COVID-19: A National Survey on Perceived Level of Knowledge, Attitude and Practice among Frontline Medical Professionals in Nepal

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Research article

Keywords: Frontline medical professionals, COVID-19, Coronavirus disease, Knowledge, Attitude, Practice

DOI: https://doi.org/10.21203/rs.3.rs-40299/v1

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Abstract

Background

COVID-19 is currently recognized as an emerging public health problem caused by SARS-CoV-2. Thousands of people around the world have been infected since it appeared the very first time in Wuhan. For any epidemics, FMPs are at high risk of infection, and also become the vector for the disease transmission. Inadequate knowledge has been proven to be the causative factor for disease infection & transmission. This study aimed to determine the knowledge, attitude & practice among FMPs, including doctors, nurses, and other paramedics working in the frontline in the different Hospitals in Nepal.

Methods

Non-probability convenience sampling technique was used in this cross-sectional study to collect data from 603 FMPs. A self-administered questionnaire was utilized to assess the KAP of the FMPs. It was divided into 4-parts consisting of 31-items, demographic characteristics (11-items), knowledge (10-items), attitude (5-items), and practice (5-items). It consisted of both multiple-choice questions and Likert scale items questionnaire. Data were analyzed using SPSS version 23.

Results

A majority of the participants (76%) reported adequate knowledge. Most of the demographic characteristics, except the place of work, showed significant association with knowledge. About 54.7% of the FMPs demonstrated a positive attitude. Some of the demographic characteristics such as; age, gender, level of education, profession, and online course regarding COVID-19 showed significant association with attitude. A large population (78.9%) displayed appropriate practice, while only two demographic characteristics, profession and online course regarding COVID-19, showed significant association. Pearson correlation showed a significant association between KAP at the level of p < 0.01.

Conclusions

There was a significant association between KAP among FMPs. The FMPs having higher education showed better knowledge and attitude, but the practice was not affected by their education level. Very few FMPs were involved in IPC training and online courses regarding COVID-19, and they displayed better KAP scores. A higher level of knowledge might be accountable for a better attitude and practice. So, FMPs need to be encouraged and motivated to update knowledge regularly. The government and stakeholders should arrange educational programs and training. Also, FMPs need to be encouraged to use official websites to acquire knowledge.

Background

The Coronavirus Disease 2019 (COVID-19) is recently identified as a fatal respiratory problem caused by the Novel Coronavirus subtype SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus 2) [1]. On the last of December 2019, a cluster of pneumonia cases appeared in Wuhan city, a highly populated city in Central China, where more than 11 million population reside [2]. The disease is highly contagious and characterized by fever, cough, dyspnoea, fatigue, myalgia and anosmia [3]. On chest computed tomographic (CT) scan bilateral lung infiltration with ground glass appearance is evident [4]. The World Health Organization (WHO) stated the Chinese outbreak of Novel coronavirus as a public health emergency on January 30 [5] and named COVID-19 on February 11, 2020 [6]. The disease rapidly spread over 114 countries and infected more than 118,000 people, including 4291 deaths, so WHO declared COVID-19 as a global pandemic on March 11, 2020 [2].

On January 13, 2020, the first case was detected in Nepal, a 32-year-old man studying at Wuhan, who returned to Nepal for winter vacation [7]. He went to the hospital for a cough. For a positive history of travel from the COVID-19 epicenter, and he was investigated for COVID-19. Throat swab was taken and sent to Hongkong for RT-PCR and tested positive for COVID-19 [7]. As of June 24, 2020, Nepal reached 10,099 confirmed cases with 24 mortality. On the same date, 9,395,027 confirmed cases, with 480,627 deaths were reported globally.

