

Knowledge about the COVID-19 pandemic among undergraduate medical and dental students in Lalitpur, Nepal

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Abstract

Background Health science students are an important source of support to health systems. The number of cases of coronavirus disease-19 is still increasing especially in South Asia. Therefore, for better management, there is an urgent need to understand the knowledge of the disease among health science students. Therefore, this study was undertaken to assess the knowledge of medical and dental students regarding the coronavirus pandemic.

Methods A cross sectional study was performed during the third week of June among first to final year medical and dental students. As the country was in lockdown, a structured online questionnaire was used to obtain data. The responses obtained were cleaned, coded, entered in IBM SPSS Statistics for Windows and the normality of the data checked using one-sample Kolmogorov Smirnov test ($p < 0.05$). The demographic parameters were tabulated and total score compared among different subgroups of participants. The frequency of different measures mentioned by respondents to control the pandemic were also noted.

Results Out of the 565 participants, 336 (59.6%) were females followed by 229 (40.4%) males. Nearly half of the participants, 282 (49.8%) were belonging to age group 21–23 years. Majority 415 (73.5%) were undergraduate medical and 150 (26.5%) were undergraduate dental students. The largest number of respondents, 140 (24.9%) were from second year of study and 344 (60.9%) were from urban areas. The median total score was 21 and the interquartile range 4. The maximum possible score was 30. The scores among students belonging to different years of study were significantly different ($p = 0.033$). Total scores were not significantly different among other subgroups of respondents.

Conclusions The knowledge of the participants was good. Deficiencies in knowledge were noted in certain areas and these should be addressed through an educational intervention. In countries where epidemic is on the rise, strategies to keep health science students updated with proper information related to COVID-19 is important. Similar studies can be undertaken in other medical colleges in the country and in nursing and pharmacy colleges also.

Background

COVID-19 is a global pandemic and has affected many people's health and economy. The causative factor for COVID-19 is a new strain of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) [1]. The disease outbreak was declared as pandemic by the World Health Organization (WHO) during the third week of March 2020. [2] During the last four months COVID-19 is responsible for increasing morbidity and mortality around the world.[3]

The viral nature of the causative factors is seen as a double stranded RNA virus capable of causing various symptoms seen to affect various organs like lungs, liver, intestine and neurons. [4, 5] Corona viruses has caused other diseases in the past which includes the pandemic of severe acute respiratory syndrome (SARS) in 2002 and 2003 and Middle East respiratory syndrome (MERS) outbreak in 2015. [6]

The symptoms of COVID-19 resemble the symptoms of previous infections caused by the same group of virus. [7] Transmission is thought to occur via respiratory droplets from close contact with a person suffering from the disease. The incubation period is between 2 and 14 days and individuals are most contagious when symptoms are worst. Transmission can also occur after contact with asymptomatic people.

The infectivity is remarkably similar for the symptomatic as well as asymptomatic patients having the same viral load as the infected patients. [8, 9] This is an alarming issue regarding the transmission potential from the infected patients during their early days of infection. [9] Transmission from touching contaminated surfaces and then touching one's face is also suspected. [10] The COVID-19 disease is highly infectious and the main clinical symptoms include malaise, pyrexia and difficulty in breathing with cough. This can lead to several respiratory complications and death if left untreated for some cases. [11, 12]

Medical students are directly or indirectly connected with epidemics and pandemics. There is a shortage of healthcare professionals in many developing countries. Medical students can also be a part of the treatment care practices and can increase the efficiency of inadequately staffed clinics by taking patient histories, providing patients with laboratory test results, educating patients, documenting visits, and answering questions about COVID-19. [13] Patients with chronic diseases need routine care even during pandemics. Pregnant women need routine checkups. Medical students can also provide care to the inpatients who are not suffering from COVID-19. Under the supervision of seniors, medical students can play an active role in the management of these patients. In the absence of medical students all these inpatients have to be covered by house officers and this may overwhelm the health care system. Hence, staffing the hospital with senior medical students can maximize the availability of other clinicians to treat patients with COVID-19. [14]

