A web-based health education module and its impact on the preventive practices of health-care workers during the COVID-19 pandemic

Kiran Abbas 1*, S. Muhammad A. Nawaz2, Nazish Amin3, Fareena M. Soomro4, Kanza Abid3, Moiz Ahmed5, Khalid A. Sayeed6, Shamas Ghazanfar7 and Noorulain Qureshi3

1 Department of Medicine, Jinnah Postgraduate Medical Center, Karachi 75230, Pakistan, 2 Department of Urology, Glan Clwyd Hospital—Betsi Cadwaladr University Health Board, Denbighshire LL16, Wales, UK, 3 Department of Medicine, Jinnah Sindh Medical University, Karachi 75950, Pakistan, 4 Department of Psychiatry, Liaquat University of Medical and Health Sciences, Jamshoro, Sindh 75950, Pakistan, 5 Department of Medicine, Jinnah Postgraduate Medical Centre, Karachi 75640, Pakistan, 6 Department of Medicine, Liaquat College of Medicine and Dentistry, Karachi 75220, Pakistan and 7 Department of Medicine, Dow University of Health Sciences, Karachi 75500, Pakistan

*Correspondence to: K. Abbas. E-mail: kiranabbas2020@gmail.com

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Abstract

Proper training on the preventive measures against COVID-19 among health-care workers is crucial for mitigating the spread of viral infection. The present study evaluated the efficacy of a brief web-based module on the practice of hand hygiene and respiratory etiquette among respective health-care workers. A comparative study was conducted with a total of 500 participants. A self-reported questionnaire was used for both pre- and post-intervention evaluation. The post-intervention assessment was conducted 1–2 weeks following the intervention. The difference in the practice of hand hygiene and respiratory etiquettes during work hours was recorded. We found that the intervention resulted in an evident difference in the use of alcohol-based hand sanitizer by the participating doctors before examining the patient. Interns showed a much higher propensity to wash their hands for at least 20 s, relative to other health-care workers. The difference between pre- and post-intervention handwashing for >5 times/day was 6.5% in females and 4.5% in males. In short, the study was able to demonstrate that a web-based health education module is an effective tool for the education and promotion of preventative measures in hospital setups, which may ultimately aid in halting the spread of COVID-19 among health-care workers.

Introduction

In December 2019, an acute respiratory disease, COVID-19, caused by a novel coronavirus (2019 nCoV) emerged from the Hubei province of China, quickly spreading nationwide in a month [1]. The 2019 nCoV is an enveloped RNA positive β-coronavirus and like the other β-coronaviruses, MERS and SARS, it has also now been found to cause mild respiratory disease which may develop into a potentially fatal respiratory illness in some instances [2]. COVID-19 has been declared a pandemic and a Global Public Health Emergency by World Health Organization (WHO) as it has spread across the world affecting >400 000 people [3]. The patients are diagnosed using real-time reverse transcription polymerase chain reaction [4].

COVID-19 is similar to SARS coronavirus but is highly infectious and presents with a variety of symptoms related to respiratory illnesses including fever, cough, myalgia and fatigue [5]. Among the
less common symptoms that it manifests include sputum production, headaches, dizziness and hemoptysis [5]. While most of the patients develop respiratory issues, some of the patients have also been reported to have gastrointestinal symptoms like diarrhea, nausea and vomiting [6]. Patients with underlying conditions like diabetes and hypertension are at an increased risk of infection and have been seen to present with a severe form of disease [7]. Person-to-person transmission in hospitals, communities and travelers contribute the most to the spread of COVID-19 globally [8]. While it is easier to track symptomatic patients, the transmission of 2019-nCoV infection from asymptomatic carriers poses a real challenge in identifying cases and controlling the spread of the disease [9].

Health-care workers are at the highest risk of contracting the virus specifically in poor-resource countries like Pakistan where the health-care setups are running short of even the basic facilities like N-95 masks or surgical gloves. The health-care workers have no choice but to keep working even under these dangerous circumstances. They are risking their lives and the lives of their family members to provide health-care services to their patients [10, 11].

