Review Article

Trend of COVID-19 cases and health sector response in Nepal

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Abstract: We are facing global pandemic of novel corona virus diseases COVID-19 which is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). This paper is aimed to assess trend of COVID-19 cases and health sector response in Nepal. We reviewed WHO databases to observe the global trends and epidemiology of COVID-19 as well as daily situation updated reports of Health Emergency and Operation Centre (HEOC), guidelines, national and international government documents. The first case of COVID was reported in Nepal on 23 January 2020 and number of cases reached 454 on 21 May 2020. In order to address the increasing number of cases of COVID-19, Government of Nepal is adopting various preventive measures like extending lockdown period, setting up quarantine and isolation facilities, sealing borders, suspending flights, closing public places etc. There is need of joint effort by individuals, communities and government to prevent the further spread and flatten epidemic curve in Nepal.

Keywords: Coronavirus diseases; COVID19; health; Nepal

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1. Introduction

The COVID-19 pandemic caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), initially detected in Wuhan, China which took lives of many citizens of China and now it is continuously spreading in many parts of the world creating the global pandemic (Center for Disease Control and Prevention [CDC], 2020). World Health Organization (WHO) declared the outbreak of corona virus as a Public Health Emergency of International concern on 30 January 2020 (WHO, 2020) and Public Health Pandemic on 11 March 2020 (WHO, 2020). Some major signs and symptoms are fever, cough, myalgia, dyspnea, anorexia and complications like pneumonia, respiratory failure etc. may be noticed on COVID-19 patients (Guo et al., 2020; Huang et al., 2020; Poutanen et al., 2003). It is mainly transmitted during close contact via respiratory droplets while coughing or sneezing (CDC, 2020, 2020a). As of 21 May 2020, vaccines or antiviral treatments are not available for COVID-19. The standard diagnosis method for this virus is reverse transcription polymerase chain reaction (rRT-PCR) test done using upper respiratory specimen (CDC, 2020b). As of 21 May, around 4.90 million cases have been reported in 188 countries with more than 323412 deaths (WHO Dashboard, 2020).

COVID-19 has imposed great threat to low and middle income countries including Nepal. The fragile health system and availability of limited resources are vital challenges to cope with this large-scale outbreak and to mitigate its consequences (Koirala and Acharya, 2020). The first case of COVID-19 was confirmed in Nepal on 23 January 2020 (Bastola et al., 2020). Nepal Government adopted 6T strategy (travel restriction, testing, tracing, tracking, treatment and togetherness) to combat this pandemic (The Record, 2020). Soon after the detection of second case on 23 March, Government of Nepal (GoN) declared lockdown across the country on 24 March and enforced self and home quarantine of two weeks for the people visiting Nepal (UN Nepal, 2020). Later the quarantine time was extended for three weeks on 4 April 2020 when Ministry of Health and Population (MoHP) announced that two weeks was not enough to prevent the spread of disease again extended the quarantine time (Subedi, 2020). GoN also collaborated with various multisectoral agencies, local health sectors and international bodies to formulate high level coordination mechanism to combat this public health issue strengthening the national health system (The World Bank, 2020). In total, 126 hospitals were designated for running COVID clinics and 28 hospitals designated in level one, two and three for treating the patients of COVID-19 in Nepal (MoHP, 2020).

Furthermore, MOHP has developed “Health Sector Emergency Response Plan COVID-19” to strengthen the health system response to counter the COVID-19 pandemic. The plan includes strategic approaches and interventions such as public health and social measures, hospital based interventions, management of human resources and logistic and fund management. The plan also states that collaboration will be made with Nepal Health Research Council and other academic and research institutions to strengthen the country’s capacity in conducting COVID-19 related research (MoHP, 2020). This paper aims to review the current trends of COVID-19 and health sector response to combat its outbreak in Nepal.

2. Materials and Methods

Government of Nepal, Ministry of Health and Population, Health Emergency and Operation Centre (HEOC) report, guidelines, national and international government documents and news were reviewed for evaluating the responses of government in combating this pandemic. Data were also retrieved from WHO dashboard for analysis.