Medical students are considered to have an important role towards the pandemic of COVID-19. There are guidelines published by the regarding the participation of medical students by the Medical Schools Council (MSC) of the United Kingdom and the Association of American Medical Colleges (AAMC) of the United States. [15, 16] Medical students can work as a volunteers with adequate training and can take part in managing the pandemic withing their competencies under the supervision and adequate safety gears. [15, 16] Literature has shown that many medical students have taken part for the united efforts towards managing this pandemic. [17, 18]

COVID-19 pandemic has caused shortage of healthcare resources worldwide and the same situation may be developing in Nepal. In this situation, massive human resources from undergraduate medical, dental, pharmacy and nursing schools can be utilized. Although most of the students are in the learning phase of their career, and do not have license to practice, emergency circumstances may force the government to engage them in the management of COVID-19 as volunteers.

There is an evidence for the active participation of the medical student's engagement during the Spanish flu outbreak of 1918 at Pennsylvania. [19] Similar types of involvement of medical students were

observed during 1952 polio epidemic in Denmark, where the medical students were engaged with manual ventilation procedures for the affected patients. [20] Medical students from the medical schools in United states, Italy and United Kingdom are graduating early, so that they can serve as clinicians during this pandemic. [14]

There is no certainty about the end of this COVID 19 pandemic. Data is still awaited about the effectiveness of social distancing, the transmission of the virus and the development of new therapies and vaccines. As the number of cases of COVID-19 is still increasing day by day, it is better to involve the medical students before the healthcare system reaches a breaking point. As mentioned previously, certain medical schools are allowing students to graduate early to manage the acute shortage of staff.[17] Also medical students are future doctors of the country. They are the educated members of the community and will be an important taskforce towards managing pandemics like COVID-19.

Hundreds of medical students have already found ways to support the response to COVID-19. [21] In Nepal, both the undergraduate medical and dental program are of four and half years' duration followed by a year of rotating internship. Students join the Bachelor of Medicine and Bachelor of Surgery (MBBS) and Bachelor of Dental Surgery (BDS) programs after completing twelve years of schooling. [22, 23] Medical students can be provided online training on infectious disease epidemiology, infectious disease control and outbreak response with special reference to COVID-19. Therefore, to facilitate outbreak management and design educational programs, there is an urgent need to understand the knowledge of COVID-19 among medical students. Therefore, this study was undertaken to assess the knowledge of medical and dental students regarding the coronavirus pandemic.

Methods

Study design: A cross-sectional survey assessing the medical and dental student's knowledge, regarding the COVID-19 pandemic.

Study duration: The data collection was done during 20th June to 26th June, 2020, when the country was under lockdown due to COVID-19.

Sample selection: Students from first year to final year MBBS and BDS were selected for the study. Written consent was obtained from the participants.

Sample size: The institution has a total of 506 medical students excluding interns and a total of 162 dental students making a total of 668 students. All students were approached for this study.

Sampling method and Technique: All students willing to participate were included after obtaining written, informed consent.

Inclusion and exclusion criteria: All students from first year to final year MBBS and BDS from the institution. Any student unwilling to respond to the survey was excluded. Interns and alumni were excluded.

Study questionnaire: The study questionnaire was designed by the researchers based on the literature and referring to WHO guidelines on COVID-19. [3, 24] The questionnaire had three sections. Section I contained the written consent part. Section II contained demographic details for age, gender, year of study, study stream and area of residence. Section III contained questions regarding knowledge of COVID-19 among the students. Questionnaire had questions to assess the knowledge about clinical symptoms, routes of transmission, use of medicines and also about prevention and control of COVID-19. Twenty questions were single best response multiple choice questions having 5 distractors. One question was an opinion poll regarding the best method to control corona infection. Ten questions were of true/false type. True answers were scored as '1' and false answers as '0'. Same scoring system was followed for all the multiple-choice questions and also Yes/No types of questions. The questionnaire has been attached as a supplementary file.

