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Assessment of Preparedness of Government of Nepal in COVID designated Hospitals and Clinics for Pandemic Response

Pradip Gyanwali,[1] Navindra Raj Bista,[1,2] Mira Khadka,[1] Anju Vaidya,[1] Namra Kumar Mahato,[1] Mukesh Kumar Karn,[1] Suman Pant,[1] Namita Ghimire,[1] Anil Pokhrel,[3] Meghnath Dhimal[1]

[1]Nepal Health Research Council, Government of Nepal, Kathmandu, Nepal, [1,2]Tribhuvan University Teaching Hospital, Institute of Medicine, Kathmandu, Nepal, [3]National Disaster Risk Reduction and Management Authority, Government of Nepal, Kathmandu, Nepal.

ABSTRACT

Background: Preparedness, readiness, and response status of any country is integral in identifying, managing, and preventing COVID-19 pandemic. The objective of this study is to assess the status of the Government of Nepal designated COVID hospitals and COVID clinics to respond against COVID-19.

Methods: A cross sectional study was conducted with the focal persons of COVID hospitals and COVID clinics using a semi-structured questionnaire from April 26, 2020 to May 27, 2020 via face to face interview with onsite observation and telephonic interview in few unreachable health facilities.

Results: Government of Nepal designated COVID hospitals and COVID clinics demonstrated efforts in establishing preparedness plans and committees such as COVID management core team (96.7% and 86%), provision of coordination with the government authority (both 100%), preparedness response plan (93.3% and 84%), and infection prevention and control committee (63.3% and 65.6%) to respond to COVID-19 respectively. The participants reported differences in training provided to their health care workers with maximum COVID hospitals (80%) providing training on use of personal protective equipment and least (43.3%) on handling dead bodies. Only half of the COVID clinics (49.5%) had provision of triage systems.

Conclusions: COVID hospitals and COVID clinics in Nepal demonstrated different status of COVID pandemic preparedness and readiness. In case of surge, Nepalese hospitals would struggle due to lack of trained workforce and infrastructure. Interdisciplinary, multi-sectoral collaboration with various focused strategies, including in-service training to staff, is paramount to increase preparedness and readiness.

Keywords: COVID-19; Nepal; preparedness; readiness

INTRODUCTION

Public health emergencies poses a threat to human health and socio-economic stability as a whole.[1] The emerging infectious diseases have critically challenged Public Health Emergency Management Systems (PHEMSs) of countries, especially developing and low-income countries like Nepal.[2] Pandemic preparedness at hospital level needs to develop a preparedness strategy to provide optimum care to the patients.[3]

The first case in Nepal was confirmed on January 23, 2020 which was an imported case from China.[4,5] The Ministry of Health and Population (MoHP), Government of Nepal (GoN) took initiatives to prepare the health care facilities by designating COVID hospitals and COVID clinics as per the "Interim guideline on delivery of COVID and other health care services in the context of COVID-19 pandemic-2020" on April 12, 2020.[6]

With a rapid increase in active cases of COVID-19 on a day to day basis, there was a simultaneous increases in severe cases requiring hospitalization and the mortality from disease, and high possibility of a pandemic effect on human health and health system.[7]

Pandemic preparedness at health facility plays an essential role to mitigate the effects of disease outbreak and ensure that health and other essential systems runs smoothly during the pandemic.[8] This study was designed

Correspondence: Dr Navindra Raj Bista, Department of Anaesthesiology, Tribhuvan University Teaching Hospital, Maharajgunj, Kathmandu Nepal. Email: navindra.bista@gmail.com, Phone: +9779841461305.

to assess existing preparedness and readiness of GoN against COVID-19.[9]

METHODS

A descriptive cross-sectional study was conducted throughout the country from April 26, 2020 to May 27, 2020. All the designated COVID hospitals and clinics were selected in the study. Initially, a total of 95 COVID clinics and 31 COVID hospitals were included in the study. All the 95 COVID clinics focal persons were interviewed about health facility preparedness and planning. Two of them were found not operating COVID clinics so these two clinics were excluded from the study. Similarly, one COVID hospital was designated as non-COVID hospital by the provincial government and was also excluded from the study. Hence, a total of 93 COVID clinics and 30 COVID hospitals were taken into consideration for further data collection.

