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Status of Maternal and Child Health Seeking Behavior among Women Aged 15-45 Years during Earthquake of 2015 in Nepal: A Mixed Method Study

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ABSTRACT

Background: Delivery of the maternal and child health services are generally affected during the time of disaster. This study aims to assess the maternal and child health service utilization in areas in Nepal affected by the 2015 earthquake.

Methods: A mixed method study was carried in 29 Village Development Committees from nine earthquake-affected districts in Nepal. Quantitative data on maternal, neonatal and child health indicators before and after the earthquake were collected from the Health Management Information System. Focus group discussions and key informant interviews with different stakeholders were conducted to collect qualitative data. Quantitative data was analyzed using Microsoft Excel 2013. Qualitative data was analyzed manually using thematic analysis technique.

Results: Most of the indicators were comparable before and after the earthquake. Indicators such as Bacille Calmette-Guerin vs. Measles-Rubella vaccine drop-out rate, 1st antenatal care visit, delivery by skilled birth attendant and 1st postnatal care visit within 24 hours of delivery improved after the earthquake. Though most of the health facilities were damaged, health services resumed under tents or in open spaces. Some of the common problems among pregnant women included stomachache, headache, malnutrition, diarrhea, and mental stress.

Conclusions: There was not much effect in the delivery of maternal neonatal and child health services. This reflects the coordinated efforts from government as well as non-government organizations and civil societies during and after the earthquake in Nepal.

Keywords: Earthquake; maternal and child health; Nepal; service delivery; service utilization.

INTRODUCTION

On 25 April 2015, on 25 April, 2015, a major earthquake also called Gorkha earthquake with a magnitude of 7.8 richter scale hit Nepal. Around 8,567 people were killed and more than 16000 were injured. More than 25 hospitals and 1,000 smaller health facilities were completely or partly damaged in the earthquake.[1] The largest number of completely destroyed health facilities was in Sindhupalchowk, Nuwakot and Gorkha districts.[2]

Maternal, neonatal and child health (MNCH) services were severely disrupted. About 90% of health facilities in affected districts were non-functional disrupting antenatal, delivery, and postnatal care in the catchment areas.[3] An estimated 126,000 pregnant women were at risk of adverse maternal outcomes, while two million women and girls of reproductive age could be affected.[4] This study aimed to assess MNCH service utilization in areas affected by the 2015 earthquake.

METHODS

It is a mixed method study conducted from August to December 2017 in nine districts affected by 2015 earthquake which include Gorkha, Dhading, Nuwakot, Lalitpur, Kavre, Dolakha, Ramechhap, Okhaldhunga, and Solukhumbu. Out of a total of 72 VDCs from these districts, 29 VDCs were selected randomly for this study.

MNCH indicators such as antenatal care (ANC), delivery by skilled birth attendant (SBA), childhood immunization,

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and postnatal care (PNC) before and after the earthquake were collected from Health Management Information System (HMIS) from the 29 affected health facilities of the selected districts. For the "before earthquake" period, 6 months of data (Jestha to Kartik) of Fiscal Year 2070/71 and 2071/72 were used and for the "after earthquake" period, 6 months of data (Jestha to Kartik) of FY 2071/72 and 2072/73 were used. The denominators to calculate the respective MNCH indicators were adjusted for 6-month period accordingly.

Nine focus group discussions (FGDs) were carried out among mothers from nine affected districts who were pregnant at the time of the earthquake to collect data on their experiences on MNCH service utilization during the earthquake. Similarly, 29 key informant interviews (KIIs) were carried out among selected health facility in-charges from nine districts, four semi-structured KIIs were carried out with District Health Offices/ District Public Health Offices.

Descriptive analysis of quantitative data was done using Microsoft Excel 2013. Qualitative data analysis was manually done using content analysis and verbatim transcription. Ethical approval was taken from Ethical Review Board (ERB) of Nepal Health Research Council (NHRC).

RESULTS

Table 1 shows the vaccination coverage before and after earthquake. Bacille Calmette Geurin (BCG) and Measles-Rubella (MR) coverage decreased after the earthquake compared to before the earthquake while all other vaccine coverage indicators were comparable before and after earthquake. The BCG vs. MR drop-out rate was negative for both periods and even further decreased after the earthquake period.

Table 1. Immunization coverage and drop-out rates before and after earthquake.