Pretesting of the questionnaire: The study questionnaire was content validated by the researchers and by experts of medicine department. The validity of the questionnaire was assessed by pilot testing the questionnaire by administering to sixty students (alumni) who had already passed the MBBS course. The reliability was assessed by calculating the Cronbach alpha. The data from pilot testing was not included in the final analysis. The value of Cronbach alpha was 0.7.

Data Collection methods: Since the study was conducted during lockdown it was not possible to collect the responses directly from the students, hence a structured online questionnaire was used as a data collection tool. An online questionnaire was constructed using Google form. The online questionnaire was sent to the participants via their e-mail and social networking accounts. Class representatives of each year were contacted. Students completed the questionnaire at leisure. They signed an integrity pledge that they will answer the questions by themselves and would not consult other resources and with their friends and family members while answering the same.

Data analysis: The responses obtained from the questionnaire were entered in IBM SPSS Statistics for Windows, Version 26 and the normality of the data checked using one- sample Kolmogorov Smirnov test ($p < 0.05$). The total score was calculated by adding the scores of all the questions except question 25 which was asking participant's opinions. Each correct answer was given a score of 1 and the maximum possible score was 30. The total score and the individual scores were noted not to follow a normal distribution and median scores were calculated. Comparisons of total scores among different subgroups of students was performed using appropriate non-parametric tests ($p < 0.05$). The demographic parameters were analyzed descriptively and tabulated as number and percentage.

Results

Out of the six hundred and sixty-eight students, five hundred and sixty-five participated. The survey response rate was 84.6%. The demographic characteristics including age, gender, stream of study, year of study and area of residence has been presented in Table 1. Out of the 565 participants, 336 (59.6%) were females followed by 229 (40.4%) males. Nearly half of the participants, 282 (49.8%) belonged to the age

group 21–23 years. Majority of the participants, 415 (73.5%) were from MBBS stream and 150 (26.5%) students were from BDS stream. The largest number of respondents, 140 (24.9%) were from second year of study and 344 (60.9%) were from urban areas.

Table 1
Demographic characteristics of respondents (n = 565)

Characteristic	Number (percentage)
Age (in years)	53 (9.4)
17–20	282 (49.8)
21–23	223 (39.4)
23–26	7 (1.2)
26 years and above	
Gender	229 (40.4)
Male	336 (59.6)
Female	
Education	415 (73.5)
MBBS	150 (26.5)
BDS	
Year of Study	100 (17.9)
First Year	140 (24.9)
Second Year	127 (22.7)
Third Year	112 (19.9)
Fourth Year	86 (15.2)
Final Year	
Area of residence	72 (12.7)
Rural	344 (60.9)
Urban	149 (26.4)
Semi urban	

The median total score was 21 and the interquartile range was 4. The maximum possible score was 30. The median scores among different subgroups of respondents has been shown in Table 2 along with the interquartile range and the P values. The scores among students of different years of study were

significantly different ($p = 0.033$). The median total scores were significantly different among third and fourth year, second and fifth year, second and fourth year and first and fourth year students.

Table 2
Median scores among different subgroups of respondents

Characteristic	Median score (Inter quartile range)	P value
Age (in years)	21 (4)	0.340
17–20	21 (3)	
21–23	21 (4)	
23–26	22 (7)	
26 years and above		
Gender	21 (4)	0.375
Male	21 (4)	
Female		
Education	21 (4)	0.732
MBBS	21 (3)	
BDS		
Year of Study	21 (4)	0.033
First Year	20.5 (4)	
Second Year	20 (4)	
Third Year	21.5 (3)	
Fourth Year	21 (3)	
Final Year		
Area of residence	21 (3)	0.309
Rural	21 (4)	
Urban	21 (4)	
Semi urban		

Table 2. Median scores among different subgroups of respondents

[Table 2 should be inserted here]

[Figure 1 should be inserted here]

Figure 1 shows student strategies for managing the COVID-19 pandemic.

