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Education on Protective Measures for Primary Care Staff During COVID Outbreaks

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Walden University

College of Nursing

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Lenina Chi-Ukpai

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

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Walden University
2022

Abstract

Education on Protective Measures for Primary Care Staff During COVID Outbreaks

by

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MS, Walden University, 2017

BS, Imo State University, Imo State Nigeria, 2000

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

November 2022

Abstract

Since the emergence of COVID-19, health care workers have been in continuous risk of infection because of the way the disease is transmitted. Hence, the proper use of personal protective equipment (PPE) is important during the pandemic. The aim of this project was to increase health care workers' and patients' disease protection and prevention. This staff education project assessed the knowledge of proper PPE practice among health care workers who were in close contact with COVID-19 patients and provided lecture and practice in proper donning and doffing of PPE. Guided by the Lewin theory of change, the knowledge of the 9 health care workers who attended the 2-session education was assessed prior to the education and after the education to determine if staff knowledge related to PPE use improved. Findings from the pretest and posttest conducted after the training showed that there was 12.5 % increase of health care workers' who appreciated the importance and sensitivity of the donning and doffing process. There was 50% increase in health care workers' reporting always involving an observer with checklist during doffing and there was a 40% increase in the participating health care workers reporting strict observe of the methodical technique of PPE donning/doffing. The social change expected as a result of this project is increased safety of frontline staff and the patients and families they serve in primary care practice.

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Section 1: Nature of the Project

Introduction

During a disease outbreak, the risk of infection is high for various groups of workers in emergency response (health care workers, specialized treatment unit workers, and first aid teams). Early in the COVID-19 pandemic, 20% of the total numbers of COVID-19 positive cases were among health care workers (Lancet, 2020). The leading form of transmission for COVID-19 is person-to-person contact through aerosolized respiratory droplets. There were concerns in nursing practice regarding aerosol-based spread, as numerous common procedures, such as providing high flow oxygen and endotracheal intubation expose health care workers to high risk for infection. Various measures have been employed to decrease the contagion risk among health care providers. With the availability of a vaccine, health care workers were given the first priority to be vaccinated against COVID-19, promoting their safety. Other measures put in place were ensuring physical distance between patients and health care workers and also making sure patients were properly isolated in ventilated rooms for patients suspected to or confirmed to have COVID-19. Patients and other visitors were screened for fever and respiratory symptoms before entering the health care facility (Giuliano et al., 2020).

Administrative measures were put in place such as monitoring of health care workers at risk to detect any occupational exposures early when the disease is more easily treated. Examples of these monitoring measures included screening health care workers for fever and other symptoms of COVID-19. Procedures were put into place to ensure that any exposed health care worker could report symptoms to their supervisor who, in turn, escalated the matter to a medical officer. Health care workers who developed a fever and other respiratory symptoms were encouraged to stay at home.

Problem Statement

While the COVID-19 prevention efforts have been effective to some extent, infection control specialists have cautioned against incorrect personal protective equipment (PPE) donning/doffing when handling patients with highly infectious diseases. Clinical studies established that health care workers have been infected due to inappropriate donning/doffing practices even when observing other CDC risk reduction guidelines. A report on

donning and doffing errors (Poller et al., 2018) found the doffing procedure leads to more errors; CDC guidelines recommend removing gowns and gloves at the same time. Blunders in PPE doffing often lead to health care workers' infection, creating a probability for cross-transmission of pathogens to other staff members and patients. Hence, better training of personnel may improve PPE donning/doffing practices among health care workers in the future.

According to Assi et al. (2021), inappropriate use of PPE is not something new. Over time, regulators have developed standards to protect workers from getting injured or falling sick on the job. Nevertheless, occasionally a rare or new infectious illness makes its way into American health facilities. Examples include Ebola in 2014, MERS in 2012, and recently COVID-19. These illnesses have changed the way health care workers look at the use of PPE. Training on proper PPE use may take a back seat due to lack of resources (Kamerow, 2020), but the COVID-19 pandemic emphasized the need for health care workers to be trained on proper PPE practice. Hospitals have had to re-evaluate their staff's preparedness in dealing with major pandemics.

PPE work when proper procedures are followed in donning and doffing. Doffing is considered to be a time of high risk of self-infection and transmission because it involves several steps and requires another person to assist. According to Lee et al. (2021), there is delay in emergency care owing to the complicated process of PPE donning. Therefore, proper donning/doffing of PPE procedures for health care workers is critical for the safety and protection of staff, patients, and families.

Currently, proper use of PPE to prevent health care workers from contracting COVID-19 remains important in primary care settings in the health care system. Unfortunately, the PPE resources to prevent infection are not fully implemented in some primary care settings, including the setting for this project. Several studies reported that inappropriate use of PPE was due to lack of education, lack of proper equipment, lack of administrative support, and changing recommendations. It is established that lack of education, in particular, can considerably effect compliance with PPE recommendations (Brooks et al., 2021). Therefore, education in the procedures of PPE donning/doffing is critical to the protection of those wearing it.