Frontline Medical Professionals (FMPs), including doctors, nurses, and paramedics, are prone to get infected. As per the International Council of Nurses (ICN), at least 90,000 FMPs were infected with the virus globally, with more than 260 deaths among nurses only. However, the WHO reported only 23,000 infections among FMPs. So, there still exists a lack of official data reported by the responsible bodies. That has put the FMPs at a higher risk of infection, further leading to high risk to the patients. Meanwhile, Nepal also reported the 1st COVID-19 case among FMPs (a nurse) on May 12, 2020, that increased to 71, including doctors, nurses, paramedics, and laboratory staff working in the frontline on June 24, 2020.
According to the previous reports, the FMPs are being infected both in the workplace and in the community [8, 9]. A recent study from China, COVID-19 infection on FMPs were common at the initial stage of the disease outbreak in Wuhan. However, the infection rate was reduced to nil among the FMPs, who were deployed from different provinces to combat COVID-19—the reason they reported having infections at the initial stage to be negligence and lack of knowledge [10]. Previous similar epidemic studies conducted found that the lack of knowledge among FMPs to be the causative factors for disease infection & transmission [8], and also leads to late diagnosis, treatment and care. The reason is insufficient knowledge and improper practice for infection prevention [12]. This study aims to determine the knowledge, attitude & practice among FMPs, including doctors, nurses, and other paramedics (Health Assistant and CMA, etc.) working in the frontline in the different Hospitals in Nepal.

Methods

We conducted a cross-sectional, non-experimental, and quantitative study to assess the knowledge, attitude & practice regarding COVID-19 among FMPs. Non-probability convenience sampling technique was implemented to gather data from FMPs, including doctors, nurses and other paramedics, who are working in the frontline in the different Hospitals in Nepal. Participants were excluded from the study if they have already participated in similar studies for COVID-19. The data collection procedure was performed in the first week of June 2020. A self-administered questionnaire (Additional file) was developed after a thorough review of the literature of previously published papers regarding SARS-COV, MERS-COV, and SARS-COV-2 and following WHO & CDC guidelines. It was divided into 4 parts consisting of 31-items; demographic characteristics (11-items), knowledge (10-items), attitude (5-items) and practice (5-items). It consists of both multiple-choice questions and Likert scale items questionnaire. We made a short item questionnaire because too long questions might affect the quality of the study. We used 70% as a cut-off value for all the questionnaires.

Demographic characteristics consisted of 11 items, including age, gender, level of education, marital status, profession, working experience, source of information, place of work, infection prevention and control (IPC) training, and online course regarding COVID-19. Knowledge consisted of 10 items, including causative agent, incubation period, mode of transmission, main symptoms, confirmatory diagnosis, high-risk population for severe outcome, preventive measures, current management option, possible complications and mortality rate. It was a multiple-choice question. The correct answer was given 1 point, and an incorrect answer was given 0 point. The score ranged from 0 to 10. Higher scores denoted better knowledge. While knowledge is considered as adequate knowledge, is considered as inadequate knowledge. Attitude consisted of a 5-points Likert scale having 5 items, including worry about transmitting the virus to family, friend & society, belief of virus transmission from an asymptomatic patient, belief of IPC from hand-washing with soap & water, belief of development of a vaccine for COVID-19 and belief that COVID-19 would be controlled completely. Participants' response was from 5 to 25. Higher scores denoted a better attitude. As per 70% cut-off points, it would become 17.5, but there was no score in the decimal so, a score of was rated as a positive attitude, was rated as a negative attitude. The statement for options strongly agree, agree, neutral, disagree and strongly disagree was scored as 5, 4, 3, 2, and 1, respectively. Scoring system was just the opposite for worry about transmitting the virus to family, friend & society. Practice also consisted of 5-points Likert scale having 5 items, including implementation of 5 moments of hand hygiene with 7 steps, utilization of 60% alcohol-based hand sanitizer in the absence of soap & water, wearing of PPE, carefully doffing of PPE and isolation of suspected or infected patients. Participants' response was from 5 to 25. Higher scores denoted better practice. A similar scoring system obtained for the practice as a score of was rated as appropriate, and was rated as inappropriate practice. The statement for options was always, often, sometimes, rarely and never are scored as 5, 4, 3, 2, and 1, respectively.

The validity and reliability of the questionnaire

The prepared questionnaire was sent to 5 randomly selected experts for content validity. Then, reliability was tested from a pilot study from 40 individuals. A Cronbach's alpha of 0.76 was obtained.

