

# Effectiveness of Planned Teaching Programme on Knowledge and Practice among Nursing Students Regarding Donning and Doffing of Personal Protective Equipments

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**Abstract:** During the current corona virus pandemic, significant emphasis has been placed on the importance of mitigating nosocomial spread of corona virus disease 2019 (COVID-19). One important consideration involves the appropriate use of effective personal protective equipment (PPE), which may reduce a healthcare provider's likelihood of becoming infected while simultaneously minimizing exposure to other patients that they care for. A pre-experimental study was conducted to develop and assess the effectiveness of planned teaching programme on knowledge and practice among nursing students regarding donning and doffing of personal protective equipments in selected nursing college of Delhi. The main objectives of the study were to develop planned teaching programme on donning and doffing of personal protective equipments and to assess the effectiveness of planned teaching programme in terms of knowledge as well as practice regarding donning and doffing of personal protective equipments among nursing students. The study was conducted in a selected college of Delhi from 14<sup>th</sup> February to 18<sup>th</sup> February 2021. Total 50 samples were selected by using purposive sampling techniques. Structured questionnaire and checklist were used to collect the demographic characteristics and assessed their level of knowledge and practice regarding donning and doffing of personal protective equipments. The findings revealed that the difference between pre- test and post- test knowledge score 't' value of 2.5 for the degree of freedom (49) at 0.05 level of significance. And the difference between pre -test and post -test practice score 't' value of 0.12 for the degree of freedom (49) at 0.05 level of significance. The findings of the study reveals that there was significant increase in knowledge as well as practice after the administration planned teaching programme regarding donning and doffing of personal protective equipments.

## 1. Introduction

The current global pandemic is caused by the "novel corona virus disease (2019-nCoV) or severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) popularly known as COVID-19 disease" originated in the city of Wuhan in Hubei Province, China, during December in 2019. The virus quickly spread throughout the world. Many countries reacted too late to implement preventive measures leading to a sudden upsurge in the number of cases worldwide. Genomic analysis of the virus SARS-CoV-2 was found to be phylogenetically similar to other bat originated corona viruses like SARS-Cov-1 and MERS-CoV, thereby confirming that bats are the primary reservoir of the virus, however, the intermediate source of origin and its transfer to humans is not yet known. [1]

According to WHO, the disease is caused by the SARS-CoV-2 virus, which spreads between people in several different ways. The virus can spread from an infected person's mouth or nose through small liquid particles when they cough, sneeze, speak, sing or breathe. These particles range from larger respiratory droplets to smaller aerosols. Current evidence suggests that the virus spreads mainly between people who are in close contact with each other, typically within 1 meter (short-range). A person can be infected when aerosols or droplets containing the virus are inhaled or come directly into contact with the eyes, nose, or mouth. The virus can also spread in poorly ventilated and/or crowded indoor settings, where people tend to spend longer

periods of time. This is because aerosols remain suspended in the air or travel farther than 1 meter (long-range). People may also become infected by touching surfaces that have been contaminated by the virus when touching their eyes, nose or mouth without cleaning the hands. [2]

Effective use of Personal Protective Equipments by healthcare workers (HCWs) is an important component of infection prevention in healthcare settings. Personal Protective Equipments (e.g., gowns, gloves, masks) protects HCWs from contamination with infectious agents and helps prevent cross-contamination to other patients. However, Personal Protective Equipments effectiveness is influenced by how health care workers wear and doff (remove) Personal Protective Equipment.

## 2. Material and Methods

50 B.Sc. nursing 2<sup>nd</sup> year students were selected by using Non- probability purposive sampling technique. Structured questionnaire and checklist were used to collect the demographic characteristics and assessed their level of knowledge and practice regarding donning and doffing of personal protective equipment's. Structured questionnaire comprised of 4 question on demographic variable and other 20 question to assess the knowledge and practice about COVID-19, donning and doffing of Personal Protective Equipment and checklist comprises 36 question of donning and doffing of Personnel Protective Equipment's. Split -Half method was used to check the internal consistency of the

checklist to assess the practice of donning and doffing of Personal Protective Equipment's and it was found 0.86 where as the accepted range is between  $\pm 1$ .

**Data Collection Procedure**

On the Day 1, the investigator introduced self and explained the purpose of the study to the participants. Informed consent was taken from the participants. Pre - test conducted by administering structured questionnaire followed by the administration planned teaching programme On 5<sup>th</sup> day Post - test was conducted by using the same structured questionnaire.

**3. Result and Discussion**

In the present study the findings shows that pre-test level of knowledge, the majority (96%) was having good knowledge, 4% was having moderate knowledge and 0% had poor knowledge. The findings of the study were consistent with the findings of the study done by Kiran Asha, Sushma Kumari, et al [3] which revealed that 88.7% (134) of participants had the knowledge, while 11.3% (17) did not have knowledge regarding universal precautions. 72% had lack of information and education about Personal Protective Equipments.