Purpose Statement

The purpose of this Doctor of Nursing Practice (DNP) project was to create an evidence-based educational intervention to be delivered in two short sessions over 2 days to address the identified knowledge gap, lack of appropriate education in the use of PPE, and to improve the confidence of nurses and the other health care workers in a small primary care setting regarding safe use of PPE to prevent COVID-19 spread. The practice-focused questions are: Will an in-person education session improve staff members' knowledge of the circumstances when PPE are mandatory? Does an in-person education session with a donning and doffing demonstration improve staff members' knowledge of proper use of PPE?

Additional infection prevention and control precautions are necessary when a health care worker comes into direct contact with people suspected or confirmed to be COVID-19 positive and when essential services are provided in surroundings where there is extensive community transmission (Andersen, 2019). Apart from using the standard precautions when dealing with all patients, contact and droplet precautions should be observed when providing care to a person suspected or confirmed to be COVID-19 positive. Precautions include wearing a medical mask, a gown, gloves, and eye protection. These precautions should be taken by all health care workers dealing with COVID-19 cases. This staff education project ensured that staff members understood when to use PPE and the correct processes for donning and doffing PPE.

Nurses and other health care workers in practice settings need targeted educate regarding when to use PPE, what type of PPE to use for different situations, and the correct processes for donning and doffing PPE. It is important for health care workers to protect themselves from possible exposure. Protection starts by ensuring they can easily access the proper PPE and on a regular basis. Irrespective of the PPE available to a health care workers, being skillful in PPE donning and doffing is vital. Education on protective measures for the primary care staff was expected to increase their knowledge about and techniques for proper use of PPE and lead to reduced nosocomial spread of COVID-19 in the practice setting of the project.

Nature of the Doctoral Project

To prepare the staff education intervention, the first step was to conduct a thorough literature review to ensure there was adherence to the current best practices. I reviewed the health care-related literature published since

the year 2020 in the databases EMBASE, MEDLINE, EBSCO, and Google Scholar, using the key words *personal protective equipment, PPE, donning/doffing, care professionals, community health services, and COVID-19*, and combinations of these key words such as *health care workers protective measures during COVID-19, educating health care workers on protective measures during COVID-19, and use of PPE in primary care settings*. Additional sources of relevant literature for use in developing the education sessions included the Centers for Disease Control and Prevention (CDC) guidance on COVID-19 for Emergency Medical Services (EMS), the World Health Organization (WHO) Interim Guidance on Prevention, Identification, and Management of Health Worker Infection in the Context of COVID-19, and the CDC *Emergency responders: Tips for taking care of yourself*.

Primary care is critical in the global response to COVID-19. Primary care providers play an important role in gatekeeping and clinical responses such as recognizing and triaging likely COVID-19 cases, making early diagnosis, assisting vulnerable groups to deal with anxiety about the pandemic, and decreasing the demand for hospital services. Health care workers who provide this primary care are important in the continuum of care and their safety should be prioritized (Giuliano et al., 2020). Health care workers should don personal protection equipment based on the infection risk profile of their patients. Mask fitting should be performed for all staff to make sure there is adequate protection and refitting is important for health care workers with changes in weight. Health care workers who do not fit in the available respirator masks or are pregnant should not be deployed in risky areas like red and yellow zones. For the purposes of infection control, patient waiting areas are organized into three zones: red, yellow, and green. Patients with high or medium risk for COVID-19 infection are managed at the red zones and patients with little risk are managed at the yellow zones. Patients are banned from going into green zones because these zones are used by health care workers for PPE donning, planning, inventory, and PPE doffing.

It is mandatory for health care workers meeting patients in the red zones to use full level PPE complete with aerosol precaution. In the yellow zones, there is less need for PPE to protect against contact and droplets. Only face masks are needed in the green zones. Refresher training should be carried out to all health care workers on hand hygiene, PPE donning and doffing, and PPE clothing disposal. Health care workers should comply with infection control procedures to check the spread of the infection. While these recommendations may work for emergency departments, their application in the community primary care clinic setting needs to be verified through emerging evidence review, synthesis, and education of workers.

Significance

This project has numerous stakeholders including, all staff members, the administrators, and patients and families seen in the clinic. Surveillance of health care workers is essential as they are at high risk of contracting COVID-19. Health care workers should have a personal thermometer or have easy access to one when necessary to self-monitor their temperatures twice a day. Those with fever or respiratory illness symptoms should seek medical attention immediately. Common areas should be thoroughly cleaned and disinfected frequently and high touch points cleaned three times daily. Toilets should be cleaned frequently, and waste disposed of correctly. Health care workers should identify patients with non-infectious illnesses depending on their latest lab results and medical records and plan for distribution of their medications. To further reduce patient contact, health care workers should embrace telehealth consultations, computer scheduling of appointments, and e-payment for services. Up-to-date information related to the evolving outbreak situation should be disseminated to health care workers so that they can take actions to mitigate their risk of infection. Hospitals and clinics should ensure there is an adequate supply of PPE for health care workers and replenished supplies proactively to maintain stock levels. Following best practices in PPE use will reduce the spread of COVID-19 to health care workers and patients alike.