Immunization coverage	Before earthquake (%)	After earthquake (%)
BCG	71.4	61.9
DPT-HepB-Hib1	79.2	78.9
DPT-HepB-Hib3	77.5	77.9
Polio 1	77.2	77
Polio 3	77.6	77
MR	86.1	80.1
BCG vs MR dropout rate	-14.7	-18.2
DPT-HepB-Hib1 vs 3 dropout rate	1.7	0.9
OPV 1 vs OPV 3 drop-out rate	-0.4	0.6

Table 2 shows the childhood illness and management before and after the earthquake. The problem of diarrhea among children under five years decreased from 39.9% before the earthquake to 37.9% after the earthquake. The problem of acute respiratory infection (ARI) and pneumonia increased after the earthquake (from 68.2% to 75.8% for ARI and from 34.1% to 35.3% for Pneumonia). The proportion of children treated with oral rehydration solution (ORS) slightly increased after the earthquake while the proportion of children treated with a combination of ORS and zinc slightly decreased after the earthquake. Out of the total number children who suffered from pneumonia, 111.5 % were treated with antibiotics before the earthquake whereas 99% were treated after the earthquake.

Table 2. Childhood illness and management before and after earthquake.

Childhood Illness and management related variables	Before Earthquake	After Earthquake
Proportion of children under 5 years suffering from diarrhea	39.9%	37.9%
Proportion of children under 5 years treated with ORS		
Out of total children suffering from diarrhea	58.3%	59.8%
Out of total under-5 children	23.2%	22.7%
Proportion of children under 5 years treated with ORS and zinc tablet		
Out of total children suffering from diarrhea	94.8%	87.2
Out of total under-5 children	37.8%	33%
Proportion of children under 5 years suffering from ARI	68.2%	75.8%
Proportion of children under 5 years suffering from pneumonia	34.1%	35.3%
Proportion of children under 5 years suffering from ARI and then pneumonia		
Out of total children suffering from ARI	45.4%	51.4%
Out of total under-5 children	31%	39%
Proportion of children under 5 years who suffered from pneumonia and were treated with antibiotic		
Out of total children suffering from pneumonia	111.5%	98.6%
Out of total under-5 children	38%	34.8%

Figure 1 shows that the first ANC visit out of total expected pregnancies increased from 64.1% before the earthquake to 69.6% after the earthquake. However, there was a slight decrease in 4th ANC visit. Health facilities were the most common place for deliveries

both before and after the earthquake. Interestingly, figure 2 shows that both delivery in a health facility and delivery by SBA increased after the earthquake compared to before the earthquake. Although 47.9% of deliveries after the earthquake were conducted in a health facility, this was an increase from 42.7% before the earthquake. Delivery by health workers other than SBA increased sharply from 4.5% before the earthquake to 12% after the earthquake.

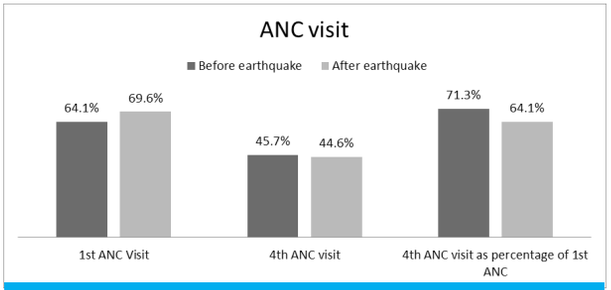

Figure 1. ANC visit before and after earthquake.

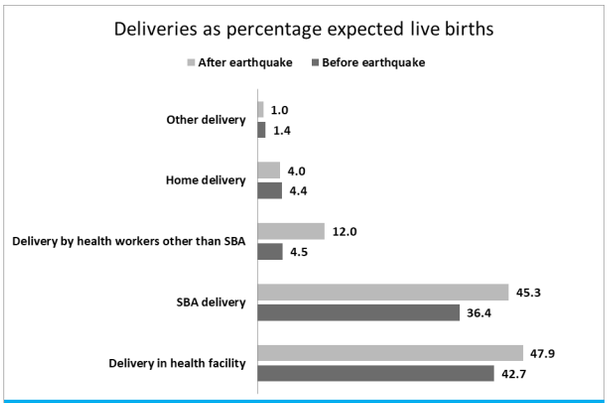

Figure 2. Place of delivery before and after earthquake.

Figure 3 shows that the percentage of mothers who received their first PNC at a health facility within 24 hours of delivery among expected live births increased from 43.6% before the earthquake to 47.9% after the earthquake. For both before and after earthquake periods, there was a decline in the proportion of mothers receiving their 3rd PNC as per protocol (within 24 hours, on 3rd day, and 7th day) compared to attending their 1st PNC (12.9% compared to 17.2%).

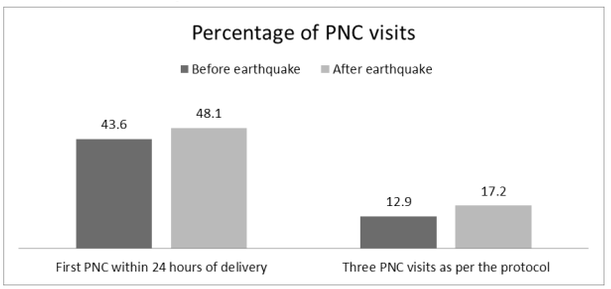

Figure 3. Postnatal Care visit before and after earthquake.