Sample Size Calculation

The sample size was calculated from a known population with a formula,

$$Sample\ size\ (n) = \frac{Z^2pq(1-p)}{e^2} \div \left(1 + \frac{Z^2pq(1-p)}{e^2N}\right)$$

Where, the population size (N) is 209552, including registered doctors, nurses, and paramedics. Confidence Level is 95%, population proportion (p) is 0.5, margin of error (e) is 0.05 (5%) , alpha divided by 2 (1-Confidence Level) is 0.025 and Z-score is 1.96. From the above formula, the minimum required sample size (n) calculated was 384.

Statistical Analysis
We used the Statistical Package for Social Sciences (SPSS) version 23 for data analysis. One way ANOVA and Chi-square or Fisher Exact tests were used to analyze continuous data and categorical data, respectively. Pearson correlation was used to investigate the relationship between knowledge, attitude & practice among FMPs. The descriptive statistical analysis was completed for demographic variables. Continuous data were presented as mean ± SD, whereas categorical data were presented as number (n) or percentage (%). A p-value of < 0.05 was considered statistically significant.

Results

Demographic Characteristics of Participants (Table 1)
| Variables                     | Sample (n = 603) | Percentage (%) |
|-------------------------------|------------------|----------------|
| **Age**                       |                  |                |
| 16–29 years                   | 390              | 64.7           |
| 30–49 years                   | 206              | 34.2           |
| 50 + years                    | 7                | 1.2            |
| **Gender**                    |                  |                |
| Male                          | 173              | 28.7           |
| Female                        | 428              | 71             |
| Others                        | 2                | 0.3            |
| **Level of Education**        |                  |                |
| Diploma Level                 | 155              | 25.7           |
| Bachelor’s Degree             | 307              | 50.9           |
| Master’s Degree or Above      | 141              | 23.4           |
| **Marital Status**            |                  |                |
| Single                        | 311              | 51.6           |
| Married                       | 286              | 47.4           |
| Divorced or Widow             | 6                | 1              |
| **Profession**                |                  |                |
| Nurse                         | 342              | 56.7           |
| Doctor                        | 158              | 26.2           |
| Paramedics                    | 103              | 17.1           |
| **Working Experience**        |                  |                |
| Less than 2 years             | 198              | 32.8           |
| 2 to 5 years                  | 186              | 30.8           |
| More than 5 years             | 219              | 36.3           |
| **Source of Information**     |                  |                |
| Social Media                  | 524              | 43.5           |
| Television                    | 288              | 23.9           |
| Websites (WHO, CDC, John Hopkins Medicine) | 393 | 32.6 |
| **Place of Work**             |                  |                |
| Private Hospital              | 335              | 55.5           |
| Government Hospital           | 165              | 27.4           |
| Others                        | 103              | 17.1           |
| **Infection Control Training**|                  |                |
| Yes                           | 264              | 43.8           |
| No                            | 339              | 56.2           |
| **Online Course**             |                  |                |
| Yes                           | 172              | 28.5           |
A total of 603 FMPs were involved in this web-based survey. Of them, 64.7% of the participants were in the age group of 16 to 29 years, and the majority were female (71%). Nearly half of the participants (50.9%) were bachelor's degree holders and single (51.6%). The vast majority of the participants were nurses (56.7%), and a higher proportion (36.3%) of participants had more than 5 years of work experience. Participants gathered information from various sources, where social media was much used. More than half of the participants (55.5%) represented the private hospital. While, only 43.8% of the participants involved in the IPC training and, merely 28.5% of the participants received the online courses.

**Perceived Level of Knowledge, Attitude and Practice (Fig. 1 & Table 2)**

| Variables | Sample (n = 603) | Percentage (%) |
|-----------|------------------|----------------|
| No        | 431              | 71.5           |