Summary

Primary care is critical in the global response to COVID-19. Primary care staff members play an important role in gatekeeping and clinical responses such as recognizing and triaging likely COVID-19 cases, making early diagnosis, assisting vulnerable groups to deal with anxiety about the pandemic, and decreasing the demand for hospital services. Given the contact primary care staff have with COVID-19 cases, they must be knowledgeable about the correct use of PPE. This staff education project was expected to close the gap between best practices in the use of PPE in primary care settings and current practices in a small primary care clinic. Section 2 addresses the theoretical support for this project, the relevance of the project to nursing practice, the local background and context of the project, and the role of the DNP student in carrying out the project.

Section 2: Background and Context

Introduction

The clinical practice problem addressed by this project was the need for all staff nurses to use PPE in the appropriate situations and to practice safe use of the PPE. Better training of clinic personnel may improve PPE donning/doffing practice among the health care workers. The practice-focused questions guiding the project were: Will an in-person education session improve staff members' knowledge of the circumstances when PPE are mandatory? Does an in-person education session with donning and doffing demonstration improve staff members' knowledge of proper use of PPE? This section of the final paper will address the theoretical support for the project, the relevance of the project to nursing practice, the local background and context of the project, and the role of the DNP student in carrying out the project.

Concepts, Models, and Theories

The Kurt Lewin theory of change was used as the basis for this project. Lewin developed a three-stage model of change known as unfreezing, change, and refreezing. Application of the theory calls for health care workers to discard previous information about donning/doffing PPE and substitute it with fresh knowledge. The theory was founded on the notion that if a person can recognize the power of forces, then they are likely to know what forces should be moderated and those that need to be reinforced in order to bring about change (Burnes, 2020). The unfreezing stage involves finding a method to help people abandon old behaviors and aid them in overcoming resistance and group conformity. Change is the second stage and involves change in thought processes, feelings, and behaviors. Refreezing involves adapting the change as a new routine. Refreezing is critical to ensure the change created will be sustained over time. Even though Lewin's theory is widely appreciated in health care settings, it is criticized for being too simple and direct. However, it is these attributes of the theory that make it easy to teach and follow in the clinical setting.

This project is guided by Lewin's theory as issues were identified with improper PPE donning/doffing among the clinic's staff members. Through a pretest, education and demonstration for staff members about proper donning/doffing procedures, and a posttest, I identified behaviors that had become a pattern and was able to address them immediately. At this stage, it was important to overcome any group or individual resistance to the education and to support behavior change. Ideally, the health care workers will continue to apply their new knowledge to change their PPE practices as guided by the three stages of Lewin's theory of change.

Relevance to Nursing Practice

PPE donning and doffing is a complicated procedure and health care workers, including nurses, need to be educated and re-educated on how to go about the process. There is a high risk for cross contamination to both staff and patients as a result of inappropriate use of PPE. Reasons for incorrect use of PPE are lack of awareness on the significance of PPE, time constraints for donning and doffing of PPE, and the lack of understanding the importance of the procedure for correct and safe removal. Amelioration of all these reasons for infection risk depends on staff being well educated on proper usage of PPE. Fears about the adequate supply of PPE, the changing nature of the COVID-19 virus, and working in unaccustomed spaces with unfamiliar supplies and equipment further compound the issues in relation to the incorrect use of PPE and the risks presented.

An allied risk for inappropriate use of PPE is the need of donning/doffing in the correct sequence. COVID-19 is highly contagious and transmission of the virus is still a high threat to health care workers, especially nurses, who are at the frontline of care. Therefore, education of the staff in the primary care clinic was critical in reducing nosocomial infection (Yujeong & Yeaun, 2021).

Local Background and Context

The doctoral education project was carried out in a primary care clinic where I undertook my DNP practicum. The clinic treats adults aged 16 years and older and is situated in the southern United States. At this site, I had easy access to the staff members and my preceptor facilitated scheduling the education, collection of pretest

and posttest data, and access to information that I need to improve current use of PPE. As noted earlier, there were gaps in the appropriate use of PPE, so I targeted all the employees of the primary care clinic. The education was carried out at the primary care clinic and all health care workers in the clinic were invited to participate in the pretest, education, and posttest. The clinic employs one MD, one NP, two RNs, three medical assistants, one office secretary, and one administrative officer. All nine of these staff members participated in the education.