COVID hospitals were categorized into three levels where Level 1 was designated to manage positive cases with mild symptoms, Level 2 for moderate to severe symptoms and Level 3 to perform specialized operations and provide multispecialty services to COVID-19 patients.

A questionnaire was prepared after literature review and expert consultation. A total of 52 enumerators were recruited for data collection and were trained on questionnaire, and to collect data using the KoBo toolbar.

The detailed information regarding designated focal persons for COVID-19 in the respective health facility was collected from Health Emergency Operation Center (HEOC). All the focal persons were contacted via phone for confirmation of their email addresses and time for data collection. The documents related to this study including informed consent document, questionnaire, ethical approval letter and letter of support from HEOC were emailed to the focal persons before data collection.

Two types of data collection techniques were used in this study: face to face interview and telephonic interview. Face to face interviews were conducted with focal persons of 24 COVID hospitals and 61 COVID clinics whereas telephonic interviews were conducted with 6 COVID hospitals and 34 COVID clinics due to geographical constraints and national lockdown imposed by the GoN.

The data was collected in the KoBo toolbar. The collected data was then extracted in Microsoft Excel version 2013. For analysis, statistical computer package IBM SPSS, Version 24 was used. In order to perform analysis of data, it was necessary to code the response variables i.e., Yes=1, No=0. Analysis of the data was performed through descriptive statistics, such as frequencies for each of the variables.

Written informed consent was obtained from all the participants who had undergone face to face interviews. In case of telephonic interviews, electronic consent via email as well as verbal consent was obtained. Before the initiation of the study, ethical approval was obtained from the Ethical Review Board of NHRC (Registration number: 148/2020).

RESULTS

There were three levels of COVID hospitals among which level 1, level 2 and level 3 were 15 (50%), 12 (40%) and 3 (10%), respectively. Similarly, different types of hospitals were running COVID clinics as shown in figure 1.

Table 1 depicts the proportion of COVID designated health facilities with different preparedness and planning committees for COVID-19. All the COVID clinics 93 (100%) and COVID hospitals 30 (100%) had established provision of coordination with the government authority. The study findings highlighted that a lower number of COVID hospitals 19 (63.3%) and COVID clinics 61 (65.6%) had formed IPC committees in comparison to other committees established for preparedness and planning for COVID-19. All the COVID hospital entrance consisted of infection prevention measures of hand washing with soap water or alcohol-based hand rub while only 89 (96%) COVID clinics had that provision. In similar line, most of the COVID hospitals 28 (93.3%) and COVID clinics 86 (92.4%) had established screening mechanisms via use of infra-red thermometer.

There was variation in the training and orientation provided by COVID designated health facilities to their health care workers. The maximum number of both COVID hospitals 24 (80%) and COVID clinics 71 (76.3%) had provided training on use of PPE to their health workers as shown in Table 1. Majority of the COVID hospitals had provided their health care workers with training/orientation on COVID-19 testing and sample handling 24 (80%) followed by trainings on COVID clinic 20 (66.7%), IPC 20 (66.7%), COVID-19 case management 19 (63.3%), waste management 18 (60%), and Intensive Care Unit (ICU)/ventilator management 17 (56.7%). In a similar way, COVID clinics had built the capacity of their health care workers on COVID-19 testing and sample handling 67 (72%), IPC 66 (71%), waste management 59 (63.4%), COVID clinic 56 (60.2%), and COVID-19 case management 42 (45.2%).