n: Number of participants, WHO: World Health Organization, CDC: Centers for Disease Control & Prevention
| Variables            | Knowledge |                     | Attitude |                     | Practice |                     |
|----------------------|-----------|----------------------|----------|----------------------|----------|----------------------|
|                      | Adequate (n, %) | Inadequate (n, %) | P-value  | Positive (n, %) | Negative (n, %) | P-value  |
| Age (years)          |           |                      |          |                     |           |                      |
| 16–29                | 278 (71.3) | 112 (28.7)           | .002     | 198 (50.8)         | 192 (49.2) | .012                |
| 30–49                | 174 (84.5) | 32 (15.5)            |          | 126 (61.2)         | 80 (38.8)  | .015                |
| 50+                  | 6 (85.7)   | 1 (14.3)             |          | 6 (85.7)           | 1 (14.3)   | .009                |
| Gender               |           |                      |          |                     |           |                      |
| Male                 | 154 (89)  | 19 (11)              | .000     | 105 (60.7)         | 67 (39.3)  | .044                |
| Female               | 303 (70.8)| 125 (29.2)           |          | 223 (52.1)         | 205 (47.9) | .012                |
| Others               | 1 (50)    | 1 (50)               |          |                     |           |                      |
| Level of Education   | Diploma Level |            | .000     | 70 (45.2)         | 85 (54.8)  | .001                |
| Bachelor's Degree    | 230 (74.9)| 77 (25.1)            |          | 165 (53.7)        | 142 (46.3) | .240                |
| Master's Degree or Above | 126 (89.4)| 15 (10.6)           |          | 95 (67.4)        | 46 (32.6)  | .584                |
| Marital Status       | Single    | 219 (70.4)           | .006     | 165 (53.1)        | 146 (46.9) | .374                |
|                      | Married   | 234 (81.8)           |          | 163 (57)          | 123 (43)   | .231                |
|                      | Divorced or Widow |           |          | 2 (33.3)         | 4 (66.7)   | .584                |
| Profession           | Nurse     | 242 (70.8)           | .000     | 172 (50.3)        | 170 (49.7) | .001                |
|                      | Doctor    | 141 (89.2)           |          | 107 (67.7)       | 51 (32.3)  | .109                |
|                      | Paramedics | 75 (72.8)          |          | 51 (49.5)         | 52 (50.5)  | .230                |
| Working Experience   | Less than 2 years |            | .001     | 114 (57.6)       | 84 (42.4)  | .160                |
|                      | 2 to 5 years |            |          | 91 (48.9)        | 95 (51.1)  | .230                |
|                      | More than 5 years |           |          | 125 (57.1)      | 94 (42.9)  | .230                |
| Source of Information| Social Media |            | .004     | 290 (87.9)       | 234 (85.7) | .067                |
|                      | Television | 229 (50.0)           |          | 167 (50.6)       | 121 (44.3) | .230                |
|                      | Website (WHO, CDC, John Hopkins Medicine) | |          | 227 (68.8)     | 166 (60.8)  | .230                |
|                      | Place of Work |            | .113     | 174 (51.9)       | 161 (48.1) | .230                |
|                      | Private Hospital |           |          | 263 (78.5)      | 72 (21.5)  | .971                |
|                      | Government Hospital |           |          | 313 (65.8)     | 80 (63.0)  | .746                |
## Variables

| Variables                  | Knowledge Adequate (n, %) | Knowledge Inadequate (n, %) | Attitude Positive (n, %) | Attitude Negative (n, %) | Practice Appropriate (n, %) | Practice Inappropriate (n, %) | P-value |
|----------------------------|---------------------------|----------------------------|-------------------------|--------------------------|-----------------------------|-------------------------------|---------|
| **Infection Control Training** | Yes                       | 215 (81.4)                 | 49 (18.6)               | .005                     | 156 (59.1)                  | 108 (49.8)                    | .057    |
|                            | No                        | 243 (71.7)                 | 96 (28.3)               |                          | 174 (51.3)                  | 165 (48.7)                    |         |
| **Online Course**          | Yes                       | 142 (82.6)                 | 30 (17.4)               | .017                     | 109 (63.4)                  | 63 (36.6)                     | .007    |
|                            | No                        | 316 (73.3)                 | 115 (26.7)              |                          | 221 (51.3)                  | 210 (48.7)                    |         |

KAP: Knowledge, attitude and practice, n: Number of participants, WHO: World Health Organization, CDC: Centers for Disease Control & Prevention