Pakistan has only about 1000 public hospital setups and ~2 million registered doctors for a population of over 200 million, as per the Pakistan’s Economic Survey 2018–2019. This sums up to a single doctor for every 1000 persons. As of April 2020, >4000 cases of COVID-19 has been reported country-wide with a death toll of 77. Out of the infected cases, ~80 patients are doctors. This number is exclusive of the many nurses, staff members, technicians and the janitorial staff who have been infected by the COVID-19 according to the Arab News by health departments in all four provinces, Gilgit-Baltistan, and Kashmir.

An effective mitigation strategy during a pandemic is to ensure that the preventive techniques are being followed by the health-care providers as well as the nurses and other staff. WHO recommends infection control interventions to combat the virus and reduce its transmission. This includes frequent handwashing, following respiratory etiquette recommendations and maintaining physical distance from other people to limit the spread [3].

Online social networks have resulted in a tremendous amount of social interaction and have also been used as a tool to track a pandemic by giving real-time surveillance [12]. The online tools can be used to educate the health-care workers; the young recently graduated doctors who were not trained to deal with a pandemic, the technicians, the nurses and the janitorial or security staff.

The Internet seems an ideal medium for such an intervention; as pointed out in a survey from United States; most respondents stated that the first source of information consulted during the event of a pandemic would be the internet [9]. Public health and infection control measures are urgently required to limit the spread of the virus and to reduce secondary infections as the outbreak of COVID-19 has become a threat to the general population and the health-care workers globally.

Hence, the aim of the study was to evaluate the effectiveness of a brief web-based module covering health education on the preventive practices against COVID-19 pandemic including the hand hygiene measures and respiratory etiquettes among the health-care workers.

**Methodology**

A comparative study was conducted between January and April 2020 with a total of 500 participants belonging to different health-care setups, in Pakistan. An ethical approval was obtained from the institutional review board of Jinnah Postgraduate Medical Center and informed written consent was acquired prior to the data collection. A non-probability purposive sampling technique was used to select participants. All health-care workers; doctors, nurses, technicians, staff members belonging to a health-care setup were eligible to take part in the study. We specially targeted the recent medical graduates who have just started their internship. Health-care workers who were on leave at the time of data collection were excluded from the study. Since the country was under a
government-ordered quarantine at the time of data collection, an online data collection system was used to recruit the participants.

**Pre-intervention assessment**

For the pre-intervention assessment, all consenting adults were directed to an online self-administered questionnaire. The questionnaire was divided into two main parts: (i) demographics characteristics and (ii) compliance with hand and respiratory hygiene during the COVID-19 pandemic at hospital setups. The authors used social media including Facebook, Twitter and Instagram to maximize their reach.

**Intervention**

All participants were directed to the course link upon the completion of the pre-intervention assessment and were requested to enroll themselves for a brief web-based module on ‘Hand & Respiratory Hygiene for COVID-19 Pandemic course for Health-care workers’. Hand hygiene was defined as, ‘an effective measure to prevent coronavirus by cleaning hands adequately’ and the respiratory hygiene was defined as, ‘the practice of measures for the prevention and mitigation of the spread of the COVID-19 by respiratory droplet and airborne transmission routes’ [13-14]. The course contents were inspired by the updated Centers for Disease Control and Prevention (CDC) and WHO guidelines. The total duration for the online course was 20–30 min. The course was approved by two experts on infectious diseases and community medicine.

**Hand hygiene intervention**

All participants received e-health education about the importance of compliance with the appropriate hand hygiene standards in reducing transmission of COVID-19.

All participants were instructed to wash their hands for at least 20 s with the soap before and after going to the patient’s room, providing a physical health examination, or performing an invasive procedure. They were instructed to use the alcohol-based sanitizer or gel when soap was not available. All participants were demonstrated the hand hygiene technique based on the World Health Organization guidelines [15].