Role of the DNP Student

This project was important because it increased health care workers' protection during the COVID-19 pandemic at the clinic where I completed my DNP clinical hours. My role in the project was to research and prepare the education content, determine the pretest and posttest questions, deliver the education intervention over 2 days at the clinic, analyze the pretest and posttest data using the number of correct and incorrect answers, and disseminate the results and recommendations for future application to the clinic staff. I used reality-based training that involved using real cases in an actual quarantine room setting to increase health care workers' performance in the use of PPE.

After finishing the training, it was expected the participants would have improved their competence and confidence levels in their capacity to observe best practices of donning/doffing of PPE. A study carried out by Poller et al. (2018) found that health care workers resorted to practices like removing their gowns and gloves by rubbing them against their already sterilized clothes before discarding. This defective doffing practice may be unconscious behavior, due to time constraints, or a result of lack of current knowledge on the significance of proper removal of PPE.

Since the demonstration provided the opportunity for on-the-spot feedback to participants, they were given feedback about knowledge and practice skills immediately. For instance, their selection of sequential steps in donning/doffing of PPEs revealed their knowledge of and practice in the order of performance, which is critical in proper donning and doffing (The Lancet, 2020). Mistakes in the order of the steps could be pointed out and corrected before moving to the next step.

Summary

As the COVID-19 evolves, protection of all health care workers has become fundamental as the virus is

highly transmissible to both patients and other health care workers when ineffective protection procedures are used. Health care workers can reduce the risk of contracting the virus by observing proper donning and doffing of PPE. The literature supported the use of health care worker education to protect the workers and reduce transmission. Section 3 of this paper provides detail related to the sources of evidence for the project, the ethical protections of participants, and the analysis and synthesis of the data collected for the project.

Section 3: Collection and Analysis of Evidence

Introduction

The clinical practice problem addressed by this project was the need for all staff in a primary care clinic to use PPE in the appropriate situations and to practice safe use of the PPE. Improper donning and doffing may lead to disease among the health care workers who are critical frontline workers in fighting pandemic diseases such as COVID-19. The very best designed PPE cannot protect health care workers from infectious agents if the workers ignore best practices for or lack the knowledge to follow proper donning/doffing procedure. Therefore, the proper donning/doffing procedure of PPE for health care workers, which is critical for their safety and protection, was taught during two in person all staff education sessions. This section of the paper discusses the practice-focused questions, the sources of evidence, the protections of human subjects, and the analysis and synthesis of the pretest and posttest data collected.

Practice-Focused Question(s)

The purpose of this DNP project was to create an evidence-based educational intervention to be delivered in two short sessions over 2 days to address the identified knowledge gap, lack of appropriate use of PPE, and improve the confidence of nurses and the other health care workers in the small primary care setting regarding their safe use of PPE to prevent COVID-19 spread. The clinical practice problem addressed by this project was the identified need for all staff to use PPE in the appropriate situations and to practice safe use of the PPE. The practice-focused questions were: Will an in-person education intervention improve staff nurses' knowledge of the circumstances when PPE are mandatory? Does an in-person education session with donning and doffing demonstration improve nurses' knowledge of proper use of PPE?

Sources of Evidence

This DNP project entailed use of two types of evidence: (a) literature review to support developing the education for all health care workers in a primary care setting regarding PPE best practices and (b) data from pretest and posttest questionnaires to determine whether the education improved the attendees' knowledge. The literature review was conducted to ensure that the current best evidence was presented in the education sessions. The data

from the pretest and posttest questionnaires were analyzed using descriptive statistics (counts and percentages) to assess whether the staff members' knowledge of clinical use of PPE in the appropriate situations and best practices for safe donning and doffing of the PPE improved as a result of the education.

Evidence Generated for the Doctoral Project

To generate the pretest and posttest knowledge data, staff members of the primary care clinic were recruited to attend the education and complete the questionnaires. All the employees of the primary care clinic were invited to the education sessions and all nine staff members attended the two sessions that were carried out at the primary care clinic. While all staff members attended the education, completion of the pretest and posttest questionnaires was voluntary. The education consisted of an in-person presentation of the current literature on protective measures for primary care workers during the COVID-19 pandemic. Because the number of employees in the clinic was small, only the number of staff members who answered correctly and incorrectly and the overall percent knowledge gain are reported in the project findings. To avoid issues of confidentiality, pretest and posttest questionnaires were not matched in the analysis and no identifying data were collected.

On the first day of the training, participants first took the knowledge pretest. Then the training took place in-person on 2 consecutive days. On the first day of the training, I focused on the literature, while on the second day, I concentrated on correct donning and doffing of PPE, which included a demonstration and hands-on practice. At the end of the second session, the participants took the knowledge posttest. The data collected from the pretests and posttests were analyzed to determine if the participants' knowledge improved from the training.

