

Does Antenatal Care Matter Reducing Maternal Mortality in Nepal?

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Background

Maternal mortality is defined as “the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration or site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental causes” (Maine, 1991).

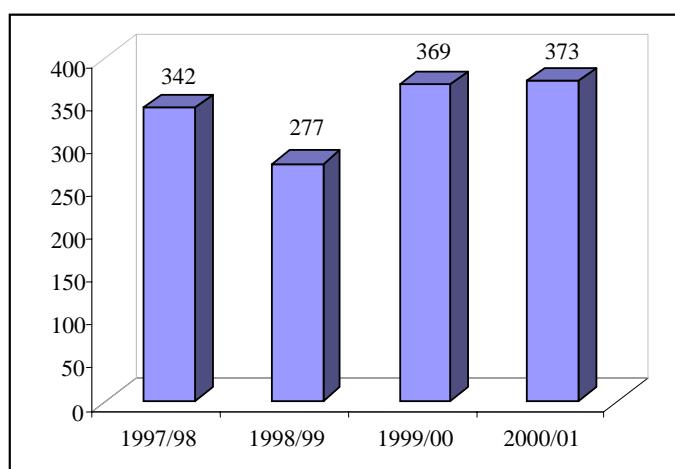
Every year about 515,000 women die worldwide due to obstetric complications. More than 50 percent of these deaths occur in Africa, about 42 percent in Asia, about 4 percent in Latin America and Caribbean and less than 1 percent death occur in the more developed region. Estimated maternal mortality ratio (MMR) in the world is 400/100,000 live births. Maternal mortality ratio (MMR) is highest in Africa (1,000) followed by Asia (280), Oceania (260), Latin America and Caribbean (190), Europe (28) and Northern America (11) (World Health Organization, 1995).

High maternal mortality has been a major public health problem in Nepal. According to 1996 Nepal Family Health Survey (NFHS), MMR is 539 per hundred thousand live births (Family Health Division, 1996). Around three-fourths of the maternal deaths are due to direct obstetric causes, around two-thirds of deaths occur after delivery and about one-third of deaths occur during pregnancy in Nepal. Out of these deaths, more than two-thirds occur in the community. Delay in decision to seek care, delay in reaching care and delay in receiving care are identified as three delays responsible for high maternal deaths in Nepal. The immediate causes of maternal death are identified as, hemorrhage, hypertensive disorder, obstructed labor, eclampsia and

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complication of unsafe abortion (Family Health Division, 1998a). Although information regarding MMR is not available after 1998 (survey has not been conducted), service statistics reveal that the reported maternal death is in increasing trend (as shown in the figure 1). To address these issues, His Majesty's government of Nepal has launched the safe motherhood program as a priority program (Family Health Division, 1998b).

Figure 1
Trend of Reported Maternal Death in Nepal



Source: Department of Health Services, Annual Reports

Antenatal care (ANC) as a part of safe motherhood program

Since the Safe Motherhood Conference in Nairobi, the issue of high maternal mortality drew attention of the world. This attention reinforced to the ICPD conference 1994 to include Safe Motherhood as a component of reproductive health. Nepal as a signatory of the ICPD conference has endorsed the plan of action of International Conference on Population and Development (ICPD) and integrated Safe Motherhood program in primary health care system (Family Health Division, 1998c).

National Health Policy 1991 identified Safe Motherhood as a priority program area and undertook safe motherhood initiative in 1992. National safe motherhood policy strategy was developed and endorsed in 1993 and program was launched initially in 10 districts in Nepal. Now, it has been expanded to 13 districts. Department of Health Services has set its priority to expand safe motherhood program gradually throughout the country (Department of Health Services, 2000). National Safe Motherhood Policy 1998 has identified reduction of maternal/ neonatal mortality as a national objective and includes Safe Motherhood Program (SMP) as a major component of primary health care. Antenatal Care is one of the focused areas of SMP. Other components are delivery care, postpartum care, neonatal care, management of obstetric complications and family planning (Family Health Division, 1998d). Functions of antenatal care are:

- to take the history of pregnant women, to do the physical and laboratory checkup, to monitor the growth and position of fetus and recognize the risk factors and manage the complication,
- to provide health education and counseling for general health, danger signs and referral system,
- to provide iron tablet, Tetanus Toxic (TT) injection and medicine for malaria or other diseases,
- to identify and refer the complicated cases,
- to provide suggestion for regular antenatal checkup (at least 4 times) and skilled and institutional delivery.