**Respiratory hygiene and etiquettes**

All participants received proper education on cough etiquettes and respiratory hygiene. The guidelines were adapted from the CDC website on respiratory hygiene [16].

**Post-intervention assessment**

The next phase of the study commenced following the completion of the online course. Only the email addresses were recorded of those who gave consent to be contacted by the authors for a post-intervention interview after a period of 1–2 weeks. The consenting participants were requested to fill a feedback form collecting data about the changes in compliance with hand hygiene and respiratory etiquettes in the health-care setup.

**Statistical analysis**

The data were entered and analyzed through Statistical Package for the Social Sciences (SPSS version 24). All continuous variables were presented as mean plus SD and categorical variables were presented as frequency and percentages. The results were presented as cross-tabulation between independent and dependent variables. The impact of intervention was also illustrated by determining the difference in participant’s practice habits pre- and post-intervention. Further stratification was done to explore the sociodemographic correlates in play.

**Ethics**

The Authors made sure that the data being recorded remained completely anonymous and confidential. No unnecessary personal identifiers or protected health information including name of the participant, date of birth, contact numbers, residential or work address, social security number/national identity card number and any
medical record numbers were recorded or requested from the participant.

The participants were ensured that the data they provided would remain anonymous and at any point, they could leave the study. The recorded data always remained with the principal investigator throughout the study.

**Results**

A total of 500 individuals participated in the study. Out of these, ~99 participants did not respond to the post-intervention assessment, leaving data of 401 participants in the final analysis. As shown in Table I, approximately two-thirds of the participants were female. Approximately one-half of the study participants were recent medical graduates or internees with no prior training in hand hygiene or respiratory etiquette in a health-care setup. About one-fifth of participants were licensed doctors and remaining were nurses and other hospital management staff. It was found that, in the assessment of hand hygiene among the participants, the intervention improved the participants’ perception and the frequency of the use of alcohol-based hand sanitizer during work hours (Table II). With the intervention of respiratory etiquette, a similar change was found in the use of a tissue to cover a cough or sneeze. Upon taking the demographic factors into account, many important correlates could be drawn in these instances (Table III). The most important changes among demographic variables were observed in the intervention of hand hygiene. For instance, female as well as health-care workers who had a doctor in the immediate family were more likely to use alcohol-based hand sanitizer before and after examining the patients. Recent medical graduates or internees showed a much higher propensity to wash their hands for at least 20 s, relative to nurses and technicians. In addition, participants working in health setups that were situated in Karachi, Sindh demonstrated a greater likelihood of taking all universal preventative measures against COVID-19 compared with those belonging to other cities of Pakistan. The differential impact of the intervention is illustrated in Table IV. The implications of such findings are thus further considered in the Discussion section of this text.

| Variables                                      | Frequency n (%) |
|-----------------------------------------------|-----------------|
| Mean age±SD (years)                           | 23.6±5.3        |
| Gender                                        |                 |
| Male                                          | 165 (33.0)      |
| Female                                        | 335 (67.0)      |
| Health-care worker type                       |                 |
| Internee (fresh medical graduate)             | 267 (53.4)      |
| Doctors                                       | 109 (21.7)      |
| Nurses                                        | 81 (16.2)       |
| Technicians and other staff members           | 43 (8.6)        |
| The Health-care setup location                |                 |
| Karachi, Sindh                                | 277 (55.4)      |
| Other place(s) in Sindh                       | 223 (44.8)      |
| Are any of your immediate family members a doctor? |           |
| Yes                                           | 401 (80.2)      |
| No                                            | 99 (19.8)       |
| Any prior training on hand hygiene            |                 |
| Yes                                           | 130 (26.0)      |
| No                                            | 370 (74.0)      |
| Any prior training on respiratory etiquettes  |                 |
| Yes                                           | 112 (22.4)      |
| No                                            | 388 (77.6)      |

