Sophie Goyet et al.

Post-disaster health system recovery in Nepal

Sophie Goyet,a Rajan Rayamajhi,a Badry Nath Gyawali,b Bhola Ram Shrestha,c Guna Raj Lohani,c Damodar Adhikari,a Edwin Salvador,d Roderico Ofrin,e Jos Vandelaera & Reuben Samuela

b Epidemiology and Diseases Control Division, Ministry of Health, Government of Nepal, Kathmandu, Nepal.
d Bangladesh Country Office, World Health Organization, Dhaka, Bangladesh.
e South-East Asia Regional Office, World Health Organization, New Delhi, India.

Correspondence to Reuben Samuel (email: samuelr@who.int).

(Submitted: 2 May 2017 – Revised version received: 18 December 2017 – Accepted: 19 December 2017 – Published online: 5 September 2018)

Abstract

Problem Seven months after the April 2015 Nepal earthquake, and as relief efforts were scaling down, health authorities faced ongoing challenges in health-service provision and disease surveillance reporting.

Approach In January 2016, the World Health Organization recruited and trained 12 Nepalese medical doctors to provide technical assistance to the district health authorities most affected by the earthquake. These emergency support officers monitored the recovery of health services and reconstruction of health facilities, monitored stocks of essential medicines, facilitated disease surveillance reporting to the health ministry and assisted in outbreak investigations.

Local setting In December 2015 the people most affected by the earthquake were still living in temporary shelters, provision of health services was limited and only five out of 14 earthquake-affected districts were reporting surveillance data to the health ministry.

Relevant changes From mid-2016, health facilities were gradually able to provide the same level of services as in unaffected areas, including paediatric and adolescent services, follow-up of tuberculosis patients, management of respiratory infections and first aid. The number of districts reporting surveillance data to the health ministry increased to 13 out of 14. The proportion of health facilities reporting medicine stock-outs decreased over 2016. Verifying rumours of disease outbreaks with field-level evidence, and early detection and containment of outbreaks, allowed district health authorities to focus on recovery and reconstruction.
Lessons learnt Local medical doctors with suitable experience and training can augment the disaster recovery efforts of health authorities and alleviate their burden of work in managing public health challenges during the recovery phase.

Introduction
Major disasters can have a severe health impact on populations and health systems, especially in underprepared low- and middle-income countries. The huge efforts undertaken for the immediate response can often be sustained only for a few weeks. Yet disasters have long-term consequences and their management encompasses more than immediate interventions. Affected health systems must be restored, actual and potential health risks mitigated, and communities enabled to prepare better for future disasters.

More attention is being given to post-disaster response. Whereas the immediate response to the Nepal earthquake of 2015 has already been well described, there is a lack of published information about health-sector recovery. This paper draws lessons from a health system strengthening intervention conducted at district level during the recovery phase of the 2015 Nepal earthquake.

Local setting
On 25 April 2015, an earthquake struck Nepal, followed by hundreds of aftershocks. Thirty-one of the country’s 75 districts were affected, out of which 14 highly affected ones were prioritized for rescue, relief and recovery operations. A total of 8897 deaths, including 18 among health workers and 22 310 people injured have been reported, while 662 (83.5%) of the 793 public health facilities in the 14 most affected districts were destroyed or partially damaged. More than 36 national and 137 international medical teams from 36 countries responded to the government of Nepal’s appeal for humanitarian response. About 117 000 patients were treated in outpatient departments, 41 200 were hospitalized and a total of 7124 surgical operations including 41 amputations were performed within 2 weeks.

An inter-agency cluster-based response was activated by the Government of Nepal. The health cluster was led by the Nepal Ministry of Health and co-led by the World Health Organization (WHO). For the immediate emergency response, the WHO facilitated the short-term deployment of Nepalese WHO staff working outside of Nepal on request from the health minister. They only remained in the country for the first few weeks after the disaster. In addition,
from day 3 after the disaster, 14 WHO surveillance medical officers from the polio eradication and immunization preventable diseases programme of the WHO Nepal office were deployed in the 14 most-affected districts to assist the district health authorities in coordinating the health sector emergency response. However, from October 2015, with the relief period ending, surveillance medical officers had to return to their primary priorities of supporting the immunization programme (Fig. 1).

