related to access to services and in Nepal, it is an important factor given the difficult topography with hills and mountains and the absence of adequate roads and transportation. Organizing such travels further adds to the cost of accessing emergency services. The third delay depends on the functioning of health care facilities providing emergency obstetric care (EmOC) and is related to; the availability of skilled providers, necessary infrastructure, behavior of health workers and the cost of services. Cost is thus a major factor contributing to all three delays.[15] Previous researches had identified decision making process as an important factor in determining maternal mortality; if the decision is left for too long then there is a greater risk of the mother dying on the way or at the health care facility.[10] Postpartum hemorrhage

with retained placenta, obstetric labor, sepsis, preeclampsia and pregnancy with jaundice are direct causes of maternal death as per the verbal autopsy method. In this study the socio cultural, economic factors mostly explored in this study. Maternal death mostly occurred at home (N: 25/33) which are related to first delay factors, six out of 33 died on the way and two died at the health care facility.

There are multiple factors of maternal deaths which is complex and interlinked. The cost of transport and health service, lack of service, distance to health facility, lack of family and community support, family support and lack of skill health worker are major factors contributing to maternal deaths. Out of thirty three deceased, only two families used trained health workers. The dalits are most vulnerable when it comes to giving birth in remote. Other factors were expensive travel fares or carrying charges (doko /stretcher), lack of bridges to cross rivers during monsoon, health facilities being too far, time-consuming intermediate means of transport in an emergency situation. Overall mobility due to delay in managing human resources necessary to carry a patient seems to have significant effect on maternal mortality.

Conclusion

The access barriers are due to low socio economic condition of the family and women's position in the family. Poverty, difficult geography and remoteness are the underlying causes having a strong impact on the socioeconomic condition faced mainly by the disadvantaged groups in the community. Home delivery practices and use of relatives are basically due to poverty, lack of knowledge regarding the gravity of the problem and ignoring the early danger signs, cost of travel and health services and distance to emergency obstetric care services.

Multisectoral approaches to quality maternal health service includes infrastructure (road, transportation, outreach health facilities, bridges, and intermediate means of transport) development and women empowerment programs need to be strengthened to save the mother's life in remote hill villages of Nepal.

The maternal death case studies show that many mothers, who died during childbirth, did so without any trained personnel present. In this study over 60% had only relatives or other non-trained people present during birth, despite having awareness about it. This highlights the need to have a skilled person present if complications develop.

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