The most common response was sealing international borders as the human movement will be reduced and the risk of community transmission minimized. Second was increasing laboratory and diagnostic facilities as these may help to diagnose the cases early and can reduce the risk of transmission. Similar responses were obtained with regard to increasing hospital facilities which can help in treating the infected COVID-19 patients. Community mitigation came as fourth followed by drafting legislation for control. Community mitigation is done for reducing the rate of infection transmission from person to person contact and includes the social distancing measures.

The number of respondents providing correct responses to individual questions has been mentioned in Tables 3 and 4. Table 3 deals with multiple choice questions while Table 4 is concerned with true-false questions.

Table 3
Number of students providing correct answers to multiple choice questions

Q. No	Statement (Correct answer)	Number and % of respondents answering correctly (n = 565)
1.	The virus causing COVID-19 infection is called as: [SARS-CoV-2]	540 (95.6)
2.	Corona virus is a: [Single stranded RNA virus]	524 (92.7)
3.	The most common set of symptoms of COVID-19 are: [Fever, Dry Cough and Tiredness]	443 (78.4)
4.	The minimum concentration of alcohol in hand sanitizers to kill the virus should be: [70%]	399 (70.6)
5.	According to current evidence, the “commonest” mode of transmission of COVID-19 infection is: [Respiratory droplets]	400 (71)
6.	Preferred method of hand hygiene to reduce COVID-19 transmission is: [Hand rub with soap and water for 20 secs]	467 (82.7)
7.	WHO recommended self-isolation period for COVID-19 is: [14 Days]	517 (91.5)
8.	Which of the following is recommended by the WHO for isolation of a patient with confirmed case of COVID-19 infection? [Airborne infection isolation room with exhaust]	198 (35)
9.	In Nepal, for Physician/Staff running the fever/screening clinics the PPEs recommended does not include: [Respirator N95]	155 (27.4)
10.	Most effective mask for preventing corona infection would be: [N-95 face mask]	533 (94.3)
11.	In COVID-19 infection, an estimated proportion of people who recovered without need of hospital stay are: [80%]	175 (31)
12.	“Self -isolate” in COVID-19 infection means: [Persons with COVID-19 symptoms stays at home and does not go to work, school or public places]	203 (35.9)
13.	Recommended test for early case detection of COVID-19 infection is: [Molecular test (PCR)]	201 (35.6)
14.	Corona virus can survive up to 72 hours in: [Plastics and stainless steel]	189 (33.5)
15.	Thermal scanners are used to detect raised temperature from: [Any infection]	328 (58.1)
16.	Live COVID-19 map is used to: [Update estimate of geographic spread by country]	324 (57.3)

Q. No	Statement (Correct answer)	Number and % of respondents answering correctly (n = 565)
17.	An important measure for protecting oneself from COVID-19 is: [Regular hand hygiene and avoiding crowded places]	561 (99.3)
18.	Which of the following individuals has the highest risk of mortality from COVID-19? [An 80-year-old suffering from diabetes and hypertension]	539 (95.4)
19.	The R number refers to: [The average number of people who can be infected by one infected person]	378 (66.9)
20.	How much distance should two persons be apart to maintain social distancing according to WHO? [3 feet]	233 (41.2)

Table 4
Percentage of respondents providing correct answers to true or false questions