According to the findings from qualitative methods, most of the mothers expressed that they were scared during the earthquake. They were fearful of getting injured, having a miscarriage, or even dying. One woman reported that after the earthquake, she lived in a forest in a group of 60 people and did not eat rice for up to three to four days. Another woman said, *"It was a problem as my baby was very young. Living in tents was not much of a problem but it was more painful when we could not timely feed our babies."*

According to health workers, common conditions for visiting health facilities were diarrhea, fever, minor physical injuries, head injuries, and fractures. Common problems reported among pregnant women by both mothers and health workers were headache, malnutrition, abdominal pain, vaginal bleeding, diarrhea, scabies, and mental stress. Among children, the common problems were cough, pneumonia, diarrhea, fever, and allergy. There was no report of death among pregnant women in the surveyed VDCs but some of them reported an increase in the number of abortions, miscarriages, and preterm births. Most of the health workers said that pregnant women were psychologically affected and scared for their own and their baby's health.

Most of the women went to health facilities for regular check-ups. One woman said, *"I had more checkups at that time because I was scared if anything were to happen."* One health worker also reported that the flow of ANC visits increased immediately after the earthquake. However, D(P)HO reported a decrease in ANC coverage compared to the same months in previous years mainly because of the damage to health institutions. The major reasons for this decline were that the mothers were busy in relief material collection; the rainy season; and the focus of health services in emergency service delivery, logistics supply issue, and low recording-reporting.

According to most of the health workers, the main challenges they faced were the need to provide health services in tents and the unavailability of medicine. According to a health worker (Lalitpur), *"Health post was damaged that we provided service from a tent but it was difficult to provide service from the tent since it is very hot inside [the tent] and it was also difficult to maintain privacy [in the tent]. There was also a problem of electricity because of which sterilization was difficult."* To solve the problem of privacy, one health worker (Lalitpur) reported, *"To maintain privacy inside tent during ANC checkups, all other patients were asked to go outside the tent."* One health worker was concerned about the mental stress among the people as this could not be easily treated like physical

injuries. Some problems reported by D(P)HO were lack of tents, delay in medicine distribution from zonal medicine distributors, lack of staff in the health facility, and decrease in ANC visits and institutional delivery. A respondent from a district said, *"Many projects during the earthquake started to work in the field without informing us. It was an emergency period so we didn't take any action. But we were strict to the new projects. I suggest I/NGOs cover the whole district instead of 1-2 areas."*

The mothers appreciated the health workers for providing services even under tents during the earthquake and the other channels of I/NGOs for providing help and relief materials. KII with health workers had similar findings. Despite the damage of buildings, buried medicine, frequent aftershocks, and other challenges, health service delivery was found to be fully functional in all the health institutions in outside space in tents. According to one of the service providers from Lalitpur, *"At first we provided service outside the health post in the field. After getting a tent from UNICEF we started providing service in the tent."* Another health worker said, *"At the time of earthquake, all health workers were present and no one was given leave and services were provided 24 hours even on Saturday."*

Health workers acknowledged the support provided by D(P)HO and I/NGOs like distribution of the tents, prefab building and maternity prefab building construction, mothers' group reactivation and continuation, and regularity in Health Facility Operation Management Committee (HFOMC) meetings. Interestingly, some of the hidden problems like malnutrition among children were also uncovered through screening programs after the earthquake.

D(P)HOs also reported that they coordinated with different organizations like UNICEF, One Heart, and the Red Cross for solving the problems during and after the earthquake. D(P)HOs agreed that there was improvement in health service delivery now compared to the time during the earthquake. Some of the common areas that have improved were regularity in health mothers' group and HFOMC meeting and prefab building construction.

There were wide ranges of suggestions provided by different stakeholders for future improvements. Some of the suggestions given by mothers were provision of advanced health services like cesarean section-delivery and lab tests at health posts; availability of free medicine; and health education and awareness programs on disaster preparedness. Areas of improvement suggested by health workers were earthquake preparedness and post-earthquake trainings; development of earthquake response mechanism; availability of medicine; reactivation and continuation of mothers group meetings; renovation of health facilities in a quick pace; launch of sustainable projects; and frequent awareness programs on issues like communicable and non-communicable diseases, reproductive health, and environmental hygiene. Some of the common suggestions provided by D(P)HOs were earthquake-proof health facilities and school buildings; training for health workers on disaster preparedness and response; and well-equipped patient-friendly health institutions.