### Knowledge

Statistically significant differences regarding the perceived level of knowledge among FMPs were observed among variables, including age, gender, level of education, marital status, profession, working experience, source of information, IPC training, and online course (p < 0.05). In contrast, the knowledge of FMPs regarding the place of work was not statistically significant (p > 0.05). A total of 76% of the FMPs reported adequate knowledge in this survey. A higher proportion of knowledge (84.5%) was noticed among the 30–49 years age group. Males (89%) were found more knowledgeable than others. The knowledge was also observed higher among master's degree holders (89.4%). Professionally, doctors (89.2%) reported a higher level of knowledge as compared to nurses and paramedics. Higher knowledge was found in participants who have more than 5 years of working experience. Among the participants, 86.7% reported better knowledge who used social media as a source of information. The higher level of knowledge was found in FMPs who received IPC training (81.4%) and online course (82.6%).

### Attitude

Statistically significant differences regarding the attitude among FMPs were observed among variables, including age, gender, level of education, profession, and online course (p < 0.05). In contrast, the attitude of FMPs regarding marital status, working experience, source of information, place of work, and IPC training were not statistically significant (p > 0.05). Only half of the FMPs (54.7%) demonstrated a positive attitude. A positive attitude was reported by 85.7% of the FMPs aged 50+ years, 60.7% of the males, 67.4% of the master's degree holders, 67.7% of the doctors, and 63.4% of the online course receivers.

### Practice

Approximately 78.9% of the FMPs implemented appropriate practice. Most of the demographic variables, including age, gender, level of education, marital status, working experience, source of information, place of work, and even IPC training, did not show any significant association (p > 0.05). Only 2 variables, including the profession and online course, showed a significant difference (p < 0.05). Professionally, 83.3% of the nurses and 87.2% of the FMPs who received online courses demonstrated appropriate practice.

### Correlation Analysis (table)

| Table 3 Correlation analysis of Knowledge, Attitude and Practice |
|---------------------------------------------------------------|
| **Knowledge** | **Attitude** | **Practice** |
| **Attitude**  | Pearson Correlation | Sig. (2-tailed) | N |
|               | .112**        | .006            | 603 |
| **Practice**  | Pearson Correlation | Sig. (2-tailed) | N |
|               | .138**        | .001            | 603 |

**. Correlation is significant at the 0.01 level (2-tailed).**
In this survey, overall knowledge was adequate (7.41±1.43), the attitude was positive (17.60±1.97), and practice was appropriate (20.72±3.72) regarding COVID-19 among FMPs in Nepal. A significant association was observed among knowledge, attitude, and practice. Correlation is significant at the 0.01 level.

Discussion

It is a web-based national survey involving 603 FMPs working at different hospitals or clinical settings of the nation. The vast majority of the participants were female, nurses, and from the private hospital. In this survey, FMPs reported adequate overall knowledge with a positive attitude and adopted the appropriate practice. Only some of the FMPs involved in the IPC training and online course demonstrated a relatively higher KAP score.

In this survey, around 76% of FMPs illustrated adequate Knowledge regarding COVID-19. However, it is relatively higher than the previous study conducted in Uganda. There was only 69% sufficient knowledge and a bit lower than a Chinese study conducted by Zhang et al. [8] in Henan China, where 89% of the participants showed sufficient knowledge regarding the COVID-19. Moreover, a similar result was reported in a previous study carried out on MERS among FMPs of Saudi Arabia [13]. There are variances in the knowledge of FMPs while battling the outbreak in different countries. It could be due to differences in the cut-off points. Olum et al. [14] used 80% as a cut-off point to determine the level of knowledge, whereas, Khan et al. [13] and we used 70%. In Zhang et al.'s study, [8] the reason for a higher proportion of knowledge was probably due to the better preparedness for the worst. It might be because the Henan province is a neighbouring province to Wuhan, it was one of the severely affected areas next to Wuhan.

Previous studies have varying levels of perceived knowledge, attitude, and practice among the demographic variables. Some studies have reported that the male participants to have a significantly higher knowledge [14]. In contrast, some have reported that female participants have higher knowledge than their male counterparts [15]. Some studies have reported that doctors have better knowledge and a positive attitude than others [8]. However, some reported the nurses to have better practice [16]. In this survey, male participants, doctors, having a master's degree or above showed better knowledge and a positive attitude. Despite having a higher level of education, the FMPs did not show any appropriate practice. The reasons for inappropriate practice could be associated with the training they get, the working environment they have, etc. Because most of our hospitals did not provide sufficient sanitizers, PPEs, and even some hospitals, deducted the regular salary of the staff in such a harsh situation of COVID-19 pandemic.