**Discussion**

As demonstrated previously, many important findings came to our attention during the span of this study. The contribution of demographic factors also seemed to take a distinct role in determining the extent of impact of the respective interventions. Overall, many of the findings seem to confirm the notion that spreading health education with the use of electronic media is an effective measure that can be taken to halt the spread of COVID-19 among health-care workers. The use of web-based educational media has been observed to be very conducive to bringing attention to health emergencies and providing access to timely information to the concerned parties [17]. For the purposes of our study, similar electronic media was used to conduct a brief web-based module on hand hygiene and respiratory etiquettes among
health-care workers during patient interaction. Subsequently, it was found that the participants who actively partook in the designated module became substantially better informed regarding preventive measures that should be taken at workplace during the span of the pandemic.

Preventive measures are imperative in controlling the spread of communicable diseases like COVID-19, which have a particularly high reproductive number and therefore higher rates of transmission than other viral pathogens. This notion is especially apparent in circumstances where treatment options and

### Table II. Pre- and post-intervention assessment of hand hygiene and respiratory etiquettes among the study participants

| Item                                                                 | Pre-intervention (n=ntervene) | Post-intervention (n=ntervene) |
|----------------------------------------------------------------------|-------------------------------|-------------------------------|
| Daily frequency of hand washing                                      |                               |                               |
| <5 times/day                                                         | 374 (74.8%)                   | 171 (42.6%)                   |
| >5 times/day                                                         | 126 (25.2%)                   | 230 (57.4%)                   |
| Duration of each hand washing                                       |                               |                               |
| Less than 20 s                                                       | 313 (62.6%)                   | 116 (28.9%)                   |
| At least for 20 s                                                   | 187 (37.4%)                   | 285 (71.1%)                   |
| Use of alcohol-based sanitizer before examining a patient           |                               |                               |
| Yes                                                                 | 301 (60.2%)                   | 297 (74.1%)                   |
| No                                                                  | 199 (39.8%)                   | 104 (25.9%)                   |
| Use of alcohol-based sanitizer after examining a patient            |                               |                               |
| Yes                                                                 | 222 (44.4%)                   | 307 (76.6%)                   |
| No                                                                  | 278 (55.6%)                   | 94 (23.4%)                    |
| Use of alcohol-based sanitizer before performing an aseptic task or handling invasive medical devices |                               |                               |
| Yes                                                                 | 214 (42.8%)                   | 280 (69.9%)                   |
| No                                                                  | 286 (57.2%)                   | 121 (29.1%)                   |
| Use of alcohol-based sanitizer after contact with blood, body fluids or contaminated surfaces |                               |                               |
| Yes                                                                 | 301 (60.2%)                   | 286 (71.3%)                   |
| No                                                                  | 199 (39.8%)                   | 115 (28.7%)                   |
| Wash hands or use sanitizer immediately after glove removal         |                               |                               |
| Yes                                                                 | 205 (41.0%)                   | 245 (61.1%)                   |
| No                                                                  | 295 (59.0%)                   | 156 (38.9%)                   |
| Wash hands before touching your eyes, nose and mouth                |                               |                               |
| Yes                                                                 | 145 (29.0%)                   | 302 (75.3%)                   |
| No                                                                  | 355 (71.0%)                   | 99 (24.7%)                    |
| Wash hands after caring for a person with confirmed or suspected COVID-19 infection |                               |                               |
| Yes                                                                 | 319 (63.8%)                   | 305 (76.1%)                   |
| No                                                                  | 181 (36.2%)                   | 96 (23.9%)                    |
| Use of items to cover a cough or sneeze                            |                               |                               |
| Tissue                                                              | 333 (66.5%)                   | 317 (79.1%)                   |
| Sleeve                                                              | 179 (35.8%)                   | 223 (55.6%)                   |
| Hand                                                                | 467 (93.2%)                   | 70 (17.4%)                    |
| None                                                                | 47 (9.3%)                     | 27 (6.7%)                     |
| Carrying a handkerchief or tissue                                   |                               |                               |
| Tissue                                                              | 212 (42.4%)                   | 223 (55.6%)                   |
| Handkerchief                                                        | 78 (15.6%)                    | 76 (18.8%)                    |
| Handkerchief and tissue                                             | 16 (3.2%)                     | 35 (8.5%)                     |
| None                                                                | 194 (38.8%)                   | 67 (17.8%)                    |
| Use of nearest trash bin to dispose of the tissue after use         |                               |                               |
| Yes                                                                 | 207 (41.4%)                   | 348 (86.8%)                   |
| No                                                                  | 293 (58.6%)                   | 53 (13.2%)                    |
### Table III. Association of practice of hand hygiene in workplace to prevent COVID-19 with demographics

