



Knowledge and Practice of Nursing Students Regarding Standard Precautions at a Tertiary Care Hospital

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ABSTRACT

Background: Health professionals are increasingly at risk from contact with patients' and other bodily fluids, which has been a major source of alarm for the wider public and leading figures in the field of medicine across the globe. Infections related to medical care pose a significant danger to those who work in the medical field. **Objective:** The objective of this study was to identify the knowledge and practice of nursing students regarding standard precautions at a tertiary care hospital. **Methods:** A descriptive cross sectional study was conducted among nursing students regarding standard precautions. Simple random sampling technique was used for data collection. Data was collected from a sample size of 121 participants by using pre-structured demographics, knowledge and practice based questionnaire from nursing students. Data was analyzed by using the SPSS 21 software for descriptive statistics. **Results:** The findings of this study revealed that majority of the participants 64.5% have an average knowledge (50% to 85%) regarding standard precautions, while 35.5% of the participants have an excellent knowledge (>85%). Similarly 56.2% of the participants have an average practice (50% to 85%), while only 37.2% of the participants have good practice (>85%), and 6.6% of the participants have poor practice (<50%) regarding standard precautions. **Conclusion:** The findings of this study suggest that more work needs to be done to ensure that students fully grasp the concepts of hospital acquired infections and strictly adhere to the standard precautions in the hospital settings. Standard precautions should be applied under strict surveillance and established norms with the aid of well-developed interventions that raise awareness and encourage the adoption of safe practices.

INTRODUCTION

Infections related to medical care pose a significant danger to those who work in the medical field. Although numerous national and international authorities have drafted plenty of policies and regulations, there still needs to be more compliant with the standards that have been established. The rise in the number of diseases related to health care is that standard measures need to be followed too, because of a lack of understanding or carelessness.

Standard precautions, also known as "SP," are a set of infection control measures that help prevent the spread of infections that can be acquired through contacting bodily fluids, mucous membranes, and broken skin. These include safe injection methods, keeping one's hands clean, and using gloves, a mask, a gown, eye protection, or a face shield, depending on the projected amount of exposure (Batan et al., 2018).

Standard precautions must be taken with every patient, regardless of whether or not there is a confirmed infection or a suspected problem with the patient. Nurses are among the frontline healthcare workers who are in direct touch with patients for extended periods when

giving care to patients. As a result, nurses are more likely to be exposed to various occupational risks (Kaur, Singh and Kukreja, 2019).

Workers in the healthcare industry include those who provide treatment directly, including doctors, nurses, lab techs, and pharmacists, as well as those who supervise care delivery and provide essential support services, like security guards, bus drivers, and kitchen staff. Biological, toxicological, agronomic, structural, and mental distress are some risks that healthcare workers face on the job (Abuduxike et al., 2021).

Depending on the infectious agent, there may be several entry points for infection among healthcare personnel. Infection can also occur through splashes and droplets of contaminated bodily fluids on injured skin, or from a needle sticking through skin tissue. Eye, mouth, and nose infections can also be contracted when contaminated body fluids splash or droplets land on the mucous membranes, or when the same mucous membranes come into contact with contaminated skin, such as when rubbing the eyes with a hand carrying pathogens after shaking hands with a patient. The most effective solution is to set

up the hospital or healthcare unit in such a way that there is less opportunity for patients and staff to come into contact with one another. Once this is in place, the use of PPE is the primary method for limiting direct contact with potentially deadly pathogens (PPE). Many different types of protective clothing and equipment, such as coveralls, gowns, hoods, masks, and eye shields, and breathing apparatuses, are used to keep workers safe in potentially hazardous environments (Verbeek et al., 2019).

Washing one's hands according to the level of exposure, wearing gloves, donning a dress, wearing protective goggles and a face mask, maintaining proper respiratory norms, when doing a lumbar penetration test, it is normal practice to use precautions to prevent infection and use safe handling injection techniques. South Korea, which is necessary, follows these regulations for standard safeguards (KDC and Prevention Agency, 2017).

Standard precautions recommend four essential practices for preventing the spread of infection: thorough hand washing, the use of barriers to prevent direct contact, the proper disposal of sharps, and the thorough cleaning and sterilization of instruments and other potentially contaminated equipment. These four guidelines constitute the foundation of the precautionary principle (Solanky et al., 2016).

Healthcare experts have observed implementation deficiencies despite organizations' broad adoption of Standard Precautions. Percutaneous infections from contaminated needles and other sharps continue to occur (Powers, Armellino, Dolansky, and Fitzpatrick, 2016). Healthcare workers mention inadequate infrastructures, such as an absence of handwashing amenities, a lack of understanding regarding transmission, poor personal protective equipment (PPE), unhealthy worker behaviors, and inappropriate working conditions as obstacles (Porto and Marziale, 2016). As a result, interventions have been created to promote Standard Precautions as the cornerstone for preventing and controlling infections.

