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Effectiveness of structured teaching programme on knowledge and practice regarding donning and doffing of personal protective equipment among B.Sc. nursing students of college of nursing, RIMS, Imphal

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Abstract

Personal protective equipment referred to as 'PPE' is an equipment which is worn to minimize the exposure to hazards that cause serious workplace injuries and illness. It offers protection by preventing microorganism from contaminating hands, eyes, clothing, hair and shoes. PPE includes gloves, protective eye wear, apron, gown, boots/shoe cover, hair cover. PPE should be used by all health care providers, student nurses, laboratory staffs and family members who provide care to patients in situations where they are exposed to blood, body fluids, secretions or excretions.

Emergent infectious diseases are a challenge to any health system. The current pandemic of the Coronavirus Diseases 2019 (COVID-19), caused by the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), is the best recent example of this challenge. Originated in Wuhan, Hubei, china, in December 2019, this emerging infectious disease became a World Health Organization (WHO)-declared pandemic. Till May 13, 2020, this new infection has a worldwide distribution, with more than 4.34 million people infected and more than 296 thousand people dead.⁷

Keywords: Knowledge, practice, donning & doffing, Personal protective equipment

Introduction

Personal protective equipment is specialized equipment designed to protect the wearer's body from injury or infection and act as barrier between viral, bacteria, fungi and prevent spreading of infections. It protects student nurse against health or safety risks on clinical areas and decrease exposure to hazardous when caring or administering medication when control are not effective to reduce the risk to acceptable level^[8].

Adequate knowledge regarding donning and doffing PPE among nursing students can reduce the mortality and morbidity rates in this Pandemic. A similar study conducted among 543 nurses shows that nurses work in unique and unpredictable environment, which results in nurses being unable to comply with existing Universal Precaution Guidelines. A study conducted among 540 nurses in Iran Shows that there is urgent need to create and strengthen programme for improving the knowledge for better and safe practice.

Personal Protective equipment donning and doffing is a critical process that requires significant care. This process particularly the removal and disposal of contaminated PPE, is considered a highly important step in limiting exposure to pathogens (CDC 2020)^[9].

A cross sectional survey was conducted from September to October 2013 at Nizam's Institute of Medical Sciences, Hyderabad to assess the knowledge and awareness of standard precautions among health care workers that is doctor, nurse and technicians. The study finding showed the knowledge of standard precaution was highest among doctors (63.3%) followed by technicians (56.5%) and nurses (40%). There was a significant difference in knowledge and awareness of standard precautions among studied health care professionals^[10].

A new study monitoring the spread of Multi-Drug Resistant Organization (MRDO) in hospitals found that as many as 36% of healthcare workers was contaminated with MRDO following patient contact. After removing personal protective equipment (PPE) such as gloves, aprons and respirators mask, as many as 10.4% were still shown to be contaminated on their hands clothes or personal items^[11].

During my clinical training I learned how important it is to wear Personal Protective Equipment in correct method. I noticed usually a high number of patients coming in hospital with different symptoms and nursing staffs are giving direct care to the patient without wearing gloves, mask etc. I also noticed in critical situation nursing students are spending more time with critical ill patient by giving direct care without wearing proper personal equipment.

Studies noted that most of the staff and nursing student are having little knowledge regarding donning and doffing of Personal Protective Equipment and most of the health worker are not aware of procedures of Correct donning and doffing of PPE. Therefore the researcher felt the need to Prepare Structure teaching programme on Knowledge and practice regarding donning and doffing of Personal Protective Equipment.

Review of literature

Abuobaida E.E. Abukhelaif ^[24] a cross sectional descriptive study was conducted on " Personal Protective Equipment Knowledge and practice among nurses working at AL-BAHA: King Fahad Hospital, Saudi Arabia". The objective of this study is to determining the knowledge, practice and factors that influence compliance with usage of Personal Protective Equipment (PPE) among nurses working at Al-Baha King Fahad Hospital, KSA. Most of the studied nurses were females, young in age group of less than 40 years, carry bachelor's degree and work as staff nurses for more than 3 years (7.4%, 81.1%, 74.6%, and 61.6%) respectively. Data was collected using self- administered semi structured questionnaire. Statistical Package on Social Science (SPSS) version 16 was used to analyze the data. Descriptive statistics were used to analyse characteristics of participants. Chi-square and correlation was used to establish significance and relationship between variables. These study reveals that nurses had excellent knowledge with and appropriate use of PPE as vital in safeguarding HCWs and spread of infection.