3. Results

As of 21 May 2020, Nepal confirmed 454 COVID-19 cases including three deaths. Among the four neighbouring countries, the highest number of cases was reported in India (112,359 cases) and highest number of deaths was reported in China (4645 deaths). Bhutan having low population, confirms less infected cases (21 cases) as compared with others. The highest Case Fatality Rate was observed in China (5.50%) followed by India (3.06%). (Table 1)

The sample of first case was sent to Hongkong, as Nepal didn’t have reagents for test. Later, reagents were borrowed from Centre for Molecular Dynamics Nepal (CMDN) and WHO provided test kits. The National Public Health Laboratory started testing (rRT-PCR) the virus on 27 January 2020. The second case was confirmed after two months on 23 March. Nepal reported 57 cases till the end of April that reached to 454 cases in 21 May. As of May 21, 2020, in total 38737 RT-PCR tests and 78695 RDT tests have been performed and number recorded confirmed cases were 454 (Figure 1).

As of 21 May 2020, high share of people of Province 5 tested positive for COVID-19 (198 cases) followed by Province 2 (136 cases) and Province 1 (84 cases). In total, 49 cases have recovered and three deaths have occurred (Figure 2).
Table 1. Trends of COVID-19 in Nepal and it’s neighboring countries

|                  | Nepal  | India     | Bangladesh | Bhutan | China    |
|------------------|--------|-----------|------------|--------|----------|
| Total cases      | 454    | 112,359   | 28,511     | 21     | 84,507   |
| Death            | 3      | 3,435     | 408        | 0      | 4645     |
| Case fatality Rate | 0.66  | 3.06      | 1.43       | 0.00   | 5.50     |

(Source: WHO COVID-19 Dashboard)

Figure 1. Trend of cumulative cases and RT-PCR test in Nepal

Figure 2. Province wise distribution of COVID-19 cases in Nepal
As of 21 May, 2020, highest number of cases was reported among age group 21-30 years (158 cases, 34.8%) followed by 31-40 years (109 cases, 24%) and 11-20 years (87 cases, 19.2%). Male were mostly infected with COVID-19 virus (384 cases, 84.6%) compared to female (70 cases, 15.4%). (Figure 3)

Quarantine centers were set up in all the provinces of Nepal with 70376 beds in altogether as of 21 May, 2020. Around twenty-five thousand were staying in quarantine with high number of people in Province 5 (14761 people). Similarly, 3349 beds were set up for isolation services in all the provinces. All the five confirmed cases of Sudurpaschim province were discharged from isolation (Table 2).

Ministry of Health and Population (MoHP) has formulated following guidelines for mitigating the risk of COVID-19 disease. These guidelines lead the way for diagnosis, treatment, prevention and control of COVID-19 cases in Nepal (Table 3). MoHP also expanded RT-PCR testing laboratory from one National Public Health Laboratory to more than 20 places in Nepal.

### Table 2. Province-wise distribution of quarantine and isolation services in Nepal

| Province          | No. of Quarantine beds | No. of people placed in quarantine | No. of isolation beds | Confirmed cases in isolation | Discharged | Deaths |
|-------------------|------------------------|-----------------------------------|-----------------------|------------------------------|------------|--------|
| Province 1        | 6274                   | 1349                              | 455                   | 58                           | 26         | 0      |
| Province 2        | 7834                   | 4966                              | 432                   | 130                          | 6          | 0      |
| Bagmati           | 6480                   | 528                               | 990                   | 16                           | 9          | 1      |
| Gandaki           | 4384                   | 591                               | 235                   | 2                            | 2          | 0      |
| Province 5        | 25322                  | 14761                             | 534                   | 195                          | 1          | 2      |
| Karnali           | 10430                  | 741                               | 540                   | 1                            | 0          | 0      |
| Sudurpaschim      | 9652                   | 2095                              | 163                   | 5                            | 0          | 0      |
| **Total**         | **70376**              | **25031**                         | **3349**              | **402**                      | **49**     | **3**  |
Table 3. Guidelines developed by Ministry of Health and Population, Nepal Government