Problem

Safe motherhood program was launched in Nepal since 1993 with the objective of reducing maternal death and disability, which occurs due to the complication of pregnancy and childbirth. Major strategies to achieve the objective are to provide essential obstetric care (EOC) and to ensure the skilled attendants at deliveries (Family Health Division, 1998b). However the utilization of antenatal and delivery care in Nepal is very low compared to regional and global level (as shown in

the table 1). Furthermore there is a little increase in the utilization of maternal health services in 2001 compared to 1996 in Nepal (as shown in table 2) but the increase is not impressive.

Table 1: Antenatal and Delivery Care: Worldwide Status

Region	Percentage of Pregnant Women With ANC (2000)	Percentage of delivery by trained personnel (2000)
Sub-Saharan Africa	64	39
Middle East/North Africa	65	67
South Asia	51	35
East Asia/ Pacific	81	66
Latin America/ Caribbean	83	84
CEE/CIS and Baltic States	82	92
Developing Countries	65	53
Least Developed Countries	53	27
Industrialized Countries	98	98
World	70	57
Nepal (2001)	49	13

Source: UNICEF 2001

Demographic and Health Survey (DHS) 2001 reflects that institutional delivery ranges from 4 percent among women with no education to 12 percent among women with primary education, 28 percent among women with some secondary education and 50 percent among women who completed high school or higher level of education. There is also a vast difference of antenatal and delivery care between urban and rural areas. Proportion of antenatal care (ANC) at least once among urban woman is very high (82%) compared to rural women (47%). Urban women who had at least four antenatal checkups tend to use institutional delivery about 5 times (40%) more than those who had less than four antenatal checkups (8%). Half of the pregnant women received antenatal care at least once in 2001 but only about one-seventh (14 %) received adequate antenatal care (4 or more ANCs during her pregnancy period).

Similarly, routine service statistics published by Department of Health Services shows that average number of ANC visit is quite low (1.7) in the year 2000

(Department of Health Services, 2000). Nepal safe motherhood policy advocates for at least four antenatal visits during a pregnancy period and of those all the deliveries to be attended by trained personnel. Table 2 reflects that ANC and delivery attended by health personnel has increased over the period of 1996 to 2001 in some extent but the status is far below the policy level expectation. This reflects the poor situation of ANC services in Nepal. If a quality antenatal care service is provided, most of the home deliveries could be conducted at the health institution, high risk cases are referred to appropriate place on time and complication is reduced with supplementation of nutrition, treatment of diseases and immunization, which would help to prevent maternal death to a great extent.

Table 2: Trend of Maternal Service Utilization in Nepal

Maternal services	NFHS, 1996	NDHS, 2001
<i>Antenatal Care by</i>		
Health Professional	44%	49%
No one (No ANC)	56%	51%
<i>Number of ANC Visit</i>		
None	56%	51%
1	11%	8%
2-3	22%	27%
4+	9%	14%
Don't Know/Missing	2%	.2%
<i>TT injection taken during pregnancy</i>		
None	54%	45%
One Injection	13%	9%
Two or more Injection	33%	45%
<i>Place of Delivery</i>		
Health facility	8%	9%
Home	92%	89%
<i>Delivery assistance</i>		
Health professional	10%	13%
Traditional birth attendant	23%	23%
Relative, Friend, others	56%	55%
No one	11%	9%

Source: Nepal Family Health Survey 1996 and Nepal Demographic and Health Survey 2001

His Majesty's Government, Ministry of Health has set a target of reducing maternal mortality to the level 250 / 100,000 live births from its present level for the second long term health plan 1997-2017. To meet this target a long-term safe motherhood plan 2002-2017 has been prepared. Overall goal of this plan is to reduce maternal and neonatal mortality. To monitor the goal, different indicators have been set such as the percentage of delivery attended by trained health personnel, ANC care by trained health personal, met need of emergency obstetric care (EOC), met need of caesarian section (C/S).