I did not encounter any ethical issues with this project. I followed the Walden University Manual for Staff Education projects. Participation in the pretest and posttest was voluntary, although all health care workers at the clinic attended the education. Return of the anonymous pretest and posttest served as consent to participate in the project, including use of the submitted data for analysis. I began the project only after I had received Institutional Review Board (IRB) approval from Walden University. The IRB approval number is 09-06-22-0542451.

Analysis and Synthesis

Before starting the staff education, I administered a pretest to the participants. The pretest focused on staff members' knowledge, attitudes, and practices related to use of PPE. After they completed the training, I administered a posttest to gauge if staff members had gained knowledge or changed their attitudes and practices

related to PPE use. I have provided an analysis of the data collected based on the answers given to the questions. The number of “yes” answers and “no” answers and “not always” answers (counted as “no” answers) are reported in Section 4 along with an overall knowledge gain score. Recommendations for future education, practice, and research are also presented in Section 4.

Summary

This section of the project paper provided detail regarding the sources of evidence for the project, the evidence generated from the project, compliance with the Walden University Manual for Staff Education Projects, including protection of human subjects and IRB project approval. The process for analysis and synthesis of the data generated for the project and the questions related to knowledge, attitudes, and practices were presented. Section 4 reports the findings of the project and their implications; the recommendations for future education, research, and practice; and the strengths and limitations of the project.

Section 4: Findings and Recommendations

Introduction

The clinical practice problem addressed by this project was the need for all staff nurses to use PPE in the appropriate situations and to practice safe use of PPE. Training of the personnel was expected to improve PPE use and proper donning/doffing practice among the health care workers in the clinical setting for the project. The practice-focused questions were: Will an in-person education session improve staff nurses' knowledge of the circumstances when PPE are mandatory? Does an in-person education session with donning and doffing demonstration improve nurses' knowledge of proper use of PPE?

The purpose of this DNP project was to create an evidence-based educational intervention delivered over 2 days in two short sessions addressing the identified knowledge gap, lack of appropriate use of PPE, and improve the knowledge, attitudes, and practices of the nurses and the other health care workers employed at the small primary care setting regarding safe use of PPE to prevent COVID-19 spread.

Findings and Implications

Bearing in mind the limitations of face-to-face training during the COVID-19 pandemic, the participants found this method of content delivery to be an effective way to gauge their understanding of and knowledge gain related to donning/doffing of PPE compared to online training. Some participants felt that the training would not result in improvement in their practice; for instance, 60% of the participants were actively practicing health care providers with wide experience, and as such, they felt the training was a refresher course as opposed to new knowledge delivery. The demonstration and practice of PPE donning/doffing, which was of utmost importance to the trainees who constituted 40% of the participants in the training, was also considered review material by nurses who had been practicing. About half of the participants answered that they had received PPE training during contamination control education, signifying that training about PPE use specifically was not largely available. As contagion control gains more prominence, PPE training also should be provided. Participants showed improvement in knowledge of PPE use on the posttest, therefore, it was evident that, to avoid infection, increased staff member awareness through frequent education on the use of PPE was important regardless of self-assessed need for the training. Additionally, participants after the training presented a more positive attitude toward PPE use to protect

health care workers.

Improper donning and doffing may lead to viral contagion of the health care workers who are critical in fighting COVID-19. Proper attitude and continual practice in addition to knowledge are necessary to make donning/doffing of PPE safe for health care workers and the patients for whom they care. However, the donning/doffing procedure can be cumbersome and time-consuming, and participants confessed to having a desire to compromise their own safety even with knowledge about the seriousness of the donning and doffing process. While the participants showed a readiness to observe the methodical way of donning/doffing PPE, they considered it an overvalued practice, which showed a lethargic attitude possibly due to lack of motivation but more likely due to the additional workload of following strict protocol. Gaps in the doffing process detected during training can be attributed to the lack of the checklist and use of an observer, which led to lack of detection of mistakes during doffing.

The demonstration and return demonstration showed that health care workers were observing an improper sequence of doffing like removing the gown after they had removed the inner pair of gloves. A study carried out by (Poller et al., 2018) found that health care workers resorted to practices like removing their gowns and gloves by rubbing them against their already sterilized clothes before discarding. This defective doffing practice may be as a result of inattentiveness, time constraint, or lack of awareness on the significance of proper removal of PPE. Participants had similar claims about time and lack of understanding on the importance of the PPE process.