All the COVID designated health facilities had adopted different safety provisions for their staffs. Table 1 shows

similar findings for both COVID hospital 22 (73.3%) and COVID clinics 37 (39.8%) for providing transportation facilities to their staff. Majority of the COVID hospitals had a provision of quarantine facility 28 (93.3%) whereas in COVID clinics 46 (49.5%) had quarantine facility for their staffs.

As shown in Table 2, out of 30 COVID hospitals only 25 were running COVID clinics, out of which, 23 (92%) had waiting/holding areas and 19 (76%) reported to have triage system. Only 11 (44%) COVID hospitals provided 24 hours' clinic service. Similar to COVID hospitals, in the 93 clinics, 80 (86%) had provision of waiting area/ holding area, while only half of them 46 (49.5%) had provision of triage system. All the COVID hospitals had adequate space between the beds (at least 1 meter). Twenty five (83.3%) COVID hospitals provided 24 hours' pharmacy services in their premises. Only 8 (26.7%) COVID hospitals had provision for proper drainage with functional effluent treatment plants.

Regarding PPE, 12 (40%) of the designated COVID hospitals and 42 (45.2%) of 93 COVID clinics had categorized PPE sets according to Nepal Medical Council (NMC) guidelines.

As shown in Table 2, as an IPC strategy, almost all the hospitals 28 (93.3%) segregated waste as per health care waste management guidelines 2014 published by MoHP. The number of clinics doing the same was found to be 80 (86%).

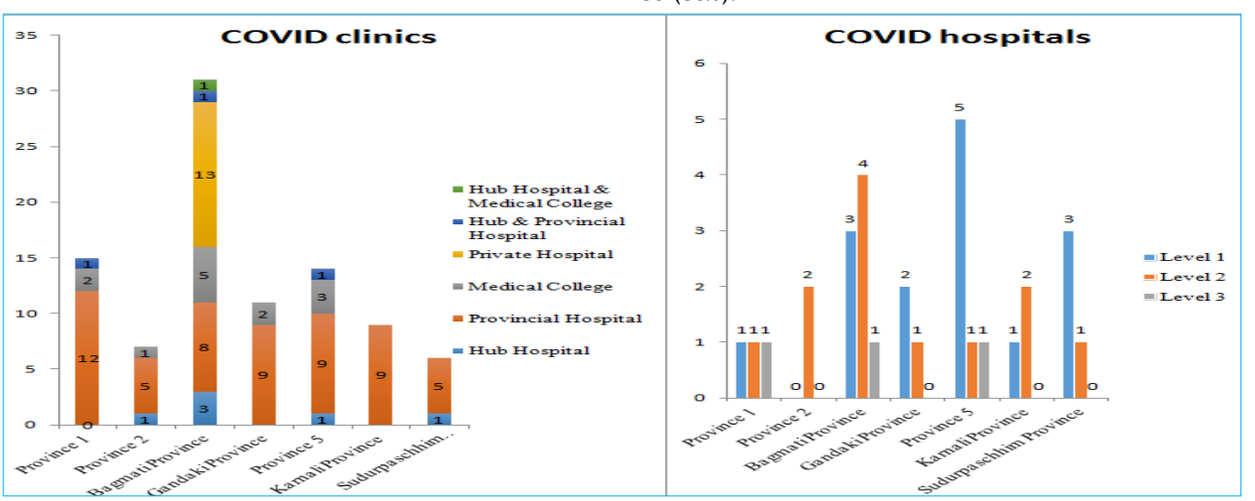

Figure 1. Distribution of COVID-19 clinics and COVID-19 hospitals according to Province of Nepal.

Table 1. Health care facility planning, Training and Safety Provision for staffs.