| Demographic characteristics (independent variables) | Hand hygiene (pre-intervention) |  |
|------------------------------------------------------|--------------------------------|---|
|                                                      | Daily frequency of hand washing of >5 times/day (n = 126) | Duration of each hand washing for 20 s at least (n=187) | Use of alcohol-based sanitizer before examining a patient (n=301) | Wash hands after caring for a person with confirmed or suspected COVID-19 infection (n=319) |
|                                                      | Daily frequency of hand washing of >5 times/day (n = 126) | Duration of each hand washing for 20 s at least (n=187) | Use of alcohol-based sanitizer before examining a patient (n=301) | Wash hands after caring for a person with confirmed or suspected COVID-19 infection (n=319) |
| Gender                                               | Male | 29 (23.0%) | 57 (30.5%) | 104 (34.6%) | 141 (44.2%) |
|                                                      | Female | 97 (77.0%) | 130 (69.5%) | 197 (65.5%) | 178 (55.8%) |
| Type of health-care worker                           | Internee (fresh medical graduate) | 54 (42.9%) | 121 (64.7%) | 126 (41.9%) | 166 (52.0%) |
|                                                      | Doctors | 34 (27.0%) | 26 (13.9%) | 89 (29.6%) | 92 (28.8%) |
|                                                      | Nurses | 20 (15.9%) | 24 (12.8%) | 60 (19.9%) | 32 (10.0%) |
|                                                      | Technicians and other staff members | 18 (14.3%) | 16 (8.6%) | 26 (8.6%) | 29 (9.1%) |
| The health-care setup location                       | Karachi, Sindh | 95 (75.4%) | 128 (68.5%) | 260 (86.4%) | 218 (68.3%) |
|                                                      | Other place(s) in Sindh | 31 (24.6%) | 59 (31.6%) | 41 (13.6%) | 101 (31.7%) |
| Is any of your immediate family members a doctor?    | Yes | 69 (54.8%) | 67 (35.8%) | 85 (28.2%) | 153 (48.0%) |
|                                                      | No | 57 (45.2%) | 120 (64.2%) | 216 (71.7%) | 166 (52.0%) |
| Prior training on hand hygiene                       | Yes | 68 (54.0%) | 65 (34.8%) | 76 (25.3%) | 123 (38.6%) |
|                                                      | No | 58 (46.0%) | 122 (65.2%) | 225 (74.8%) | 196 (61.3%) |

### Table IV. Difference in the participants’ practice of preventive measures against COVID-19 pre- and post-educational intervention