Jindal ^[30] a quantitative research approach with pre-experimental one group pre-testpost-test research designed was conducted on effectiveness of planned teaching programme regarding PPE use among the students of GNM 1st year at Maharaja Agrasean College of Nursing, Agroha. Study sample were collected by purposive sampling technique. The study was conducted amongst 30 students of GNM 1st year by using structured knowledge questionnaire. The study findings reveal that only 43% study study subjects had previous knowledge regarding PPE. The mean difference between pre-test and post-test score was 5.07 and it is statistically significant at 0.05 level of significance. The standard deviation of mean difference is 3.28 for pre-test and 2.89 for post-test. The paired "t" test value calculated 7.31. Planned teaching program was effective to improve knowledge regarding personal protective equipment use.

Problem Statement

Effectiveness of structured teaching programme on knowledge and practice regarding donning and doffing of personal protective equipment among B.Sc. Nursing students of College of Nursing, RIMS, Imphal

Objectives of the study

1. To determine the effectiveness of structured teaching

programme regarding donning and doffing of personal protective equipment among B.Sc. Nursing students of College of Nursing, RIMS, Imphal.

2. To ascertain the correlation between the knowledge and practice regarding donning and doffing of PPE among B.Sc. Nursing student.
3. To assess the association between selected demographic variables (age, sex, religion, course of the study, previous knowledge regarding the topic) and the knowledge scores of the structured teaching programme regarding donning and doffing of Personal protective equipment.

Methodology

A research approach tells us what data to collect and how to analyze it. It also suggests possible conclusions to be drawn from the data. In view of the nature of the problem selected for the study and the objective to be accomplished, an evaluative survey research approach was considered to assess the knowledge and practice regarding donning and doffing of personal protective equipment among B.Sc. nursing students of college of nursing, RIMS, Imphal. In this study, one group pre-test and post-test interventional research design was used. The data was collected from 60 B.Sc. nursing students who fulfilled inclusion criteria. The data was collected through structured knowledge questionnaire and observational checklist. The data was analyzed by using descriptive and inferential statistics. Before conducting the study, informed consent was taken from the samples after explaining purpose of the study.

Results

The findings of the study suggest that, out of 60 B.Sc. nursing students, only 83.3% of them have fair knowledge while 11.7% have poor knowledge and only 5% of them have good knowledge. However, after the intervention with the purposed teaching programe, none of the students have poor knowledge, 86.7% of them have fair knowledge and 13.3% have good knowledge as mentioned in the figure 1
The mean percentage score for knowledge of the selected B.Sc. nursing students is found to be 62.33 with a standard deviation of 10.47 which is quite low in comparison with the corresponding score in post-test i.e., 83.20 with a standard deviation of 5.24.

Percentage distribution of overall knowledge of selected B.Sc. nursing students

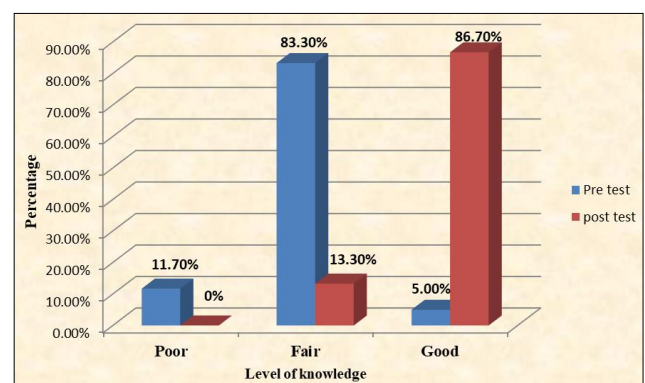


Fig 1: Percentage distribution of level of knowledge for pre and post test

Again, the mean percentage score for practice (donning procedure) of the selected B.Sc. nursing students in found to be 6.67 with a standard deviation of 13.05 which is quite

low in comparison with the corresponding score in post-test i.e., 95.75 with a standard deviation 9.96 as mentioned in the table 1.

Table 1: Frequency and percentage distribution of overall practice for donning regarding personal protective equipment in pre-test and post test n= 60

Category	Range of Category	Pre-test donning score		Post-test donning score	
		Frequency	Percentage	Frequency	Percentage
Poor	Below 50% score	50	66.03%	-	
Fair	50 – 79% score	7	33.3%	6	4.25%
Good	80% & above score	3	6.67%	54	95.75%

In other hand, the mean percentage score for practice (doffing procedure) of the selected B.Sc. nursing students were found to be 3.33 with a standard deviation of 9.21 score

which is quite low in comparison with the corresponding score in post-test i.e.,96.85 with a standard deviation of 11.03 as mentioned in the table 2.