In December 2015, the people most affected by the earthquake were still living in temporary shelters, remaining vulnerable to disease and cold weather. The situation was made worse by a 4-month closure of the border between India and Nepal, resulting in shortages of fuel and medicines. The provision of health services was limited by the border closure and had not been re-assessed since the post-disaster needs assessment in May 2015. Out of 14 earthquake-affected districts, only five were regularly reporting disease surveillance data to the health ministry. Meanwhile, the United Nations Office for the Coordination of Humanitarian Affairs was phasing out support as the relief period came to an end, thus creating gaps in both coordination and monitoring during the recovery (Fig. 1).

Approach
In January 2016, to address a perceived gap in support to the district health authorities in the earthquake-affected districts WHO posted 12 Nepalese medical doctors to the 14 most affected districts. There was one doctor to cover the well-served three central districts in Kathmandu valley and one each for the remaining 11 peripheral districts. These doctors, called WHO emergency district support officers, were to provide technical assistance to the district health authorities during the recovery phase.

The officers were recruited from within Nepal and trained following the regular procedures for recruitment and induction of WHO surveillance medical officers in Nepal. They all had some previous experience in humanitarian response. After a 1-week training on disaster and outbreak management and cluster coordination, they worked mainly from the offices of the district health authorities but also frequently travelled to remote areas within their district. Guided directly for 6 months by a WHO international consultant, and later by senior WHO national staff, they were paid at national consultant rates similar to junior WHO surveillance medical officers in Nepal.
The role of the officers was first to assist the district health authorities in coordinating the organizations engaged in health-sector recovery activities. In their assigned districts, the officers helped organize meetings of the health cluster, mobilized resources from health-cluster partners when needed and followed progress in the reconstruction of health facilities.

Second, to strengthen disease surveillance and response, the officers facilitated the reporting of disease cases to the regular disease surveillance systems operated by the health ministry as well as the ad hoc post-earthquake disease surveillance. They also facilitated event-based surveillance and assisted the district health authorities and the district rapid response teams in investigating and containing outbreaks.

Third, the officers made field visits and monitored the recovery of health services and the reconstruction process of damaged health facilities using a standardized checklist. They also monitored the stocks of 20 essential medicines supplied by the health ministry. All operational challenges identified during the field visits to health facilities were discussed with the district health authorities to help in finding solutions.

The programme was gradually phased out from January 2017. In December 2017, only two officers were still providing part-time assistance to the district health authorities of the 14 most-affected districts. This was mainly to provide follow-up on reconstruction of health facilities.

Deployment of the emergency support officers (excluding travel and communication expenses) amounted to United States dollars 1500 per officer per month. We estimated that the cost of deploying these officers was about four times less than that of the average cost (salary and per diem) of deploying WHO international staff during the immediate response phase.

**Relevant changes**

During the recovery period we observed several positive changes in the health sector situation in the affected districts (Table 1). The focus of coordination gradually shifted from emergency response to recovery activities. By December 2016, 375 health facilities (56.6% of all 662 damaged health facilities) had been repaired or rebuilt with support from various organizations. However, in 61 (20.1%) of 304 health facilities monitored after February 2016, support officers reported that buildings had been declared as unsafe by the authorities, with no major
improvement over time. From mid-2016, health facilities were gradually able to provide the same level of services as in unaffected areas, including paediatric and adolescent services, follow-up of tuberculosis patients, management of respiratory infections and performing first aid.

The proportion of health facilities reporting medicine stock-outs decreased over 2016 from 87.8% (36/41) in January 2016 to 82.8% (48/58) in December 2016, although shortages reappeared during the winter of 2016. The support officers identified several issues related to management of medicine stocks and resolved these with support from district health authorities. For instance, the officers facilitated the redistribution of medicines between health facilities according to need.

Reporting of disease surveillance data by districts greatly improved so that 13 out of 14 districts were able to report data to the health ministry. Timeliness and completeness gradually improved. The support officers gave technical and logistic support and training to district rapid response teams in the investigation and containment of 33 of the 44 disease outbreaks recorded over January to December 2016.