IPC training and online courses for FMPs are essential to update their knowledge and play a vital role in infection prevention [17]. WHO has started training sessions and online classes regarding prevention and control of COVID-19 to increase awareness and preparedness for the medical professionals [18]. Higher knowledge, positive attitude, and appropriate practice were present in the participants who attended IPC training and online courses. However, the knowledge was higher in those participants who took IPC training but was not associated with a positive attitude and appropriate practice. But those who took online IPC courses had better knowledge, a positive attitude, and appropriate practice. Such results may be due to the fact that training is often organized by the institutions, and irrespective of their interest, participants are requested to attend the training. However, online courses are taken by those who have real interest, enthusiasm, and motivation towards the disease. So, they not only give full attention but also try to implement in their daily activities.

Medical professionals are always at a higher risk of infection as they work on the frontline during any epidemics. Inadequate knowledge and lack of IPC training might jeopardize their and their family's lives. Globally, thousands of medical professionals are already infected, and hundreds have lost their lives. According to ICN, more than 90,000 medical professionals are infected, and about 260 nurses have died. Among them, China had more than 3300, Spain 6500, Britain 98 infections among medical professionals, and National Nurses United Union reported 170 medical professionals deaths in the USA and 154 doctors and dentists in Italy. So, continuous update of the knowledge by adequate training is crucial for the FMPs to tackle the COVID-19. The national and international authorities are continuously providing updates regarding COVID-19. However, social media was the most commonly used source of information rather than official websites such as; Ministry of Health and population, WHO, and CDC. Although adequate overall knowledge was reported by the FMPs, there were still knowledge gaps among different groups. Our participants mostly used online social media, radio, and television to gather knowledge, and they reported correct answers regarding the symptoms and prevention [13]. Still, most of our participants were not sure about the confirmatory diagnosis as per the standard protocol. That's the defect of relying on only social media, not the standard source of information.

Despite having adequate knowledge, only 54.7% of FMPs had a positive attitude, while nearly half of the participants expressed a negative attitude in this survey. Similarly, some previously published literature also revealed the lower rate of positive attitude by the medical professionals in different countries [19, 20]. On the other side, Chinese study [1] demonstrated a positive attitude among the majority population towards COVID-19. Perhaps, the Chinese were well trained and mentally prepared.

The vast majority of FMPs always fear infecting others, including their family, friends, and society [13, 15, 21]. We also found a similar result of almost 88% of participants having a fear of infecting others, while asking if they were worried about transmitting the virus to my family, friends
& society. However, such fear is entirely normal and acceptable to help the FMPs to prepare for the worst during this grim and challenging situation. Despite having a fear of COVID-19, still, FMPs displayed appropriate practice. Hand hygiene practice is exceptionally essential. It is quite useful for infection prevention, even the governments and many other stakeholders are promoting adequate hand hygiene even for the public. Saqlain et al. [11] reported that hand-washing to be one of the efficient barriers for disease transmission. In this survey, we asked the participants if they believed that hand-washing with soap and water was sufficient for the IPC, 91.2% of the FMPs reported strongly agreed and agreed with the statement. Upon further asking if they are following 5 moments of hand hygiene with 7 steps, 88.4% of the participants reported often or always, but remaining participants reported sometimes, rarely, and never. These results mean that our participants have appropriate hand hygiene practice. However, we still believe that hand hygiene is practically the most neglected procedure, and usually, FMPs don’t follow all the moments and steps. However, multiple studies supported our findings of having appropriate practice [8, 22].