COVID-19 virus is constantly changing through mutations and at times these mutations become a new variant. Some variants come and disappear but others like Delta and Omicron persist. Taking steps to protect nurses and reduce the spread of infection through getting the COVID-19 vaccine and boosters, wearing a mask, and testing are the best ways to slow the emergence of new variants (Parwanto, 2021). Nurses have a primary commitment to the patients and at the same time owe a duty to self. These obligations can conflict during outbreaks and pandemics when health workers must continually care for infectious and critically ill patients under extreme circumstances such as inadequate human resources, a large unvaccinated population, and uncontained spread of the disease. During pandemics, health care workers must know how they can provide care to patients while at the same time taking care of themselves. The project is expected to lead to social change as the staff education will improve risk mitigation for

both patients and health care workers by following procedures for correct use of PPE. Analysis of the pretest and posttest data, showed that all of the health care workers who participated in the education self-reported that they were knowledgeable about donning/doffing practices. There was 12.5 % increase of healthcare care workers who appreciated the importance and sensitivity of the donning and doffing process (see Table 1). Additionally, all health care providers were aware of all the components of the PPE kits. There was 33% increase in knowledge for health care workers, on being asked whether the virus spreads more during donning than doffing, knew the correct answer was doffing (see Table 1).

Table 1

	Pretest		Posttest	
	Yes	No	Yes	No
Questions on knowledge				
Are you aware of PPE donning and doffing practices for healthcare workers?	9	0	9	0
Do you have any training or have you participated in a demonstration about PPE kits donning and doffing?	5	4	9	0
Are you aware of the whole process of PPE donning and doffing in your healthcare center?	8	1	9	0
Do you understand all PPE kit components used in your health center?	8	1	8	1
Do you appreciate the importance and sensitivity of donning /doffing?	8	1	9	0
Do you know that the virus spreads more during doffing?	6	3	8	1

Table 2**Pretest**

Questions about Attitudes	Yes	No	Not Always
Do you consider PPE donning and doffing as an important procedure that should be observed seriously by healthcare workers?	8	1	0

Strictly do you observe the methodical technique of PPE donning and doffing?	5	2	2
Do you feel that donning and doffing practices are more hyped than necessary in COVID-19 areas?	6	2	1
Is it inconvenient for you to care for your patients after donning, that you think of ignoring your safety?	5	3	1
Do you consider, donning and doffing to be more important only when in COVID-19 prone area and that it is otherwise of no value?	3	5	1
Do you consider your health center to be sufficiently equipped with resources and space necessary for methodical donning/doffing practices?	6	2	1
Does it affect your behaviors if your colleagues working in same area are not observing the appropriate process of PPE donning and doffing?	6	2	1
Do you concur that stringent donning and doffing practices will stop if the pandemic stays for a long time?	4	3	2

Posttest

Questions about Attitudes	Yes	No	Not Always
Do you consider PPE donning and doffing as an important procedure that should be observed seriously by healthcare workers?	9	0	0
Strictly do you observe the methodical technique of PPE donning and doffing?	7	1	1
Do you feel that donning and doffing practices are more hyped than necessary in COVID-19 areas?	8	1	0
Is it inconvenient for you to care for your patients after donning, that you think of ignoring your safety?	7	1	1
Do you consider, donning and doffing to be more important only when in COVID-19 prone area and that it is otherwise of no value?	1	7	1
Do you consider your health center to be sufficiently equipped with resources and space necessary for methodical donning/doffing practices?	7	1	1
Does it affect your behaviors if your colleagues working in same area are not observing the appropriate process of PPE donning and doffing?	2	6	1
Do you concur that stringent donning and doffing practices will stop if the pandemic stays for a long time?	6	3	0

Upon analyses of attitudes about donning/doffing of PPE, there was an increase of 12.5% of health care workers who felt that donning/doffing was an important procedure that should be accorded seriousness while there was an increase of 40% of health care workers who strictly observed the methodical process of donning and doffing. There was a 40% increase in health care workers who found it difficult to care for patients after donning, and a 50% increase of the health care workers who agreed that stringent donning/doffing practices will not be achieved if this pandemic continues over an extended period (see Table 2).

Table 3

Pretest

Questions about practices	Yes %	No %	Not Always
During the ongoing COVID-19 pandemic, do you do donning/doffing in all suspected COVID-19 cases?	7	1	1
Do you pull down your masks under your chin when not around people instead of removing it?	6	2	1
Which instructions do you observe before PPE kit donning?			
Drink plenty of water to stay hydrated	7	1	1
I always remove all personal belongings (jewelry/mobile)	8	1	0
I always wash/sanitize my hands, before touching any PPE component	9	0	0
Which of the following things do you do during PPE kit donning process?			
I always observe the donning process before going inside the patient's room	8	1	0
I always check the integrity of the components of PPE kits before the donning process	8	1	0
Can I move out of patient care area after PPE donning	3	5	1
I always wear the gown first before putting first pair of gloves	6	3	0
I use a respirator, surgical mask followed by a face shield	7	1	1
I always engage an observer with checklist during doffing process to avoid breach of technique	6	2	1
Which of the following things do you observe "during doffing" process of PPE kits?			
I always engage an observer with checklist while doffing to avoid breach of technique	6	2	1
Should there always be a designated doffing zone in all patient care centers	8	1	0