	COVID clinics		COVID hospitals	
	Yes (%)	No (%)	Yes (%)	No (%)
Health care facility preparedness and planning (n_1=93, n_2 =30)				
Is the facility an existing functional hospital?	93 (100)	0	25 (83.3)	5 (16.7)
Among the existing functional hospital, provision of patient shifting to alternate hospitals (n_1=93, n_2=25)	0	93 (100)	4 (16.0)	21 (84.0)
COVID-19 task force committee	78 (84)	15 (16)	..	..
Provision of Coordination with government authority	93 (100)	0	30 (100)	0
COVID-19 management core team	80 (86)	13 (14)	29 (96.7)	1 (3.3)
Hospital COVID-19 Preparedness response plan	78 (84)	15 (16)	28 (93.3)	2 (6.7)
Provision of Infra-red thermometer available at the hospital entrance	86 (92.4)	7 (7.6)	28 (93.3)	2 (6.7)
Provision of hand washing, (soap water/ alcohol hand rub) at the hospital entrance	89 (96)	4 (4)	30 (100)	0
Hospital IPC committee	61 (65.6)	32 (34.4)	19 (63.3)	11 (36.7)
Capacity building/ Training/Orientation of Health Care Workers (n_1=93, n_2 =30)				
COVID clinic	56 (60.2)	37 (39.8)	20 (66.7)	10 (33.3)
COVID-19 testing and sample handling	67 (72)	26 (28)	24 (80)	6 (20)
COVID-19 case management	42 (45.2)	51 (54.8)	19 (63.3)	11 (36.7)

ICU/ Ventilator management	..	..	17 (56.7)	13 (43.3)
Infection Prevention Control	66 (71)	27 (29)	20 (66.7)	10 (33.3)
Waste management	59 (63.4)	34 (36.6)	18 (60)	12 (40)
Use of PPE	71 (76.3)	22 (23.7)	24 (80)	6 (20)
Handling of dead body	25 (26.9)	68 (73.1)	13 (43.3)	17 (56.7)
Safety provision for staffs (n_1=93, n_2 =30)				
COVID-19 testing provision	51 (54.8)	42 (45.2)	24 (80)	6 (20)
Provision for bathroom for staffs before leaving hospital	52 (55.9)	41 (44.1)	25 (83.3)	5 (16.7)
Accommodation	50 (53.8)	43 (46.2)	26 (86.7)	4 (13.3)
Quarantine provision	46 (49.5)	47 (50.5)	28 (93.3)	2 (6.7)
Staff transportation	37 (39.8)	56 (60.2)	22 (73.3)	8 (26.7)

** n_1 signifies for the number of COVID clinics in the respective rows, * n_2 signifies for the number of COVID hospitals in the respective rows*

Table 2. Infrastructure, Personal Protective Equipment (PPE), and Infection Prevention and Control (IPC).

Infrastructure	COVID clinics		COVID hospitals	
	Yes (%)	No (%)	Yes (%)	No (%)
COVID clinic in the hospital (n_1= 93, n_2 = 30)	93 (100)	0	25 (83.3)	5 (16.7)
If yes, (n_1= 93, n_2 = 25)				
Waiting area/ holding area	80 (86.0)	13 (14.0)	23 (92)	2 (8)
Examination area	83 (89.2)	10 (10.8)	22 (88)	3 (12)
Triage system	46 (49.5)	47 (50.5)	19 (76)	6 (24)
24 hours COVID clinic service available	52 (55.9)	41 (44.1)	11 (44)	14 (56)
Infrastructure (n_1=93, n_2 =30)				
Adequate space between the beds (at least 1m)	..	..	30 (100)	0
24 hours pharmacy services	..	..	25 (83.3)	5 (16.7)
Provision for proper drainage with functional Effluent Treatment Plant	..	..	8 (26.7)	22 (73.3)
24 hours electric supply	84 (90.3)	9 (9.7)	30 (100)	0
24 hours water supply	84 (90.3)	9 (9.7)	30 (100)	0
PPE				
Categorization of PPE sets according to NMC guidelines (n_1=93, n_2 =30)	42 (45.2)	51(54.8)	12 (40)	18 (60)
For Category 1: (For Aerosol Generating Procedures) (n_1= 42, n_2 = 12)	34(81)	8 (19)	10 (83.3)	2 (16.7)
For Category 2: (For non-aerosol generating covid-19 suspected or confirmed patients) (n_1= 42, n_2 = 12)	31(73.8)	11(26.2)	11 (91.7)	1 (8.3)
For Category 2: (For physicians examining the patients in the fever/ screening / COVID clinics) (n_1= 42, n_2 = 12)	29(69)	13(31)	9 (75)	3 (25)
For Category 3 (For escorts/ drivers (n_1= 42, n_2 = 12)	29(69)	13(31)	11 (91.7)	1 (8.3)
For Category 3 (For laboratory staffs) (n_1= 42, n_2 = 12)	27(64.3)	15(35.7)	9 (75)	3 (25)
IPC (n_1=93, n_2 =30)				
Practice of Segregation of Waste as per Health care waste management guidelines 2014	80 (86)	13 (14)	28 (93.3)	2 (6.7)
Provision of disinfecting modality for PPE				
Hypochlorite solution	83 (89.2)	10 (10.8)	28 (93.3)	2 (6.7)
UV sterilization	10 (10.8)	83 (89.2)	3 (10)	27 (90)
Autoclave	78 (83.9)	15 (16.1)	25 (83.3)	5 (16.7)