Unfortunately, the shortage of PPEs, such as facemask, face shield, gloves, goggles, and gown, during this COVID-19 crisis are the major problems faced by not only the developing countries like Nepal, but also the developed world like the USA, UK, and Italy. Being a developing country, an adequate supply of PPEs is a tremendous challenge in Nepal. Even if the government or local bodies supplied PPEs, especially the facemask and gown, the quality could not be assessed as most of them are prepared by local factories in an emergency situation. In this survey, only 56.4% of the participants were using PPEs. Most of them were using facemask, gown, and gloves. A negligible amount of N95 respirators were available for the FMPs. Albarrak et al. [22] reported that only 24.2% were wearing a facemask. It is essential to wear PPEs throughout taking care of the patients, especially when performing aerosol-generating procedures such as; intubation, bagging, cardiopulmonary resuscitation, and nebulization. [22]. At the initial stage of the disease outbreak in Wuhan, many local medical professionals were infected. Upon the arrival of the rescue team from different provinces, the infection to the FMPs went down to zero [12]. They mentioned for the infection transmission to the medical professionals at the initial stage was carelessness, inadequate knowledge, insufficient PPEs, and even improper practice. So, the WHO has also given a particular focus on the correct use of PPEs, including masks, goggles, gloves, and gown. Additionally, those FMPs who have used PPEs have comparatively fewer infection rates [10]. During this preparation of the manuscript, at least 71 medical professionals, including doctors, nurses, and other paramedics, were infected in Nepal. This is probably because of the same issues of lack of PPE and negligence, as Chinese study mentioned.

It is the fact that FMPs are highly susceptible to the infection, while their constant exposure makes them vectors for the disease transmission. Even though the FMPs have significant roles for disease prevention and control of transmission, it is necessary to follow strict rules of the PPE use, hand-hygiene, and isolation of the patients as per the CDC and WHO guidelines. The government and stakeholders have the responsibility of providing public awareness, regular updates of the infection prevention protocol, and provide adequate IPC training during this pandemic and adequate logistic supply. Moreover, responsible bodies, including the government and hospitals, must focus on motivational factors, including the availability of the resources and provision of salary and incentives to the FMPs.

It’s a cross-sectional and quantitative study, so we could not assess the changes. A web-based survey conducted to identify the KAP of the FMPs working at different hospitals of the nation where the health workers have full excess to the internet service. We could not reach out to the place where this facility was not available. Despite these limitations, it is a national survey on the KAP regarding the COVID-19 among FMPs in Nepal. This survey would probably be responsible for providing up-to-date information and improve clinical practice among medical professionals.

Conclusion

There was a significant association between KAP among FMPs in our study. The FMPs having higher education showed better knowledge and attitude, but the practice was not affected by their education level. Very few FMPs were involved in the IPC training and online courses regarding COVID-19, and they displayed better KAP scores. A higher level of knowledge might be accountable for a better attitude and practice. So, FMPs need to be encouraged and motivated to regularly update knowledge where the government and stakeholders should arrange the educational programs and training. In addition, FMPs need to be encouraged to use official websites to acquire the knowledge to minimize the knowledge gap.

Abbreviations

CDC
Centers for Disease Control & Prevention
CMA
Community Medicine Assistant
COVID-19
Coronavirus Disease-2019
CT
Declarations

Ethics approval and consent to participate

- Ethical clearance was obtained from the Ethical Review Board (ERB) of Nepal Health Research Council (ERB Protocol Registration No. 383/2020P) and written informed consent was obtained from participants before data collection.

Consent for publication

- Not applicable

Availability of data and material

- The datasets supporting the conclusion of this article are included within the article. Upon genuine request, raw data can be provided by the corresponding author.

Competing interest

- The authors declare that they have no competing interests.

Acknowledgement

- Not Applicable

Funding

- None

Author contribution

- All authors have read and approved the manuscript.

NT: Study conceptualization, questionnaire development, data collection and manuscript preparation

SR: Study conceptualization, questionnaire development, manuscript preparation and supervision

SD: Statistical analysis

PR: Data entry and Data collection,

BS: Supervision, and Final draft approval

BS: Data entry, Data collection, and Final draft approval
Acknowledgements

- We thank Dr. Sujan Babu Marahatta, Ms. Matina Maharjan, Dr. Niresh Thapa, Ms. Ilam Gurung and all the participants for their tremendous support.

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Figure 1

Knowledge Attitude and Practice shown by Frontline Medical Professionals

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