I always remove gloves first during doffing procedure using glove-in-glove technique without sanitizing the gloves	2	6	1
I remove my gown after removing inner pair of gloves	4	5	0
I turn the gown inside-out during removal to get the infected side inside of gown	7	1	1
I move out from the doffing area after removal of gloves and surgical mask	6	2	1
Do I sanitize my hands/gloves before and after each step of doffing process	8	1	0

Posttest

Questions about practices	Yes %	No %	Not Always
During the ongoing COVID-19 pandemic, do you do donning/doffing in all suspected COVID-19 cases?	8	1	0
Do you pull down your masks under your chin when not around people instead of removing it?	8	1	0
Which instructions do you observe before PPE kit donning?			
Drink plenty of water to stay hydrated	8	1	0
I always remove all personal belongings (jewelry/mobile)	9	0	0
I always wash/sanitize my hands, before touching any PPE component	9	0	0
Which of the following things do you do during PPE kit donning process?			
I always observe the donning process before going inside the patient's room	9	0	0
I always check the integrity of the components of PPE kits before the donning process	9	0	0
Can I move out of patient care area after PPE donning	1	8	0
I always wear the gown first before putting first pair of gloves	8	1	0
I use a respirator, surgical mask followed by a face shield	8	1	0
I always engage an observer with checklist during doffing process to avoid breach of technique	9	0	0
Which of the following things do you observe "during doffing" process of PPE kits?			
I always engage an observer with checklist while doffing to avoid breach of technique	9	0	0
Should there always be a designated doffing zone in all patient care centers	9	0	0
I always remove gloves first during doffing procedure using glove-in-glove technique without sanitizing the gloves	1	7	1
I remove my gown after removing inner pair of gloves	1	8	0

I turn the gown inside-out during removal to get the infected side inside of gown	8	1	0
I move out from the doffing area after removal of gloves and surgical mask	7	1	1
Do I sanitize my hands/gloves before and after each step of doffing process	9	0	0

Reviewing the practices of participating health care workers, there was 14% increase in participants who self-reported donning/doffing while caring for patients suspected to have COVID-19 and 33% increase in health care workers who pulled down their masks under the chin when not around people instead of removing them. When doffing, there was increase of 50% of health care workers who involved an observer (eyewitness) or used a checklist. There was an increase of 12.5% of the participants who strictly followed the sanitizing of their hands and gloves before and after every stage of doffing process (see Table 3).

Table 1

Questions on knowledge	% Increase
Are you aware of PPE donning and doffing practices for healthcare workers?	0
Do you have any training or have you participated in a demonstration about PPE kits donning and doffing?	80
Are you aware of the whole process of PPE donning and doffing in your healthcare center?	12.5
Do you understand all PPE kit components used in your health center?	0
Do you appreciate the importance and sensitivity of donning /doffing?	12.5
Do you know that the virus spreads more during doffing?	33

Table 2

Questions about Attitudes	Yes pretest %	Yes post-test %	% Increase
Do you consider PPE donning and doffing as an important procedure that should be observed seriously by healthcare workers?	8	9	12.5

Do you strictly observe the methodical technique of PPE donning and doffing?	5	7	40
Do you feel that donning and doffing practices are more hyped than necessary in COVID-19 areas?	6	8	33.3
Is it inconvenient for you to care for your patients after donning, that you think of ignoring your safety?	5	7	40
Do you consider, donning and doffing to be more important only when in COVID-19 prone area and that it is otherwise of no value?	3	1	66
Do you consider your health center to be sufficiently equipped with resources and space necessary for methodical donning/doffing practices?	6	7	16.6
Does it affect your behaviors if your colleagues working in same area are not observing the appropriate process of PPE donning and doffing?	6	2	66.6
Do you concur that stringent donning and doffing practices will stop if the pandemic stays for a long time?	4	6	50

Table 3

Questions about practices	Yes Pretest %	Yes Pot-test %	% Increase
During the ongoing COVID-19 pandemic, do you do donning/doffing in all suspected COVID-19 cases?	7	8	14
Do you pull down your masks under your chin when not around people instead of removing it?	6	8	33
Which instructions do you observe before PPE kit donning?			
Drink plenty of water to stay hydrated	7	8	14
I always remove all personal belongings (jewelry/mobile)	8	9	12.5
I always wash/sanitize my hands, before touching any PPE component	9	9	0
Which of the following things do you do during PPE kit donning process?			
I always observe the donning process before going inside the patient's room	8	9	12.5
I always check the integrity of the components of PPE kits before the donning process	8	9	12.5
Can I move out of patient care area after PPE donning	3	1	66.6
I always wear the gown first before putting first pair of gloves	6	8	33
I use a respirator, surgical mask followed by a face shield	7	8	14