| Demographic characteristics (independent variables) | (Pre-intervention–Post-intervention) (%) |  |
|------------------------------------------------------|------------------------------------------|---|
|                                                      | Daily frequency of hand washing of >5 times/day | Duration of each hand washing for 20 s at least | Use of alcohol-based sanitizer before examining a patient | Wash hands after caring for a person with confirmed or suspected COVID-19 infection |
|                                                      | Daily frequency of hand washing of >5 times/day | Duration of each hand washing for 20 s at least | Use of alcohol-based sanitizer before examining a patient | Wash hands after caring for a person with confirmed or suspected COVID-19 infection |
| Gender                                               | Male | 4.5% | 3.1% | 4.2% | 3.2% |
|                                                      | Female | 6.8% | 2.4% | 3.1% | 2.2% |
| Type of health-care worker                           | Internee (recent medical graduate) | 6.4% | 4.2% | 6.1% | 3.3% |
|                                                      | Doctors | 2.5% | 2.8% | 3.2% | 4.6% |
|                                                      | Nurses | 2.1% | 3.5% | 2.4% | 3.2% |
|                                                      | Technicians and other staff members | 2.8% | 2.1% | 2.4% | 2.8% |
| The health-care setup location                       | Karachi, Sindh | 3.4% | 2.2% | 3.4% | 4.8% |
|                                                      | Other place(s) in Sindh | 2.6% | 2.6% | 1.8% | 3.2% |
| Is any of your immediate family members a doctor?    | Yes | 2.4% | 4.8% | 6.7% | 3.4% |
|                                                      | No | 1.9% | 3.0% | 3.2% | 2.2% |
| Prior training on hand hygiene                       | Yes | 4.5% | 2.2% | 3.3% | 2.4% |
|                                                      | No | 3.2% | 3.5% | 3.2% | 2.8% |
health-care facilities are highly limited, as is, to the best of our knowledge, the case with the current COVID-19 pandemic. The basic reproduction number (R0) is used in infectious disease epidemiology to assess the risk of an infectious agent with regards to its rate of spread within a population. Estimates for the R0 for COVID-19 were made in an earlier study by Liu et al. [18], while comparing the basic reproduction number (R0) of the COVID-19 virus with that of the SARS virus; it was found that the mean R0 of both viruses fell within the same estimated range, yet COVID-19 was already found to be more widespread at the time of publication, implying greater transmissibility. However, keeping in account potential estimation errors and insufficient data, the actual figures might change as more data are collected. The data serve the implication that non-pharmaceutical educational interventions may be required to prevent the spread of COVID-19 at the national, local and individual level, chiefly given the lack of a functional vaccine or an alternative preventative course of action. Public intervention may ultimately take many forms, as long as the content is inclusive of information on limiting contact, using proper handwashing techniques, screening travelers and adopting proper quarantine strategies, as was demonstrated in our specific study group, it can be of immense benefit to health-care workers as well [19].

A study conducted on the health-care workers from Pakistan assessed the role of medical education during a public health emergency [20]. The results of this study showed that, as expected, about one-half the health-care workers had awareness and three-fourth participants were practicing proper preventive measures against COVID-19 including the appropriate handwashing and respiratory etiquettes already. However, surprisingly 73% participants had not attended any lecture, course or seminar on COVID-19 for knowledge purpose.

The study also stated that a large number of the health-care workers were deficient in knowledge on how to take care of COVID-19 confirmed or suspected patients, use of N-95 mask and protocol on disinfection. The authors suggested that lectures or awareness programs relating to COVID-10 prevention should be beneficial in mitigating the spread of virus among health-care workers [20]. Health-care workers are often working in close contact with suspected or confirmed COVID-19 cases, therefore, they can play a vital role in mitigating the spread of the disease by employing proper preventive measures themselves and making sure that they do not become the source of infection for their family members.

Some studies support the role of medical students of final year or recent graduates in preventing the spread of COVID-19 pandemic. Medical schools in United Kingdom have been urged to consider employing medical students as a part of the medical response team as the NHS urgently requires more staff in health-care during the COVID-19 pandemic [21]. Similarly, mitigation strategies are also required in Pakistan to limit the spread of the disease specifically among health-care workers. As medical practitioners are expected to have sufficient knowledge regarding the basic health and hygiene techniques, our study found that with some basic training, they can be guided to take necessary steps to defend themselves and their families against COVID-19 infection by imparting this knowledge to their family members as well as to the general community.