Q. No	Statement (Correct answer)	Number and % of respondents providing the correct response
1.	Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS) are caused by similar viral species as COVID-19. [True]	449 (79.5)
2.	COVID-19 treatment guidelines have been developed for healthcare professionals working at hospitals in Nepal. [True]	175 (31)
3.	There are specific drugs available to treat corona virus infection. [No]	521 (92.2)
4.	Antibiotics can cure corona virus infection. [False]	437 (77.3)
5.	Convalescent plasma therapy can be used in treating corona infections. [Yes]	397 (70.3)
6.	Betahistine shows promise in treating corona virus infection. [No]	68 (12)
7.	Remdesvir is a new antiviral drug still in clinical trials for corona virus treatment. [Yes]	495 (87.6)
8.	Ibuprofen is recommended as an anti-inflammatory agent in COVID-19. [No]	203 (35.9)
9.	Can COVID-19 be transmitted from a person who has no symptoms? [Yes]	536 (94.9)
10.	The homeopathic medicine Arsenicum album 30C can effectively prevent COVID-19. [No]	512 (90.6)

Discussion

COVID-19 Pandemic has greatly impacted individuals and health care workers throughout the world. At the end of June 2020, cases are slowly decreasing in countries where there was early outbreak of the pandemic, while in Nepal the number of cases has started to rise rapidly. This study was conducted to ascertain the current status of students' knowledge about the COVID-19 pandemic. Most students had good knowledge about the corona virus disease, its signs, and symptoms. Students from MBBS and BDS stream were aware of facts like the causative factors for the COVID-19 disease (95.6%) and the type of virus causing this infection (92.7%). This was in accordance with a recent study from Pakistan [25], where majority of students, (97.4%) were aware about the causes and the viral nature of the disease and also with another study from India, which showed 92.7% of the participants' had good knowledge.²⁶ Our study has shown that only 71% of students were aware about the mode of transmission of this virus, which is lesser compared to the results from a similar study among students, where 97.4% of them knew about the transmission modes and the signs and symptoms of the disease.

This study has revealed that 78.4% of participants knew about the signs and symptoms of COVID-19, which is lesser compared to another study from India, in which 86.7% of participants were aware of these symptoms. [26] This study showed that 99.3% of participants were aware about the important protective measures like avoiding crowds and maintaining hand hygiene. This is also in accordance to a study from India, where 96.9% of participants knew about preventive measures. Similar observations were seen for the recommended 14 days of isolation period for the affected patients. [26]

In this study, medical and dental students had acceptable (70% of maximum) knowledge about coronavirus. The reason might be the free availability of information about the disease in electronic media, various social media and other websites. Studies have shown that availability of this information in media can be a source of information for the students. [26] Respondents, (91.5%) were also aware of the cautionary actions, self-isolation period as per WHO guidelines and the effective use of mask for preventing corona infection (94.3%). These results were like the other published studies. [27, 28]

The knowledge levels regarding these questions were high in our study as compared to another study from the Philippines, where the knowledge for social distancing and wearing a mask was found to be 62.64% and the same for hand sanitization was 66.42% [29].

The results showed that for the questions regarding self-isolation in COVID-19 infection and recommended test for early case detection, a smaller number of participants responded correctly. The correct responses were only from 35% of participants. Similarly, for the statements for WHO recommendation for isolation of a patient with confirmed case of COVID-19 infection, and the survival of corona virus on the plastic and stainless-steel surfaces, only 35% of participants responded correctly.

Results were better for the statements regarding thermal scanners; 58.1% of participants responded that these were used to detect raised temperature from any infection. Social distancing issues were responded correctly by only 41.2% of students. The knowledge levels for the interns and passed out students were

higher as compared to the students who are studying in other years according to a study from Iran. [30] The scores for the medical and dental students were significantly different according to years of study ($p = 0.033$). Median score was significantly higher among those in the higher years of study. This may be due to content and curricula during the years of study created better understanding about diseases. [31] There is no difference in total score among BDS and MBBS students (P value = 0.732). This may be due to effective various sources of information including government health authorities and social media which plays pivotal role in knowledge gain and hence dissemination of information. [32]

Regarding the treatment of corona virus by antibiotics, our study has shown that 77.3% of participants have responded correctly, which is somewhat lesser than a similar study from Italy, where 80.7% of participants responded correctly. [33] Similarly, the responses for a question regarding the specific drugs available for treating corona virus, in our study correct responses were obtained from 92.2% of respondents, which was better than the Italian study, where the correct responses were only 69.7%.