Patients are prone to contracting infections from nurses and other healthcare workers. However, nurses and other healthcare personnel are constantly exposed to germs that might cause illness. The recapping of needles and sharps has regularly exposed healthcare staff to blood-borne diseases like hepatitis B, C, or HIV. Similarly, if Healthcare practitioners fail to follow standard procedure when treating asymptomatic patients who may be contaminated, they run the risk of getting these illnesses. Recapping needles and reluctance to wear personal protective equipment (PPE) are major contributors to needle stick injuries and, consequently, HAIs (Ehimen et al., 2020).

To protect themselves, patients, and colleagues from infection, healthcare workers can avoid these diseases if they consistently observe standard precautions. These precautions include several acts that reduce the risk of contact with blood and bodily fluids (Mudedla et al., 2014). Hand hygiene, four pillars of conventional measures for preventing infection include the use of safeguards to prevent actual interactions, the correct handling and removal of sharp instruments, the comprehensive cleaning

of instruments, and the proper disposal of sharps (Solanky, et al., 2016).

Despite widespread knowledge of the need for conventional measures to prevent the transmission of infectious organisms in the workplace, healthcare workers have been reported to have low compliance rates (Al-Faouri et al., 2021). Continuous education and training impact standard precaution compliance (Zeb & Ali, 2021). Awareness and adherence to basic precautions are essential for avoiding infection and lowering the risk of contracting medical center diseases.

Objectives of the Study

To identify the knowledge and practice of nursing students regarding standard precautions at a tertiary care hospital.

Research Questions

- What is the knowledge level of nursing student regarding standard precautions at a tertiary care hospital?
- What are the practices of nursing student regarding standard precautions at a tertiary care hospital?

Operational Definitions

Knowledge

Knowledge in this study will be measured through an adopted knowledge based questionnaire by using Nominal scale. Yes will be ranked as 2 and No will be ranked as 1. The maximum score of knowledge is 18 and minimum score is 9. Based on the scale from the questionnaire excellent knowledge will be consider as >85% (>15 out of 18), average knowledge will be consider as 50% to 85% (09 to 15 out of 18), and poor knowledge will be consider as <50% (<09 out of 18).

Practice

The questionnaire will use a Likert scale to assess practices. So, strongly agree will be ranked as a 5, agree will be ranked as a 4, neutral will be ranked as a 3, disagree will be ranked as a 2, and strongly disagree will be ranked as a 1. In terms of percentage, >85% (>30 out of 35) will be consider as good practice, 50% to 85% (18 to 30 out of 35) will be consider as an average practice and <50% (<18 out of 35) will be consider as poor practice.

LITERATURE

The term "universal precautions" is being phased out in favor of the more inclusive "standard precautions," which acknowledge that any bodily fluid may include infectious and deadly bacteria. All bodily fluids must be handled with the utmost care, including blood, sperm, vaginal secretions, CSF, synovial fluid, pleural fluid, pericardial fluid, and amniotic fluid. Except in the case of blood, regular hygiene practices are not to be followed while dealing with a patient's face, nasal secretions, sputum, sweat, tears, urine, or vomits.

Researchers in Pakistan found that, across the board, nurses knew less than doctors about patient care. Age was found to be a major predictor of a healthcare provider's familiarity with basic precautions. The spread of nosocomial infections can be stopped and the societal toll from infectious diseases can be lessened by educating medical professionals better. Almost two-thirds (70%) of

all participants had excellent understanding of conventional precautions, while 19.5% had good knowledge and 12.2% had medium or below average knowledge. Overwhelmingly, knowledgeable people in this group were medical professionals (60%). In general, those in the older age brackets knew more than those in the younger ones (Dhedhi, Ashraf, and Jiwani, 2021).

HCP contamination can occur due to failure to use PPE, PPE malfunction, incorrect use of PPE, and self-contamination during care and in the doffing process. When immediate health consequences of contamination are not apparent for either patients or HCP, HCP may not recognize the importance of work practices, including correct and consistent PPE use. One study that used video monitoring showed that adherence to correct PPE use was 34% with variability by provider type (Katanami et al., 2018).

Even when HCP wear PPE, incorrect use occurs, which can provide a false sense of security and lead to self-contamination and transmission events. Understanding the types of errors that occur in using PPE is one step toward identifying solutions. Investigators performed 325 HCP observations of adherence to contact and droplet precautions and observed 283 failures. Of these failures, 102 were deviations from safe operating practices or procedures, such as entering a room without donning PPE or not donning the gown completely; 44 process or procedural mistakes, such as being interrupted while doffing PPE, were identified; and 37 slips or lapses, such as unintentional self-contact without awareness, were identified (Krein et al., 2018).

Unfortunately, such failures can result in pathogen transmission. One study showed that 37% of HCP hands were contaminated after doffing contaminated gloves, but contamination varied based on the doffing technique (Alhmidi et al., 2019). Another study of glove and gown removal simulations showed that self-contamination of skin or clothing occurred in 46% of simulations, which would have gone unrecognized in real-world settings (Tomas et al., 2015).