Table 2: Frequency and percentage distribution of overall practice for doffing regarding personal protective equipment in pre-test and post test n= 60

Category	Range of Category	Pre-test doffing score		Post-test doffing score	
		Frequency	Percentage	Frequency	Percentage
Poor	Below 50% score	49	79.92%	-	
Fair	50 – 79% score	4	3.33%	5	3.15%
Good	80% & above score	7	16.75%	55	96.85%

The difference is tested by paired t-test and found to be very highly significant as evident by $p < 0.001$ which is significant even at 0.001 probability level. The finding supports the previous statement that is, the purposed teaching programe on donning and doffing of personal protective equipment is

effective, to a great extent. There is a positive significant relationship between knowledge and practices of respondents on donning and doffing of PPE ($r=0.421$ and 0.306). So this is highly correlated with each other as depicts in the table 3.

Table 3: Correlation between the knowledge and practice regarding donning and doffing of PPE among B.Sc. Nursing student.

Category	Percentage mean pre-test knowledge	Percentage mean post-test knowledge	Per test percentage donning score	Post-test percentage donning score	Pre-test percentage doffing score	Post-test percentage doffing score.
Percentage mean pre-test knowledge	1	.232	.421**	.238	.339	.306**
Percentage mean post-test knowledge		1	.250	.028	.321	.216
Per test percentage donning score			1	.221**	.666	.077
Post-test percentage donning score				1	.157	.406
Pre-test percentage doffing score					1*	-.142**
Post-test percentage doffing score.						1

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

The study associated none of the demographic factors have impact on pre-test knowledge regarding personal protective

equipment hence it is insignificant at 5% probability level ($p= 0.05$) adopted as depicts in the table 4.

Table 4: Association between the knowledge with the selected demographic variables n=60

Sl. No	Demographic variable	Category	Category of Pre-test knowledge						Total	χ^2 -value
			Poor		Fair		Good			
			F	%	F	%	F	%		
1	Age	20	1	3.3%	26	86.7%	3	10.0%	30(100.0%)	10.74 df:6 p: .097
		21	2	16.7%	10	83.3%	-		12(100.0%)	
		22	2	14.3%	12	85.7%	-		14(100.0%)	
		23	2	50.0%	2	50.0%	-		4(100.0%)	
2	Religion	Hindu	2	13.3%	12	80.0%	1	6.7%	15(100.0%)	3.398 df:6 P: .758
		Muslim	-		4	100.0%	-		4(100.0%)	
		Christian	5	15.2%	27	81.8%	1	3.0%	33(100.0%)	
		Others	-		7	87.5%	1	12.5%	8(100.0%)	
3	Course of the study	1st year	1	9.1%	1	90.9%	-		11(100.0%)	10.71 df:6 p: .098
		2nd year	-		16	84.2%	3	15%	19(100.0%)	
		3rd year	4	21.1%	15	78.9%	-		19(100.0%)	
		4th year	2	18.2%	9	81.8%	-		11(100.0%)	

Table 5: Association between the pre-test knowledge with the selected demographic variables n=60

Sl no	Demographic Variable	Category	Category of Pre-test knowledge						Total	χ^2 -value
			Poor		Fair		Good			
			F	%	F	%	F	%		
4	Sources	NA	2	11.1%	15	83.3%	1	5.6%	18(100.0%)	1.009 df:8 P:.998
		Attended programme	-		1	100.0%	-		1(100.0%)	
		Mass media	1	20.0%	4	80.0%	-		5(100.0%)	
		Others	2	13.3%	12	80.0%		6.7	15(100.0%)	

χ^2 -value; df: degree of freedom; P-value: probability due to chance factor

Conclusion

The overall findings of the study clearly showed that the knowledge and practice regarding donning and doffing of personal protective equipment among B.Sc. nursing students has improved significantly after the implementation of the intervention. Thus it can be concluded that, structured teaching programme is an effective intervention in enhancing knowledge and practice of B.Sc. nursing students regarding personal protective equipment

Future Scope

- A comparative study can also be done between effectiveness of STP versus other modes of teaching structured instructional module, computer based reaching.
- A similar study can be conducted using true experimental design
- Future studies can be conducted to estimate the knowledge regarding donning and doffing of PPE among staff nurses
- Similar kind of the study can be conducted for a large group on a long term basis
- Future studies can include the attitude of the nursing personnel in order to make out the relationship between knowledge, skill and attitude.

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