The median knowledge score in our study was 70% (21 out of 30). The study conducted in Debre Birhan University, Ethiopia showed that the knowledge score was 73.8% [34], while it was 88.2% in a multicenter study from Ethiopia. [35] The knowledge score depends on a number of parameters including the respondents and the questions used to assess knowledge and understanding.

It was noted that 70.3% and 87.6% of respondents answered correctly about treatment with convalescent plasma and with the antiviral drugs remdesvir; 93.6% knew that Arsenicum alum 30C was not used to treat corona infections as it was a homeopathic drug without proven efficacy for treating corona infections.

The areas where the participants were having lesser knowledge were on personal protective equipment (PPE) and facilities for proper management of COVID-19 at health facilities. In question on PPEs recommended for physician/staff running the fever/screening clinics in Nepal, only 27.4% were able to correctly answer. In today's circumstances when there is high demand of PPEs, health science students must have correct knowledge on types of PPEs recommended at various work stations at health facilities. [32] Also only 31% of respondents were aware that COVID-19 treatment guidelines have been developed for healthcare professionals working at hospitals in Nepal. [36] These are the areas where educational interventions can be targeted for better level of knowledge and also to fill in the gaps of knowledge related to COVID-19.

Strength and limitations: Good response rate was the strength of the study. The study also had limitations. Student knowledge was tested only by using a questionnaire and the information was not triangulated with that obtained from other sources. Despite the integrity pledge we are not completely sure that students did not consult other information sources or their friends and family members while answering the questionnaire.

Conclusion

Our study showed that there is good knowledge about COVID 19 among medical and dental students. More than 90% of the respondents had correct knowledge about causative agent and strain, effective mask for corona protection, self-isolation period, effective preventive measures like avoiding crowd and frequent hand washing. Surprisingly, only 71% on respondents correctly stated that respiratory droplet is the source of infection for COVID-19. This knowledge gap among 29% respondents is very crucial for medical and dental students as they are focal persons to work with community and share their knowledge correctly with them.

In countries where epidemic is on the rise, strategies to keep health science students updated with proper information related to COVID-19 is important. The lacunae noted can be addressed through educational sessions. Similar studies can be undertaken in other medical colleges in the country and in nursing and pharmacy colleges also.

List Of Abbreviations

AAMC: association of American Medical colleges; BDS: Bachelor of dental surgery; COVID-19: Corona virus idease-19; ; IBM SPSS: International Business Machines statistical package for social sciences; MBBS: bachelor of medicine and bachelor of surgery; MERS: Middle east respiratory syndrome; MSC: Medical schools council; PPE: personal protective equipment; RNA: ribonucleic acid; SARS-CoV-2: severe acute respiratory syndrome corona virus-2; WHO: World Health Organization

Declarations

Ethics approval and consent to participate: The research proposal was approved by the Institutional Review Committee (IRC) KIST Medical College with reference number 2076/77/39. The participants were informed about the purpose of the research and written consent obtained prior to enrolling them. Anonymity was maintained throughout the research and no information related to individual respondents are available in public domain.

Consent for publication

We have not used any personal information or images. So, this is not applicable for this manuscript.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interest

The authors declare that they have no competing interests.

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Authors' contributions

NJ, NS and PRS conceived and designed the study. The concept of the study was discussed with and modified as per inputs received from the other authors. NJ and PRS finalized the methodology. NS, OB, PD and TM finalized the tool used. NJ collected the data. PRS, NJ analysed the data. NJ, SK and PRS drafted the manuscript. OB, PD and TM made significant contributions to writing the manuscript and reviewing the literature. All authors were involved in revising the manuscript. The final manuscript has been read and approved by all the authors.