**n_1 signifies for the number of COVID clinics in the respective rows, * n_2 signifies for the number of COVID hospitals in the respective rows*

DISCUSSION

The COVID-19 pandemic has inundated health facilities globally emphasizing the paramount need of strengthening health system preparedness and resilience.[10] The GoN designated different levels of COVID hospitals for effective management of suspected, probable and confirmed cases of COVID-19.[6] This can be considered to be a noteworthy initiative by the GoN for the containment of the COVID-19 pandemic.

This study found that almost all the COVID clinics and COVID hospitals had provision of coordination with the GoN. This depicts a strong collaborative efforts made by both government and various stakeholders. In a similar line, a study highlighted the essentiality of shared governance and collaboration between relevant stakeholders including public and private sectors to build effective strategy, bring collective impact and act within an overall system's perspective for effective disease prevention and management.[11] The formation of COVID-19 management core team and preparedness response plan along with other planning committees of the participating health facilities were remarkable. The study findings aligned with the technical report of European Centre for Disease Prevention and Control (ECDC) that highlighted the importance of COVID-19 preparedness and management committee to reduce the risk of COVID-19 transmission.[12] However, IPC committees were formed in lesser COVID hospitals and COVID clinics in comparison to other planning committees. This seeks special attention as the course of COVID-19 is progressing in Nepal, and setting up an effective IPC committee with a strong response plan and action strategy are important to efficiently handle the possible surge and challenges in future.

As an IPC measure, all levels of COVID hospitals and majority of the COVID clinics had provision of handwashing at the entrance gate reflecting effort made by the hospital authority which aligned with the IPC guidance by WHO.[13] Similar finding on the hand hygiene provision was found in the government hospitals (66.1-87.5%) in the study done in Nepal by Hamal et al.[14] Temperature checks at the entrance of health facility was another IPC measure adopted by majority of them as with the study conducted in the United States where temperature checks at entrance was one of the primary screening mechanisms for responding to COVID-19.[15] COVID hospitals and clinics in our study showcased good practice of waste management in line with the principles of IPC for acute respiratory infection patient care by applying routine IPC precautions for all patients aligned with hospitals health care waste management.[16]

In resource-limited countries like Nepal, where infrastructure and human resources are scarce, available resources should be capacitated properly. Capacity building of health care workers is a must to achieve desirable outcomes. This study found training and orientation were conducted by health facilities on different components. Government designated hospitals provided more training than clinics. . Both the hospital and clinics had least orientation on dealing with dead bodies. This might be because during the initial days of COVID-19 pandemic in Nepal, there were no mortality which might have prevented the government to give importance to provide training on handling of dead bodies.[6]