The support officers ensured there was regular mapping of health sector partners using a 4Ws matrix (Who is doing, What, Where and When). This facilitated early mobilization of partners during response to disease outbreaks or local emergencies such as landslides or flooding.

Lessons learnt
Monitoring the delivery of health services was a realistic way to identify the challenges faced by health facilities and staff during the recovery phase and report these to the district health authorities. Many operational and contextual issues could then be quickly solved by the district health authorities. Even so, due to financial or programmatic constraints, issues such as the use of unsafe buildings remained unaddressed by December 2016 (Box 1).

Explaining the role of the emergency support officers to the district health authorities was sometimes challenging. The officers had no operational budget to repair damaged health facilities or equipment or for medicines stock replenishment. Nor were they able to address issues directly. They identified problems, generated options, offered technical advice, facilitated decisions and assisted with data and information management and outbreak rapid response. Their
main role was coordination between district health authorities, health-care providers and other health partners. Managing the expectations of the district health authorities regarding the work of the support officers required repeated explanations about their terms of reference and exact roles.

Verifying rumours of disease outbreaks with field level evidence was found to be crucial. This required the support officers to coordinate with the WHO surveillance medical officers, who remained in charge of supporting the district rapid response teams in surveillance and response of immunization preventable diseases. Early detection and containment of outbreaks, coupled with a rapid response to local emergencies, both of which are expected in post-disaster situations, avoided escalation of incidents and allowed district health authorities to focus on recovery and reconstruction priorities.

Well-performing emergency support officers were those with strong interpersonal skills, ability to learn and adapt quickly, and some background in public health. To avoid creating dependence of district health authorities and health partners on support officers, they were rotated from one district to another every 3 months and were gradually assigned to more than one district. We also observed that not all districts required the same level of support.

The cost–effectiveness of this recovery assistance intervention could not be assessed using the data available, since it was not included in the programme design. If similar interventions had to be replicated in other settings, we would recommend assessing their cost–effectiveness.

Acknowledgements
We thank Dr Bashuda Nepal, Dr Irana Joshi, Dr Soniya Bhagat, Dr Priyanka Shrestha, Dr Neeta Pokhrel Regmi, Dr Ela Singh Rathaur, Dr Subash Neupane, Dr Abhiyan Gautam, Dr Rajeeb Lalchan, Dr Saugat Shrestha, Dr Vikram Karna, Dr Diwakar Parajuli, Dr Vivek Dhungana, Dr Sujan Dhakal, Dr Sharmila Shrestha, Dr Binod Gupta and Mr Deepesh Sthapit.

Funding
The intervention was mainly funded by the a specific grant of the United States Agency for International Development and the Office of the United States Foreign Disaster Assistance, with other funding coming from the governments of Norway and Thailand, and WHO.

Competing interest
None declared.
References


Box 1: **Summary of main lessons learnt**

• Local medical doctors with some relevant experience, and closely guided by experienced WHO staff, can assist district health authorities in coordinating disaster recovery efforts and managing public health challenges during the recovery phase.

• Verifying rumours of disease outbreaks with field-level evidence, and early detection and containment of outbreaks, avoided escalation of incidents and allowed district health authorities to focus on recovery and reconstruction priorities.

• WHO emergency district support officers had no operational budget, and managing the expectations of district health authorities required explanations about the officers’ role in technical assistance and coordination support.

WHO: World Health Organization.
Table 1. **The outcomes of placing emergency district support officers in districts most affected by the April 2015 Nepal earthquake**