The findings of the study were consistent with the findings of the study done by Amrita John, Myreen E Tomas , et al [4] which revealed that less than 40% of participants chose correct donning and doffing sequences based on Centre of Disease Control and prevention recommendations. There were no significant differences among physicians trained in United States versus physicians trained in medical schools outside the United States, in terms of having had training in use of Personal Protective Equipment(p = 0.46) or their knowledge of the Centre of Disease Control and prevention recommendations for donning and/or doffing sequences (p = 0.44).

In the present study the findings show that in pre-test practice 12% had good practice, 84% showed average practice and 4% had poor practice and the pre-test of practice is 19.52. The post-test practice shows that 64% had good practice, 36% had average practice and 0% had poor practice and post-test mean is 26.3.

The findings of the study were consistent with the findings of the study done by Nicholas Pokrajac, Kimberly Schertzer et al [5] which revealed that all participants had a mean pre-test score of 73.1% (95% confidence interval [CI], 70.9–75.3%). Faculty member and resident pre-test scores were similar (75.1% vs. 71.3%, p = 0.082). Mean pre-test doffing scores were lower than donning scores across all participants (65.8% vs. 82.8%, p<0.001). Participant scores increased 26.9% (95% CI of the difference 24.7–29.1%, p<0.001) following our educational intervention resulting in all participants meeting the Mean Pre test Score of 100%.

The findings of the study were similar to the findings of the study done by Helen E Groves, Taito Kitano et al [6] which revealed that 86 respondents (50%) identified the correct donning order, only 60 (35%) identified the correct doffing order; but the majority (n = 113, 70%) indicated the need to

wash their hands immediately prior to removal of their mask and eye protection. Also, 91 (54%) respondents felt comfortable with recommendations for droplet and contact precautions for routine care of patients with COVID-19.

**Tables and Figures**

Out of 50 majority (46%) had information regarding donning and doffing through demonstration by infection control nurse. Mostly (32%) have 3-4 months duration of experience related to donning and doffing of Personal Protective Equipment. All of the 50 subjects are having previous experience about Personal Protective Equipment (100%).

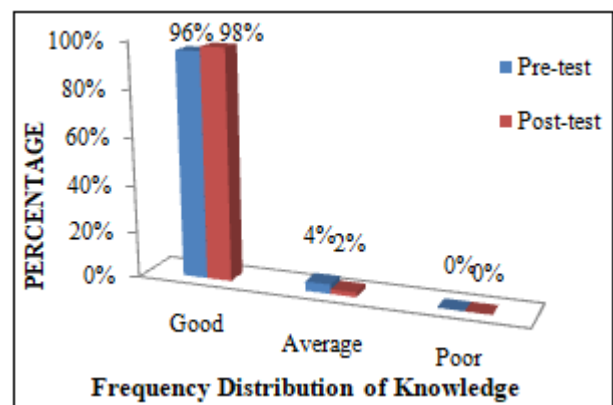
**Table 1:** Mean and standard deviation of knowledge scores of B.Sc. 2<sup>nd</sup> year nursing students, n=50

Group	Mean	Standard Deviation
Pre-test	17.6	1.56
Post-test	18.16	1.41

Table 1 shows that the pre-test mean knowledge scores of B.Sc. 2<sup>nd</sup> year nursing students regarding donning and doffing of Personal Protective Equipment is 17.6 and standard deviation is 1.56. The post-test mean knowledge scores of B.Sc. 2<sup>nd</sup> year nursing students regarding donning and doffing Personal Protective Equipment is 18.16 and standard deviation is 1.41.

**Table 2:** Frequency and percentage distribution of pre-test and post-test knowledge scores of B.Sc. 2<sup>nd</sup> year nursing students according to level of knowledge, n=50

Level of knowledge score	Frequency	Percentage	Frequency	Percentage
	Pre-Test		Post-Test	
Good	48	96%	49	98%
Average	2	4%	1	2%
Poor	0	0%	0	0%



**Figure 1**

**Column diagram showing frequency and percentage distribution of B.Sc. 2<sup>nd</sup> year nursing students by their level of knowledge**

The data represented in Table 2 and figure 1 depicts the frequency and percentage distribution of level of knowledge scores of B.Sc. 2<sup>nd</sup> year nursing students according to their pre-test level of knowledge, the majority (96%) was having good knowledge, 4% was having moderate knowledge and none of them had poor knowledge. According to their post-test level of knowledge, the majority (98%) was having

good knowledge, 2% was having moderate knowledge and none of them had poor knowledge.

**Table 3:** Effectiveness of Planned Teaching Programme in terms of knowledge, n=50

Group	Observation	Mean	Mean Difference	Standard Deviation Difference	“t” value	Tabulated Value
B.Sc. 2 <sup>nd</sup> year nursing students	Day 1 Day 7	17.6 18.1	0.5	0.15	*2.5	2.00

p< 0.05 level, \*Significant at 0.05 level of significance.