The factors that contribute to the rise in numbers of health-care workers being infected with COVID-19 infection include the negligence of the hospital administration to provide their staff with proper training pertaining to COVID-19, failure to provide proper personal protective equipment (PPE) to their employees, and non-supportive health-care setup environment. The earlier studies claim that the highly contagious features of the coronavirus require updated and adequate degree of knowledge regarding the preventive measures against COVID-19 among the health-care workers [22]. However, we reported that despite having sound knowledge on the preventive measures, the main deficiency was the unavailability of the basic protective equipment including PPEs, sanitizers, handwashing soaps and disinfectants.

Health-care workers are at the front line of the COVID-19 pandemic response and subsequently exposed to certain risks which are not limited to the viral infection exposure but also the overburden due
to the extensive working hours, mental distress, exhaustion, work-related burnout, social stigma and occupational violence [23]. Therefore, it is crucial to ensure that the health-care workers are adequately trained in coping strategically with the above-mentioned issues. Occupational health and safety should be prioritized in every health-care sector, making sure that every health-care worker is compliant with the preventive and protective practices against the pandemic [21–23]. The hospital administration is responsible for ensuring that their employees are being provided with the latest guidelines, instruction and training on infection and prevention control.

In many countries including Pakistan, the final year medical students are called out to volunteer in isolation camps and different hospital setups as the health-care sector becomes overwhelmed with the rising number of COVID-19 patients. However, medical students are not trained adequately to partake in a fight against the pandemic. Nevertheless, a study on final year medical students was conducted in Singapore to ascertain their knowledge and perception of hand hygiene in the wake of influenza pandemic [24]. Many of the students recognized the role of alcohol-based hand sanitizers in maintenance of hand hygiene. A similar study was conducted to assess the basic knowledge of hand hygiene among medical students of different specialties in Jagiellonian University Medical College, which also recognized the need for further training of medical students regarding basic hand hygiene to limit the spread of infectious diseases [25]. This suggests that despite the lack of practical skills, these students are well-informed about the current preventive measures against the pandemic. With proper practical training, these young medical graduates and final year students can help in preventing the collapse of the health-care system especially in poor-resource countries.

Thus, based on the plethora of former reports, in addition to our own study, it can be readily concluded that medical practitioners tend to hold sufficient knowledge concerning preventative measures toward the spread of communicable diseases, which can be supplemented through workshops or other forms of intervention, and provision of adequate number of PPE allowing them to protect themselves and their families against the COVID-19 infection. Further studies should be conducted in the future to help assess the most effective mediums of intervention, and the factors contributing to the increasing number of COVID-19 cases among health-care workers in Pakistan.

Despite efforts to generalize the data, there were still many limitations that were posed during the study. Primarily, the population sample was limited to voluntary participants who were exposed to the survey through an online recruitment system centered on social media. Considering the nuances of online surveys, the merits of self-evaluation should be considered. Regardless, there seems to be no real incentive for the participants to embellish their true habits, especially considering participation was entirely voluntary and no form of reward or compensation was granted on behalf of such. It must also be considered that, although the majority of feedback was positive, we were unable to obtain feedback from those who did not complete the entire course. This indicates another limitation associated with the study, where a high number of participants did not complete the post-intervention assessment. It would have been useful for us to evaluate their reasons for not continuing with the study, unfortunately, we were unable to reach out to these participants. Nevertheless, we compared the sociodemographic characteristics of participants who completed the study and those who dropped out and found similar characteristics. This could be reflective of some degree of inefficiency within our teaching modality and perhaps better methods should be sought to more effectively engage participants, though this would warrant a future study. Yet, despite the many obstacles, our study seems to have converged on many points with that of earlier literature that similarly assessed medical practitioners on hygiene and preventative measures.

**Conclusion**

The present study indicates that a brief web-based health education module is an effective tool to educate the health-care workers specifically young untrained doctors on practice and promote the
preventive measures to mitigate the spread of coronavirus disease among our health-care communities.

Conflict of interest statement

None declared.

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