The percentage of delivery conducted by trained health personnel has been planned to increase from 13 percent in 2001 to 40 percent in 2017. Other targets are to increase the institutional delivery from 9 to 22 percent, 4 times ANC visit from 14 to 40 percent, meet need of EOC from 5 to 10 percent and to increase meet need of C/S by 2 each year in Safe Motherhood districts. Guidelines for Monitoring the Availability and Use of Obstetric Services prepared by United Nations Children's Fund, 1997, suggest that out of the total pregnancy in a community, 15 percent are expected to develop complications; all of those should be treated in the EOC facilities. Similarly of those complicated pregnancies, not less than 5 percent and not more than 15 percent should be delivered by C/S. To meet these targets, effective maternal health service is required (Family Health Division, 2002).

Almost nine in ten (86%) people in Nepal live in rural area. Transportation facility is not easily available. To refer complicated cases to the appropriate health institution on time, reorganization of the complication in early stage of pregnancy is very important. Hence effective antenatal care service is crucial to reach the target and achieve the goal of reducing maternal and neonatal mortality in Nepal. Purpose of this paper is to review the literatures about the effectiveness of antenatal care to reduce maternal mortality and come up with the conclusions in the Nepalese context. There is a controversy over the effectiveness of ANC services in the reduction of maternal mortality, however the literatures are generally divided in to two views regarding the interventions to reduce maternal mortality. One is the preventive point of view, which is

in the favor of antenatal care, and another is curative point of view, which is not in the favor of antenatal care.

Arguments in favor of antenatal care

Those who are in favor of antenatal care argue that even though antenatal care does not effect directly on maternal mortality, but in developing countries where illiterates lack knowledge on pregnancy complication, and prevalence of anemia is high, antenatal care can help mothers to increase their nutritional status by distributing them iron, foliate and malaria prophylaxis. Screening of risk factors and counseling during ANC visit can influence them to seek skilled and safe delivery, which prevents maternal death. Furthermore, antenatal care can identify early obstetric complication and education about dangerous sign during pregnancy and delivery motivates women to seek appropriate referral services (Yester, 1995). Antenatal care is not always efficient to identify most of those who need obstetric services but it can be effective instrument to facilitate better use of emergency obstetric care services (Vanneste, 2000). Hence antenatal care utilization is an important determinant of safe delivery care, better antenatal care can increase the use of safe delivery care, which in turn reduces maternal mortality (Bloom, Lippeveld and Wypij, 1999).

According to McCarthy and Maine, (1992) maternal mortality is mainly affected by pregnancy related risks and it increases with the number of pregnancy. Any interventions to reduce maternal mortality should be able to answer the three questions:

- will it affect the incidence of pregnancy?
- will it affect the incidence of complication during pregnancy?
- will it affect the outcome of obstetric complication?

No single activity can answer all the above questions but health behavior including utilization of antenatal care, delivery and postnatal care are among those factors, which affect the incidence and outcome of complication during pregnancy, delivery and postpartum period.

There can be various strategies to prevent maternal death. Every strategy can have positive and negative explanations and no one is perfect. It depends on country's own situations. Among various strategies that can be useful to reduce maternal mortality, provision of antenatal care can reduce maternal mortality through its various components. Providing education to patient is one component of antenatal care, which includes education about obstetric complications, necessity of nutrition and hygiene, information about sign and symptoms of problems during pregnancy, delivery and postpartum period. This can help women to obtain timely treatment in case of complications. During the antenatal care women has an opportunity to get treatment of existing health problem such as malaria and anemia. By screening the risk factors it is possible to identify pregnant woman who will develop complication. Those women can either be treated or referred to appropriate medical facility for delivery (McCarthy and Maine, 1992).

Higher education and economic status are found to have greater effect on antenatal care and safe delivery. A logistic regression analysis to examine the effect of antenatal care utilization on the likelihood of using safe delivery care in India showed that women with higher educational and economic status were more likely to use safe delivery care. After controlling by other variables like previous birth, problem occur during delivery and level of antenatal care obtained, it was found that antenatal care obtained has strong positive relation with using a trained attendant at delivery. Women having high level of antenatal care had an estimated odd of using a health professional at the time of delivery was almost four times higher than when with low level of antenatal care. It was also found that for both highly and moderately educated women, the likelihood of delivery with a trained attendance is much higher for women who obtain a high level of antenatal care than for those with less care (Bloom, Lippeveld and Wypij, 1999). Hence enabling women to get better antenatal care will increase the use of safe delivery and reduces the maternal mortality

Arguments not in favor of antenatal care

Those who are against the view of the effect of antenatal care on maternal mortality, argue that antenatal care does not have direct effect on maternal mortality because most of the maternal mortality occur due to the complications such as abortion, hemorrhage, and obstructed labor which occur only during delivery that is why emergency obstetric care and skilled attendance at delivery are only effective interventions to reduce maternal mortality.