DISCUSSION

During the immediate response phase, natural disasters have resulted in pregnancy and birth complications including maternal mental health issues, breastfeeding challenges and poor perinatal health outcomes. The long-term effects of disaster on maternal and newborn health can be substantial as families recover from physical and emotional trauma and reallocate finances from health expenses to rebuilding their homes.[5]

The major earthquake of 2015 in Nepal affected human lives through a significant number of injuries, deaths, and damage to buildings and health facilities. Most of the health institutions were totally damaged due to earthquake. However, despite the challenges such as damage to health institutions, loss of medicine and equipment, service provision in open space and tents, etc. health service delivery was functional in most of the health facilities.

Compared to the national coverage during the period before the earthquake (FY 070/071) and after the earthquake (FY 071/072), the immunization coverage was lower in the study areas. For example, national BCG coverage in Nepal in FY 2070/71 was 98.9%.[6] It was, 93.9% in FY 2071/72.[7] Compared to this national average, the BCG coverage in the study area was much lower both before (FY 070/071) and after (FY 071/072) the earthquake. Similarly, the national DPT-HepB-Hib1 coverage in Nepal in FY 2070/71 was 90.3%. [6] It was, 93.7% in FY 2071/72.[7]

This declined slightly for DPT-HepB-Hib3 in both the fiscal years (91.7% vs. 90.7%). Compared to this national average, coverage of both DPT-HepB-Hib1 and DPT-HepB-Hib3 were lower in the study area both before and after the earthquake. The status was similar for OPV3 coverage. However, data for MR vaccine coverage was comparable with the national average in FY 2070/71,

which was 88% [6] and decreased to 85% in FY 2071/72.[7] Our data on vaccine drop-outs indicate that there was very good utilization of immunization services after the earthquake. This may also be the result of extensive MR vaccination campaigning.

The national average for receiving the 4th ANC visit as a percentage of receiving the 1st ANC visit was 59% and 54% in FY 2070/71.[6,7]The delivery of prenatal care decreases significantly after a disaster. Pregnant women initially are trying to survive the disaster by finding food, water, and shelter.[8] In our study areas, both before and after the earthquake, it was more than 60%, indicating adequate efforts to encourage mothers to attend at least four ANC visits in the study area even after the earthquake. Nepal had committed to achieve 60% deliveries by SBA by 2015.[9] But SBA delivery both before and after earthquake was far less than the set target in our study areas. In the post-disaster setting in a context such as Nepal, it was expected that health service delivery was disrupted, affecting vulnerable populations such as pregnant women and children. However, unlike the normal prediction, pregnant women were found to have utilized services such as ANC, PNC, and institutional delivery more than the period before the earthquake. Some experiences elsewhere also suggests that the arrival of medical relief teams and various health programmes from outside the region (national or international) will have improved pregnancy-related health and health in general.[10] During hurricane Katrina, even in areas where prenatal care was available, the rate of inadequate prenatal care increased from 1.3% to 3.9%.[8]

Similarly, other indicators after the earthquake were also comparable with (or improved) those before the earthquake period as found by both qualitative and quantitative analyses. This reflects multiple things working together: the role of health workers in the real field; the role of D(P)HO; coordination of VDC level with district and higher levels; support from community people; and efforts from other government and non-government sectors. There are several short-term and long-term psychological outcomes following disasters like an earthquake. A study conducted among pregnant women during the 2015 earthquake done by Khatri et al. showed that around 17% of pregnant women had a high prevalence of clinically significant common mental disorders symptoms.[11] A cross-sectional study done in Pakistan after the 2005 earthquake revealed that reproductive health events significantly varied depending on the levels of clinical severity of depression and anxiety.[12] Similar to this finding, the health workers and mothers in this study also reported psychological stress to be one of the common problems among pregnant women. However, no efforts were seen to address this problem. There was substantial national and international aid received immediately following the earthquake for reconstruction in the form of distribution of tents, prefab building and maternity prefab building construction, mother group reactivation and continuation, regularity in HFOMC meeting, etc.

CONCLUSIONS

Most of the indicators were comparable before and after the earthquake. Indicators such as Bacille Calmette-Guerin (BCG) vs. measles-rubella (MR) vaccine drop-out rate, 1st antenatal care (ANC) visit, delivery by skilled birth attendant (SBA), and 1st postnatal care (PNC) visit within 24 hours of delivery showed increment after the earthquake. Though most of the health facilities were damaged, health services resumed under tents or in open spaces. The health workers were sufficient after the earthquake. Some of the common problems among pregnant women included stomachache, headache, malnutrition, diarrhea, and mental stress. There was not much effect in the delivery of Maternal Neonatal and Child Health services. This reflects the coordinated efforts from government as well as non-government organizations and civil societies during and after the earthquake in Nepal.

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