| Guidelines                                                                 | URL                                                                 |
|---------------------------------------------------------------------------|----------------------------------------------------------------------|
| Safety measures to be adopted at the import point during the epidemic of Covid-19 disease | https://drive.google.com/file/d/1Prz1sPcQv04O9Toq1WkTs7TxsnROhNo/view |
| COVID-19 Patient Transfer Team (PTT) Guidelines                           | https://drive.google.com/file/d/1GLzSSLS_z8m-kZTeXoD3uaB6PcqbefJT/view |
| COVID-19 Dead Body Management Guideline                                    | https://drive.google.com/file/d/1qPNTguqXC5m-oC8xJSOCmJz0qQA0eSBQC/view |
| Guidelines for use of PPE -COVID-19 (In Nepali and English)               | https://drive.google.com/file/d/1WAP7guqXC5m-oC8xJSOCmJz0qQA0eSBQC/view |
| Interim Clinical Guidance for Care of Patients with COVID-19 in Health Care Settings | https://drive.google.com/file/d/1LezeHthMdhjD2uLga_8K3mknjvKYbxNG/view |
| NMC Interim Guidance for Infection Prevention and Control when COVID-19 is suspected | https://drive.google.com/file/d/1VzWcuQccAE0wmvjZgnGedicKFxBz7c21/view |
| COVID and Non-COVID Health Service Guideline                              | https://drive.google.com/file/d/1kzWQTTyi2cz8HSA4Hwv3zdjHwExJQXhO/view |
| Interim Guideline for the establishment and Operationalization of molecular Laboratory for COVID-19 testing in Nepal | https://drive.google.com/file/d/157Q7JK3rFTgQR FK3DCuVpw_-owRCBI65/view |
| Ayurveda and Alternative Medicine Guidelines of Preventive Measures and Management Protocol for COVID-19 in Nepal | qRG-uSzcLmP_WAu2Z2/view |
| Case Investigation and Contact Tracing Team Management Interim Guideline   | https://drive.google.com/file/d/15v2UHMyej_9sDp_yzBlOrXPpLPCE228C/view |
| Staff Mobilization Guideline                                               | https://drive.google.com/file/d/1GavLi0pTqgDYTxsr_vY8jFLLIKrjgZz/view |
| RDT Test Authorization to hospital Interim Guideline                       | https://drive.google.com/file/d/1GFAD3URLS85tZV4ajH4KPCbgvZn1M2rd/view |
| Interim Guidance for RMNCH services in COVID 19 Pandemic                  | https://drive.google.com/file/d/1mZF6s5YYK5SZFBFHVASJuZGwNm7eHYK/view |
| COVID-19 Emergency Medical Deployment Teams (EMDT) Mobilization Guidelines | https://drive.google.com/file/d/10x84phb0HLSv7naM_0QHCNn5_B1nEHwX/view |
| National Testing Guidelines for COVID-19                                   | https://drive.google.com/file/d/16qC8ADq-0EpQfRe2Hca8S3Ev6GqrM/view |
| COVID-19 Cases Isolation Management Guidelines                            | https://www.pubhealthupdate.com/covid-19-cases-isolation-management-guideline/ |

4. Discussion
This study is aimed to describe the current trends of COVID-19 and health sector response to it in Nepal. The novel corona virus epicentered in Wuhan China is spreading in many of the countries and territories globally. Comparing the data of 188 countries, as of 21 May 2020, USA has the largest epidemic of COVID-19 cases (1,501,876 cases) with 90,203 deaths followed by European countries (Russia, Spain, UK, Italy, France and Germany). Similarly, among Asian countries, Turkey (152,587 cases) confirmed highest cases of COVID-19 followed by Iran, India and China till date (WHO Dashboard, 2020). As of 21 May 2020, Nepal reported 0.66% of case fatality rate (CFR) that is low compared to India (3.06%) and China (5.50%). However, there might be underestimation of the rate as the asymptomatic cases might be hidden or not diagnosed (Rajgor et al., 2020). This observation may support the assumption that these leading countries should adopt appropriate public health measures to control the spread of virus and reduce the number of cases. Till the development of vaccines and specific medications, public health measures like individual effort, detection and isolation of cases, contact tracing and quarantine, social and physical distancing are crucial to prevent the disease spread and save lives of people (WHO, 2020).

The results of this study showed that people of all ages had COVID-19 infections in Nepal with high number of cases between 21 to 40 years of age and among men. According to WHO, people of all ages can be infected with novel corona virus and older and vulnerable people with pre-existing medical conditions are at high risk (WHO, 2020). A study conducted in China among 138 COVID-infected cases found that median age of patients was 56 years and 54.3% of confirmed cases were men (Wang et al., 2020). Similarly another study in Singapore carried out among 1000 patients revealed...
that the highest age range of COVID-19 infection was 20-29 years (27.3%) with high percentage among men (57.6%).