<table>
<thead>
<tr>
<th>Task</th>
<th>Situation pre-intervention (December 2015)</th>
<th>Inputs from emergency district support officers</th>
<th>Situation post-intervention (December 2016)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coordinating recovery activities in the health sector</td>
<td>District health authorities faced many competing health-sector priorities, e.g. preparing health-facility reconstruction plans, solving issues related to the border closure. The UN Office for the Coordination of Humanitarian Affairs was withdrawing support.</td>
<td>Assisted district health authorities to prepare and conduct meetings of the health cluster. Completed the 4Ws matrix (Who is doing What, Where and When). Monitored recovery activities of health-sector partners (nongovernmental agencies, UN agencies working in health)</td>
<td>Health-cluster partners were mapped using the 4Ws approach. Partners were mobilized during responses to disease outbreaks and local disasters. Duplication of reconstruction plans and activities were avoided.</td>
</tr>
<tr>
<td>Strengthening disease surveillance and response</td>
<td>Few districts (5/14) were regularly reporting data to the Epidemiology and Control Division of the health ministry. Mean timeliness and completeness scores of districts were 41.7% and 66.7% respectively. Rapid response teams were in place in all districts, with various levels of training, but without full capacity for outbreak investigations.</td>
<td>Coached medical reporters and statistic recorders. Assisted them in preparing statistical reports. Helped them solve logistic issues, e.g. with computers, electricity supplies or internet access</td>
<td>Almost all health districts (13/14) were able to report data to the Epidemiology and Control Division. 44 clusters of diseases affecting &gt; 947 individuals were reported to district health authorities, investigated and contained. Rapid response teams were empowered. Information related to these outbreaks was shared with the Epidemiology and Control Division.</td>
</tr>
<tr>
<td>Monitoring the recovery of health facilities</td>
<td>Affected areas had 793 health facilities (723 health posts, 44 primary health-care centres, and 26 hospitals). The earthquake damaged 662 (83.5%) health facilities, including 363 (45.8%) destroyed. Due to logistic constraints, field supervision by district health authorities was rarely done, except for immunization activities. Availability and quality of health services was not known after the initial post-disaster needs assessment (May–June 2015). Most health facilities (36/41, 87.8%) were reporting medicine stock-outs.</td>
<td>Participated in event-based surveillance and verification of rumours. Recorded 44 clusters of diseases over the year 2016. Coordinated efforts with surveillance medical officers for the surveillance of vaccine-preventable diseases. Conducted 822 field visits in 451 different health facilities, using a standardized checklist developed from national health-facility surveys. Median number of visits per month to health facilities was 55.5 (interquartile range: 43.0–92.5). Of 302 health facilities visited from March–December 2016, 61 (20.1%) were using buildings declared unsafe by the health ministry. Looked for local solutions to decrease the risks for health teams and patients, e.g. the use of tents or relocation to public buildings. Provided real-time and accurate feedback to district health authorities regarding availability and quality of health-service provision, and daily challenges faced by health teams. Worked to improve inventory management of medicines and communication between health facilities.</td>
<td>Field visits showed that 375 health facilities were renovated or rebuilt (56.6% of all 662 damaged health facilities; 6 district hospitals, 10 primary health-care centres, 359 health posts). Availability of services was recorded and had recovered to pre-disaster levels. Most health posts monitored from June 2016 (75/85; 89.7%) had paediatric services and could manage respiratory tract infections; 75/87 (86.2%) had adolescent services available. and could perform first aid. However, sexually transmitted infections management and human immunodeficiency virus disease follow-up were available in only 31/87 (35.6%) and 7/87 (8.1%) health posts, respectively. Numbers of health facilities reporting medicine stock-outs decreased over the year from 36/41 (87.8%) in January 2016 to 48/58 (82.8%) in December 2016.</td>
</tr>
</tbody>
</table>

UN: United Nations.

*a* Emergency district support officers were 12 Nepalese medical doctors posted by the World Health Organization (WHO) to the 14 districts most affected by the earthquake. They provided technical assistance to the district health authorities during the recovery phase.

Notes: Pre-intervention data mainly came from the post-disaster needs assessment conducted in May–June 2015 and led by the National Planning Commission with the assistance of national experts and institutions, Nepal’s neighbouring countries and development partners (UN agencies, international and national nongovernment agencies). Post-intervention data were collected by the WHO emergency district support officers during their monitoring visits to health facilities.
Fig. 1. **Timeline of events and World Health Organization support to district health authorities after the April 2015 Nepal earthquake**

- **25-Apr-15**
  - 7.8 Mz earthquake
  - Causing 8897 deaths, 22 310 injured, damage to 1227 health facilities, affecting 3175 districts, including the 14 highly affected districts

- **15-Jun-15**
  - Post-disaster needs assessment