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Figures

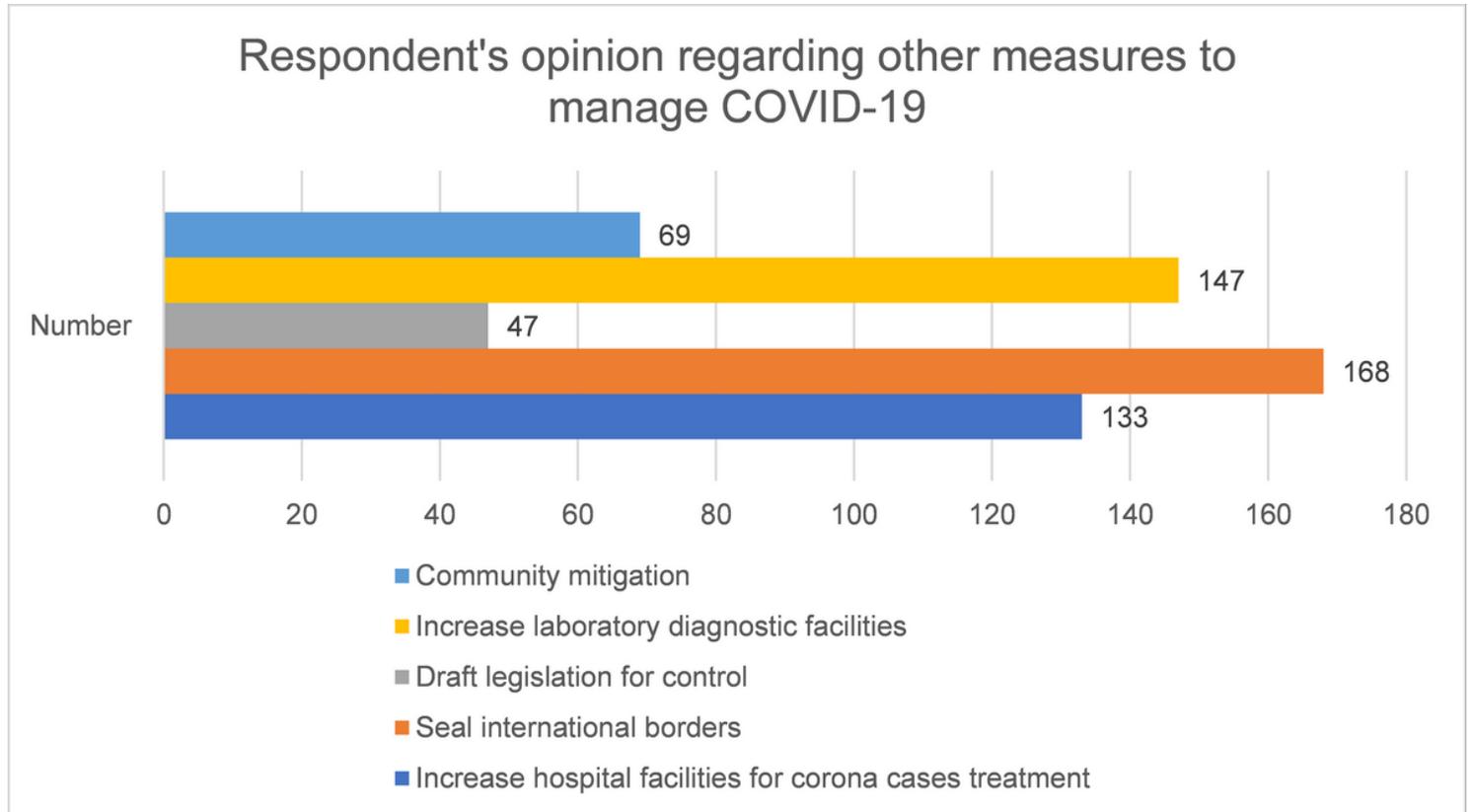


Figure 1

deals with responses suggested by the participants for the management of corona virus disease-19 (COVID-19) other than those provided by the authors in the questionnaire.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [Questionnaire.pdf](#)