Many countries have enforced various measures for fighting with the pandemic. One of the most effective actions was lockdown strategy. A study in Wuhan, China showed that doubling time of cases was increased after adopting the lockdown measure (Lau et al., 2020). On the other side, patients at emergency department in England fell by 25% during lockdown that implies the harmful situation of difficulty in assessing the non-COVID treatment services (Thornton, 2020). Likewise, the lockdown in India is estimated to have huge loss in India economy due to increment in unemployment rate and retail loans (Paul, 2020). This observation has important implication for revising the current policies to overcome the detrimental effects caused by these issues.

Predicting the large spread of COVID-19 in Lunar New Year of China, Government of Republic of China adopted various measures like extending the holiday long enough to shelter the incubation period of virus, isolating the confirmed cases in hospitals, developing quarantine shelters in different hospital and declaring the home based quarantine (Chen et al., 2020). Nepal also cancelled Visit Nepal 2020 campaign when COVID-19 outbreak turned into pandemic (Subedi, 2020). Like other countries, GoN declared lockdown across the country, sealed the land borders, suspended national and international flights (Giri, 2020), and cancelled academic examinations and educational activities (The Rising Nepal, 2020). MoHP has taken various measures for prevention of its spread and management of the treatment services in Nepal. Quarantine centers and temporary hospitals are setup with ICU units and isolation beds throughout the country. Laboratories facilities are upgraded and expanded and MoHP regularly ensures the availability of necessary items for the prevention and management of COVID-19 cases (Piryani et al., 2020). Department of Health Services has been supplying essential items such as Personal Protective Equipment (PPE), N95 mask, gowns, gloves, disinfectant sprayer pump, goggles, thermometer etc. (MoHP, 2020). Since 13 March 2020, two call centers along with three mobile phone services have been operated to provide counseling services on any queries regarding COVID-19 prevention and treatment. MOHP is continuously formulating various guidelines for providing guidance to effective diagnosis, treatment and prevention of COVID-19 cases in Nepal. Also, DHIS2 Tracker system training was conducted for health workers for routine reporting of COVID-19 test from laboratories (MoHP, 2020). There are however, other possible challenges like limited finance, lack of necessary equipment such as PPE (Nepali Times, 2020), masks and Intensive Care Unit with ventilators required for prevention and treatment services (Paneru, 2020). It is also found that, as of 21 May, 2020, limited tests have been performed in Nepal (117,432 tests) as compared to other neighboring countries China, India (2,615,920 tests) and Bangladesh (214,114 tests) (Worldometer, 2020). Nepal is still struggling to manage the test kits and other logistic materials and improve the isolation services in some provinces.

As Nepal is practicing federal system since few years only, coordination among three tiers of Government (Federal, Provincial and Local) seems challenging for dealing with the COVID-19 outbreak. Despite the timely adoption of preventive strategies in Nepal, the number of cases is in increasing trend. It’s critical to test all the suspected cases and adopt effective public health measures through public-private partnership in early stage to combat this pandemic. Being landlocked country, it’s hard for government to completely seal off the Indian border. Hundreds of Nepalese are stuck at India border and on the other side; migrants who already returned from India are violating the quarantine protocol that is one of the major reason of rise in number of cases in Nepal (Nepali Times, 2020). Collaboration with India is vital to resolve this issue. The restriction of movement during lockdown has hindered the accessibility of health services in Nepal (Dhiren, 2020). The vulnerable groups like old aged, pregnant mothers and children are at high risk. Additionally, this pandemic is likely to increase the sexual and gender-based violence (Taub, 2020) and psychological distress are also expected to rise (Qiu et al., 2020).

5. Conclusion

There is a drastic increase of number of COVID-19 cases in Nepal after May 2020, nearly after three months of first report of COVID19 case in Nepal. Based on the nature of outbreak, Government of Nepal is adopting different preventing measures. There is need of joint effort by individuals, communities and government to prevent the spread. Multilevel and multisector coordination and collaboration should be strengthened before condition goes out of control to each stakeholder. Greater efforts are needed to formulate effective strategies using the available evidence to manage the COVID-19 outbreak in early stage in Nepal.

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