The importance of training has been reinforced by the World Health Organization (WHO) and incorporated online training courses related to COVID-19 in both its official as well as national languages.[17]

Health-care workers are country's most valuable resource.[18] Safety provision for staffs is key for the success to fight against COVID-19 which was highlighted in a policy brief published by International Labour Organization (ILO).[19] In this study, approximately half of the COVID Clinics had COVID-19 testing provision for their staffs. This clearly needs to be increased as literature suggests frontliners like health care workers are at greater risk of contracting the virus while managing COVID-19.[20,21] The COVID-19 pandemic has threatened front liners all over the world and Nepal is no exception; to break the chain of transmission, from hospital to home and vice versa, safety provision of staff should be enhanced. Quarantine provision to staff which is available to less than half of hospitals needs special attention. Similar status is observed in the provision of staff transportation which requires strengthening, because disease contraction can be during commuting, hence poses a threat to healthcare workers and community people. In early March, more than 3300 health-care workers in China had been infected as per China's National Health Commission and similarly 20% of responding health-care workers were infected in Italy.[18] Considering this global scenario, safety of hospital staff in Nepal must be ensured.

All the government designated COVID hospitals and COVID clinics had adequate space between the beds (at least 1 meter) as per the guidelines set by GoN.[22] Water supply and electricity supply were found to be available 24 hours which is a basic requirement to effectively run a health facility.

Waiting area and examination area is an important element to contain virus spread in view of a potential

epidemic of COVID-19. This was found to be available in significant facilities in our study. Historically, triage in health facilities is scarce, more so in a pandemic which undoubtedly created a major increase in demand for critical care services.[23, 24] Nepal, in case of surge, had a triage system insufficient since only 76% of designated hospitals and 49% of COVID clinics had such facilities. With the increasing trend of COVID cases in Nepal, this shows a dire need of establishing triage systems. The need for infrastructure development in a sufficient and equitable manner throughout the country is essential along with required workforce.

As the pandemic progresses, access to PPE for health care workers is a major concern. Prioritization exits for medical staff in many countries, but PPE shortages have been reported in the most affected facilities.[18] This study shared similar findings where less than half of COVID clinics and COVID hospitals had categorized PPE sets according to MoHP and NMC guidelines.[6]

The contamination of the surrounding area is higher in Aerosol Generating Procedure (AGP) like laryngoscopy and intubation which demands more protective PPE.[25] This reflects the need to follow guidelines on PPE categorization by all the health care facilities which posed risk to health care workers in contracting disease. With the appropriate use of PPE, there will be a reduced risk of contamination of clothing and skin with organisms among healthcare workers.[26-28] National guidelines should incorporate global standards and prepare to manufacture quality assured PPE within the country to overcome shortage of PPE and deal with unanticipated pandemics in future. PPE shortage has been reported worldwide; disinfecting the limited PPE is an issue faced by all countries including Nepal. Centers for Disease Control and Prevention has recommended Ultraviolet Germicidal Irradiation (UVGI), Vaporous Hydrogen Peroxide (VHP), and moist heat as a promising methods to decontaminate Filtering Facepiece Respirators (FFRs) according to crisis standards of care decontamination recommendations.[29] However, in our study UVGI was not commonly used which emphasizes the need to increase this disinfecting PPE modality.

The status of hospital facilities is ever changing, the study was conducted at a point of time and does not capture its dynamicity which is the limitation of this study. Hence, regular study to assess preparedness and readiness status of health facilities is essential.

CONCLUSIONS

This study highlighted significant efforts made by the Government of Nepal COVID designated hospitals and clinics to respond COVID-19 pandemic. However, some health facilities require significant improvements such as establishment of IPC committees, triage system, and training in handling of dead bodies as found in the study. Government's focus should be on improving preparedness for COVID-19 and its surge. A coordinated multi-sectorial, interdisciplinary approach should be adopted by GoN to curb the COVID-19 pandemic.

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CONFLICT OF INTEREST: None

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