The data represented in Table 3 shows that the pre-test mean score was 17.6 and post-test mean score is 18.1 with mean difference of 0.5 which was found to be statistically significant as evidenced from the t- value of 2.5 for the degree of freedom (49) at 0.05 level of significance. This shows that Planned Teaching Programme was effective in improving the knowledge among B.Sc. 2<sup>nd</sup> year nursing students regarding donning and doffing of Personal Protective Equipment.

**Table 4:** Mean and standard deviation of practice scores of B.Sc. 2<sup>nd</sup> year nursing students, n=50

Group	Mean	Standard Deviation
Pre-test	19.52	3.63
Post-test	26.36	3.75

Table 4 shows that the pre-test mean practice scores of B.Sc. 2<sup>nd</sup> year nursing students regarding donning and doffing of Personal Protective Equipment 19.52 and standard deviation is 3.63. The post-test mean practice scores of B.Sc. 2<sup>nd</sup> year nursing students regarding donning and doffing of Personal Protective Equipment is 26.36 and standard deviation is 3.75.

**Table 5:** Frequency and percentage distribution of pre-test and post-test practice scores of B.Sc. 2<sup>nd</sup> year nursing students according to level of practice, n=50

Level of Practice Score	Pre-test		Post-test	
	Frequency	Percentage	Frequency	Percentage
Good	6	12%	32	64%
Average	42	84%	18	36%
Poor	2	4%	0	0%

**Table 6:** Effectiveness of Planned Teaching Programme in terms of practice, n=50

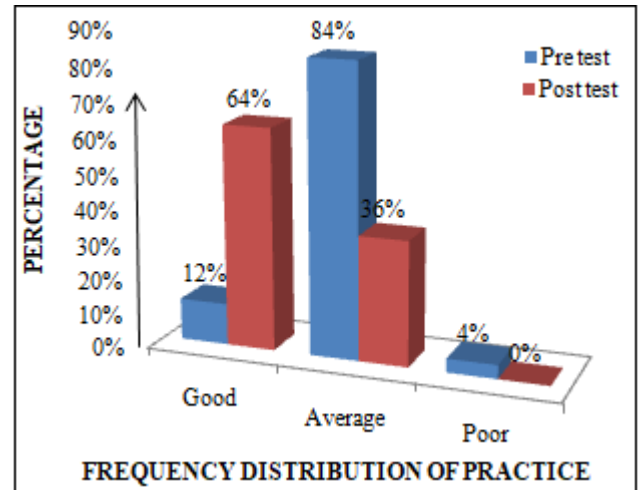
Group	Observation	Mean	Mean Difference	Standard Deviation Difference	“t” value	Tabulated Value
B.Sc. 2 <sup>nd</sup> year nursing students	Day 1 Day 7	19.52 26.36	6.84	0.12	*8.6	2.00

p< 0.05 level, \*Significant at 0.05 level of significance.

The data represented in Table 6 shows that the pre-test mean score was 19.52 and post-test mean score is 26.36 with mean difference of 6.84 which was found to be statistically significant as evidenced from the t- value of 0.12 for the degree of freedom (49) at 0.05 level of significance. This shows that Planned Teaching Programme was effective in improving the practice among B.Sc. 2<sup>nd</sup> year nursing students regarding donning and doffing of Personal Protective Equipment.

#### 4. Conclusion

Correct knowledge and practice of donning and doffing of Personal Protective Equipment is provided to the nursing



**Figure 2:** Column diagram showing frequency and percentage distribution of B.Sc. 2<sup>nd</sup> year nursing students by their practice

The data represented in Table 5 and Figure 2 depicts the frequency and percentage distribution of level of pre practice scores of B.Sc. 2<sup>nd</sup> year nursing students according to their level of practice, the majority (84%) was having average practice, 12% was having good practice and only 4% was having poor practice regarding donning and doffing of Personal Protective Equipments. The frequency and percentage distribution of level of post practice scores of B.Sc. 2<sup>nd</sup> year nursing students according to their level of practice, the majority (64%) was having good practice, 36% was having average practice and none were having poor practice.

students to prevent the spread of infection as well as to reduce the incidence of infection. It is observed that nurses spend more time directly caring for patients, as opposed to the time spent by doctors. This implies that the average nurse spends more than twice as much time in close contact with patients, in turn increasing the likelihood of contracting or spreading an infection. It is also necessary and expected that nurses use Personal Protective Equipment even when they are with patients or in an environment not considered infectious or contaminated, as information on a patient’s infection status may not be readily available or accessible. This emphasizes the need for adequate Personal Protective Equipment options and usage for nurses in particular. Therefore there is significant improvement in the

level of knowledge as well as practice after the administration of Planned Teaching Programme.

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