McCarthy and Maine (1992) suggest that family planning program, program to provide safe and legal abortion services, and program to improve the treatment of obstetric complication have immediate effect on maternal mortality. Furthermore, without including family planning and safe abortion services, a program to extend antenatal care, have less effect on maternal mortality. For example Australia, United States and Scotland spent huge amount of money to promote antenatal care but maternal mortality did not reduce because antenatal care can not detect and predict the complications due to hemorrhage, unsafe abortion and prolonged labor which happen only during delivery. So, developing countries should not give priority on antenatal care rather they should emphasize on family planning, safe abortion care and emergency obstetric care including caesarean section and blood transfusion.

Others argue that many women in developing countries are dying with simple preventable conditions. Many countries are trying to control this problem with antenatal care arguing the point of view of screening risk factors and nutritional supplementations. WHO and other organizations are promoting this view to developing countries. But impact of antenatal care on reducing maternal mortality is still questionable. There is insufficient evidence to reach the decision about effectiveness of antenatal care on maternal mortality but lots of evidences exist to doubt on the effect of antenatal care (Mc Donough, 1996). The role of screening risk factor during antenatal care has been opposed by some author and argued that the risk factors are not direct cause of pregnancy outcome because many women who are identified as risk do not develop complications while those who are identified not at risk may develop

complications. Risk approach is thus not effective strategy for maternal mortality because of its poor predictive value (Yester, 1995).

A cross sectional national level data analysis of 64 countries to examine determinants of maternal mortality identified three determinants of maternal mortality viz. health, wealth and women's empowerment. Health includes the available and use of maternal care services, wealth includes economic development (health expenditure and gross domestic product (GDP)) and women's empowerment includes status of women in the society (gross secondary school enrollment and income). From multivariate analysis it is found that women's education, health expenditure as a percent of GDP and percent of receiving trained assistance at delivery have significant effects on maternal mortality but percentage of receiving antenatal care does not have significant association with maternal mortality (Shiffman, 2000). Thus constant high maternal mortality in many developing countries in spite of intensive reproductive health program under safe motherhood initiatives are due to limited awareness of the magnitude and manageability of problem and inappropriate strategy which focus on antenatal care and trained traditional birth attendants which divert attention away from the development of midwives and hospital delivery (Debrouwere, Tonglet and Van Lerberhge, 1998).

Neutral Views

Above discussions classified the arguments into two categories. Developed countries emphasize on the provision of well-established emergency obstetric care with skilled attendants at delivery as an appropriate way to reduce maternal mortality. They argue that the risk approach through antenatal care is not effective. The studies conducted in developing countries argue that most developing countries are lacking sufficient skilled health workers and emergency obstetric care facilities. Due to illiteracy, lack of awareness and poor economic condition, existing health facilities are not utilized. In this situation giving priority on improvement of maternal health services and antenatal care through existing primary health care system would be more cost effective approach to reduce maternal mortality.

Some authors argue that as there is no single strategy to reduce maternal mortality, different countries should set their own priorities according to their own situation. The causes of maternal mortality can be viewed narrowly or broadly. A narrow view is to be concentrated only on medical diagnosis. Broad view includes the concerns on social, cultural and economic perspectives. All of these factors jointly effect on maternal mortality and are related to each other. To put emphasis on such idea (Maine, 1991) developed a model of the determinants of maternal mortality. Model reflects that improvement in socioeconomic status effects on maternal mortality through the intermediate factors i.e. a change in reproductive behavior, health status and access to health services. These proximate determinants affect the outcome factors, the pregnancy, development of complications and then maternal death or disability. These three outcomes are in sequence; unless there is pregnancy, there are no complications and no death. McCarthy and Maine (1992) further suggest that any effort to reduce maternal mortality must operate through three factors; reduce the likelihood that a woman will become pregnant, reduce the likelihood that a pregnant woman will experience a serious complication of pregnancy or childbirth and improve the outcomes for women with complications. McCarthy and Maine (1992) recommends the following interventions, which have immediate effect on maternal mortality,

- Provision of family planning services to prevent pregnancy
- Provision of legal safe abortion services to reduce the incidence of complication due to abortion
- Provision of antenatal care
- Improvement of emergency obstetric care
- Training of traditional birth attendants, and
- Education and mobilization of community.