I always engage an observer with checklist during doffing process to avoid breach of technique	6	9	50
Which of the following things do you observe “during doffing” process of PPE kits?			
I always engage an observer with checklist while doffing to avoid breach of technique	6	9	50
Should there always be a designated doffing zone in all patient care centers	8	9	12.5
.0l; .0always remove gloves first during doffing procedure using glove-in-glove technique without sanitizing the gloves	2	1	50
I remove my gown after removing inner pair of gloves	4	1	75
I turn the gown inside-out during removal to get the infected side inside of gown	7	8	14
I move out from the doffing area after removal of gloves and surgical mask	6	7	16.6
Do I sanitize my hands/gloves before and after each step of doffing process	8	9	12.5

Inaccurate donning /doffing of PPE may lead to viral infection for the health care workers. When there is no proper practice among health care workers, even the best designed PPE kits will not save health care workers from infections. There was 12.5 % increase of healthcare care workers who appreciated the importance and sensitivity of the donning and doffing process (see Table 1) There was a 40% increase in health care workers who reported strict observance of the methodical technique of PPE donning/doffing (see Table 2). There was 50% increase in health care workers always involving an observer with checklist during doffing (see Table 3). There was 75% decrease in health care workers who removed their gowns after removing their inner pair of gloves (see Table 3).

Strengths and Limitations of the Project

A major strength of the project was the way the education was delivered. The participants found the in-person education to be an effective way to gauge their understanding of donning/doffing of PPE compared to online training. Participants showed improvement in knowledge of PPE use on the posttest. There were two noted

limitations of the project having to do with attitude toward the training. Some of the participants felt that the training would not result in improvement of their practice; they felt the training was a refresher course as opposed to new knowledge and practice in PPE donning/doffing. Participants claimed to have received contamination control training that included appropriate PPE use, signifying that training about PPE use specifically was not largely available.

Recommendations

To avoid infection, it is important to increase staff awareness through frequent education on the use of PPE. Participants in training presented a more positive attitude towards PPE use to protect health care workers by using the recommended PPE donning and doffing processes after the education. As contagion control gains more prominence in primary care practices, PPE training should be provided onsite. Some participants had been exposed to COVID-19 infection and there is a continued daily possibility for exposure and transmission to occur at the clinic among any of the staff. Training must include best practices in what PPE to use, when to use it, and how to don and doff it. Transmission is less likely when processes are strictly followed. Section 5 discusses the dissemination plan for the project findings and recommendations as well as a self-assessment of my growth during the DNP program and through the planning, implementation, and evaluation of the DNP project.

Section 5: Dissemination Plan and Self-Analysis

Dissemination

The selection of the dissemination plan is largely depended on the targeted population. This project targeted health care workers at a small primary care clinic. Stakeholders interested in the outcomes of the project included the hospital board, which oversees the employees of the health facility, including nurses, doctors, and others involved in patient care (Eccles et al., 2018). The best method to use for disseminating evidence to the hospital board is a face-to-face presentation; this method will enable immediate feedback during a question and answer session. External methods that I will use to disseminate the findings and recommendations of this project are a poster or podium presentation at conferences of professional organizations such as the Association for Professionals in Infection Control and Epidemiology (APIC) and the American Nurses Association (ANA). Professional nursing organization conferences are ideal for dissemination of clinical practice projects due to the large audiences of practicing nurses.

Analysis of Self

Nursing best practices in infection control stress that nurses must sanitize their hands with every patient encounter as well as when entering or leaving a patient's room. They should also wear PPE specific to the characteristics of the infection. Sanitization of the patients' rooms and instruments used in evaluating and treating patients is essential in decreasing and avoiding the spread of infection. In life-threatening illnesses such as COVID-19, patients who are already infected may have to be quarantined and the spread of the illness to patients and to staff members throughout the clinical setting must be contained. The DNP degree program has given me the insight, experience, the setting (practicum experiences), and the vehicle (evidence-based DNP project development) to become a champion for change in the health care field, to start programs that promote optimal health care results, and to advocate for resolution of national health care delivery issues. This project was an opportunity to promote infection prevention in the primary care setting by supporting health care workers to use PPE appropriately and provide safe care to patients while protecting themselves from disease transmission. Social change is expected as a result of this staff education project as evidenced by disease risk mitigation for both patients and health care workers

through careful adherence to procedures for correct use of PPE.

Summary

Nurses have a primary commitment to their patients and, at the same time, owe a duty of care to themselves. These obligations can conflict during outbreaks and pandemics when health workers must continually care for infectious and critically ill patients under extreme circumstances such as inadequate human resources, a large unvaccinated population, uncontained spread of the disease, and low supplies of PPE. During pandemics, health care workers must know how they can provide care to patients while at the same time protecting themselves. The findings from this project in a small primary care clinic indicated that staff education will result in increased knowledge of when to use PPE and the processes for donning and doffing PPE. When followed, this evidence-based information will reduce disease transmission within the primary care setting. Updates to the education and periodic PPE donning/doffing practice, as well as spot checks for adherence to the practices for optimal PPE use will be necessary to maintain current knowledge and performance competency.

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