How does ANC help to reduce maternal mortality in Nepal?

Nepal Maternal Mortality and Morbidity Study, (1998) shows that two-thirds (67%) of the maternal deaths in Nepal occur at home, half (52%) of the maternal deaths are due to hemorrhage, 16 percent due to obstructed labor, 14 percent due to eclampsia,

12 percent due to postpartum infection, 5 percent due to abortion and the rest due to other causes. Three delays, the delay in decision to seek care, the delay in reaching the care and the delay in receiving the care are identified as the factors related with the maternal death. These delays can be caused by variety of factors such as the lack of knowledge about the recognition of problem and seriousness of the symptoms, lack of confidence in medical system including trained health personnel, travel distance and cost of service (Family Health Division, 1998a). The study further reflects that ninety percent of the maternal deaths took place in rural setting and majority of death occurred after delivery (62%), of these deliveries family members attend more than half. Traditional birth attendants presented with family members at twelve percent of the deliveries while only in eight percent of cases the trained health workers attended. Finally, slightly over one-fourth (28%) of these maternal deaths have had the antenatal care during pregnancy.

In most of these cases family members did not recognize the danger sign and lately decide to seek the care. Those who decide to seek care; it took longer time (more than two hours) to arrange transportation. After the arrangement of transportation it took about two more hours to reach the health institution. By the time they reach the health institution the patients are in poor condition. Out of the total hospital deaths around ninety percent arrived in worst conditions which indicate the importance of early recognition and decision to seek care in case of complicated situation (Family Health Division, 1998a). The screening of risk factors and counseling to the pregnant women and supplementation of nutrition and treatment of sickness during pregnancy could help to prevent the adverse situation.

Teenage mothers are at increased risk of maternal anemia and the pregnancy among adolescents is associated with maternal complication. In Nepal, girls are married at younger age, about 40 percent of girls of age 15 to 19 years are married and the median age for first marriage among girls is around 16 years that increases chance of child bearing in adolescence. A small-scale study conducted in Nepal showed that marriage at a younger age increased the risk of teenage pregnancy. The frequency of antenatal checkup among teenage pregnant women is lower compared to elder women

in Nepal. The younger are less careful about their pregnancy and the pregnancy complication is also more common among adolescents. Thus teenage pregnancy is a high-risk condition in Nepal and the pregnancy in adolescents puts them at increased risk of anaemia and other complications, because early registration is poor among adolescent pregnant women (Sharma et al., 2001). It is also seen that the symptoms such as bleeding are not regarded as problem in Nepal, and the socio-cultural factors contribute to the poor health of women and girls. Prenatal care in this situation provides the opportunity to teach hygienic sanitation, nutrition and recognition of pregnancy problems. Tetanus immunization can be given, high-risk mothers and pregnancy can be detected through clinical examination and preventive and corrective measures can be undertaken.

Hemorrhage, the number one cause of maternal death in Nepal can occur any time during pregnancy, delivery and post partum period. Immediate management for preventing bleeding and blood transfusion can prevent maternal death. Antenatal care can help to reduce maternal death due to hemorrhage by providing treatment of anemia (Ministry of Health, 1998). Antenatal care can help to reduce maternal mortality and morbidity related to anemia by providing iron tablet and treating malaria. Iron supplementation can reduce need for blood transfusion as well (Rimpela and Hemminki, 1991). During ANC visit, complicated cases can be detected and referred early for safe delivery. By educating women to recognize the serious vaginal bleeding and abdominal pain in the pregnancy period can help them to seek care immediately after complication.

Hypertension disorder is also a cause of maternal mortality. Fifteen to twenty five percent of women with pregnancy-induced hypertension develop pre-eclampsia and calcium supplementation during pregnancy is associated with reduced hypertension and reduced eclampsia (Sudan, P. et al., 1998). Thus calcium supplementation during antenatal care can play vital role to reduce maternal mortality by reducing hypertension and eclampsia in Nepal.

Obstructed labor is another cause of maternal mortality in Nepal. Obstructed labor is the result of mal-presentation and caesarian section is the most appropriate treatment. Multigravida who had required intervention in previous delivery or who had experienced a still birth or neonatal death are found to be 10 times more at risk of obstructed labor than that of multigravida without the risk factor (Kosongo Project Team, 1998). Such cases can be early recognized, diagnosed and referred through antenatal care for delivery in hospital to prevent maternal death due to obstructed labor.

Post partum infections are also the causes of maternal mortality in Nepal. Performing delivery in unhygienic condition is main cause of infection (Family Health Division, 1998a). Health education during ANC to promote clean delivery in home and perform delivery by trained person can prevent some infection. Further more TT immunization can play an important role to prevent maternal and neonatal tetanus resulting from infection at delivery. Routine ANC can also identify and treat the pre-existing reproductive tract infection (RTI) and sexually transmitted disease, which can give rise to serious maternal and neonatal morbidity. Systematic screening and treatment of syphilis in pregnancy would be at least as cost effective in terms of child health as is the expanded program of immunization (Schultz and Berman, 1991). Hence, it can be argued that antenatal care may be effective to identify women with risk of obstructed labor screening them from their past history and current health condition and referring them to the appropriate facility can prevent maternal death.

Conclusion

Of the different interventions offered by McCarthy and Maine, (1992), family planning can have its role in reducing maternal mortality by concentrating births in the safest age and parity groups. It has been suggested that a higher percentage of birth should take place in the 20 to 40 years of age and parity should be under four. However the strategy of avoiding maternal death simply by avoiding pregnancies cannot be the only approach to the problem of maternal mortality, because given the reality of contraceptive practice, one is faced with the problem of failure on large scale.

Thus the requirement of maternal health services (antenatal, delivery and postnatal services) is raised directly by the needs of women (Winikoff and Sullivan, 1987).

The burden of maternal mortality is very high in developing countries because of the malnutrition. The improved vitamin A or beta carotene intakes in preventing maternal mortality is relevant in a setting where vitamin A deficiency is endemic and access to antenatal care is poor. Night blindness due to vitamin A deficiency is common during pregnancy among women in Nepal. And women with night blindness are more likely to die from infections than are women who were not night blind. This shows that night blindness during pregnancy is a risk factor of both short and long-term mortality in Nepal and vitamin A / B-carotene supplementation through antenatal care reduce this risk to a great extent (Christian et al., 2000).

Another intervention to reduce maternal mortality is the provision of legal and safe abortion services. Nepal Maternal Mortality and Morbidity study shows that out of total maternal death 6 percent of deaths in Nepal are due to abortion and 56 percent of the total maternal morbidity in hospital is due to abortion. In this condition, safe abortion services can help to reduce maternal mortality in some extent. Although abortion has been legalized in Nepal, due to the lack of trained persons and post abortion care facilities, most of the women in rural area are deprived of this service. So, it can be argued that in the current situation where 68 percent of the maternal death occurred in the community and 86 percent people live in rural area, legalized abortion might have least effect in maternal mortality in Nepal.

Most effective intervention to reduce maternal mortality is availability of emergency obstetric care facility, which is costly and feasible for sound economic countries. But poor country like Nepal cannot afford the cost without foreign assistance. There are only about 30 facilities providing comprehensive essential obstetric care (CEO) services in Nepal. Thus these facilities are not sufficient to serve for reducing maternal mortality. WHO, UNICEF, UNFPA suggest that there should be one CEO facility and 4 basic essential obstetric care (BEOC) for every 500,000 population (United Nations Children's Fund, 1997), that means Nepal needs at least 46 CEOC and

184 BEOC facilities to cover the whole country. Further more in most of the hilly and mountainous districts even though population is less than 500,000, it is not possible for people to get referral service in neighboring district, due to the lack of transportation and geographical inaccessibility. Hence these districts need at least one CEOC and BEOCs, which is impossible in the existing situation because of the poor infrastructure, lack of trained personnel and financial shortage.

Government of Nepal has initiated to expand these facilities gradually in the coming years. However in current situation antenatal care has been provided through primary health care system up to the community level. If some intervention is implemented to improve quality of antenatal care, it can be effective to increase the institutional delivery. So, until sufficient emergency obstetric services are available to all women, advocacy for institutional and skilled delivery is a mean to reduce maternal mortality in Nepal. Thus advocacy of safe delivery through antenatal care is still relevant and appropriate to prevent maternal mortality in Nepal.

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