Although glove decontamination prior to doffing decreases the concentration of bacteria on inner gloves, self-contamination still occurs (Kpadeh-Rogers et al., 2019). Research evaluating methods of decontaminating hands (eg, wipes or spray) may help facilities compare methods (Robinson et al., 2019), but facilities also need to consider occupational health hazards, such as adverse respiratory effects and falls. Prevention Epicenter investigators identified significant variation in hand hygiene technique, duration, and thoroughness at 4 Ebola treatment centers and showed that simple techniques, such as singing a song to help estimate time while performing hand hygiene, improved adherence and duration (Mumma et al., 2019).

The usual precautions level of infection control was investigated in depth and was shown to be the foundational level. The participants are well-versed and compliant to a satisfactory degree. To increase nurses' familiarity with and observance of standard precautions for infection control, however, more training programs

and a greater emphasis on these measures by educational institutions are required. There were more women (57.1%) than men (47.3%), and 53% came from government hospitals. They had a median age of 30. Only 8.3% of the RNs were from the pediatric/gynecology departments, whereas 33.1% worked in medical/surgical units (Al-Faouri, Okour, Alakour and Alrabadi, 2021).

The risk of an occupationally acquired HBV infection in a HCW depends on the number of blood exposures sustained during medical procedures, the risk of transmission at each exposure and the prevalence of HBV in general population, particularly in hospitalized patients. Personal factors such as older age, long practice duration, high number of exposures, specifically sharps injuries (SIs) experienced by a HCW, lack of training in infection control, and not using protective equipment contribute to contracting HBV at hospital setting (Kashyap, Tiwari and Prakash, 2018).

Researchers in Ethiopia found no statistical correlation between NSI experience and understanding of recommended precautions for treating patients with blood-borne diseases in a cross-sectional study. However, the study found that participants' use of SPs was inversely associated with their prior NSI experience. Only 53.7% of survey participants reported ever recapping a used needle at work; this is significantly lower than the 67.9% of healthcare workers who reported experiencing NSIs in a study of hospitals affiliated with the University of Alexandria. Over a third (36%) of NSIs among HCWs were found to be the result of recapping used needles, making it one of the most common risk factors for an increased risk of NSIs. That was the conclusion reached by a group of researchers (Asmr et al., 2019).

The participants in descriptive research conducted in Nepal had greater awareness that action when preventing the spread of infection. The findings of this study highlight the importance of routine training, monitoring, developing, and implementing guidelines to enhance nurses' knowledge and practice in the area of infection prevention in healthcare settings. Only 48.2% of respondents had good practice in areas such as hand hygiene, personal protective equipment, decontamination, cleaning of instruments, sterilization, use of antiseptics, disposal of sharps, and waste disposal, while 57.1% had appropriate knowledge. Similarly, 88.8 percent of respondents said they had never gotten any education on how to prevent infection (Niraula and Thapa, 2018).

The study demonstrates how many healthcare providers still struggle with ensuring that patients receive the highest level of safety when receiving treatment. Needlesticks, cuts, receiving blood or other bodily fluids in the eyes or mouth, or getting blood or other body fluids on the skin when it is chapped, scraped or afflicted by skin inflammations all increase the risk of HIV transmission to healthcare workers (Makhado and Davhana-Maselesele, 2016).

MATERIAL AND METHODS

Study Design

A cross sectional descriptive study design was used in this study.

Study Variables

- Knowledge and practice are the dependent variables of this study.
- Age, gender, year of study, residence and marital status are the independent variables of this study.

Study Setting

The study setting for conducting the research was Lahore School of Nursing, The University of Lahore.

Study Population

The study population of this study was be 1st, 2nd, 3rd and final year nursing students of University of Lahore.

Sampling Technique

In order to choose the sampling technique for this research study, the simple random sampling technique was applied.

Sample Size

The sample size was determined using Slovin's formula.

$$n = \frac{N}{1 + N(e)^2}$$

N=population size (301)

n=sample size?

e= Margin of error (7%)

$$n = \frac{301}{1 + 301(7\%)^2}$$

$$n = 121.62$$

$$n = 121$$

So, the sample size was 121 participants for this study. (Li & Tong, 2021).

Inclusion Criteria

- Undergraduate Nursing students of The University of Lahore.
- 1st, 2nd, 3rd and final year nursing students.
- Those students who were willing to participate.
- Both male and female nursing students.

Exclusion Criteria

- Students who were absent at the time of data collection.
- Nursing students of Post RN and MSN were excluded.
- Internees and staff nurses were excluded.

Data Collection Method

For the purpose of data collection with Likert scale based questionnaire consisting of 7 questions, and questionnaires based on Nominal scale consisting of 9 questions was used having a consent attached with each questionnaire. Participants were requested to first read and sign the consent form before solving questions. The data was collected in the Lahore School of Nursing, The University of Lahore among nursing students present at the time and meeting inclusion criteria of this study. A time of at least 20 minutes were given to each participant to fill the questionnaire after the data was collected and put for analysis.

Data Analysis

The collected data was analyzed by using statistical package for social sciences SPSS version 21. The quantitative variables like age, gender, residence and academic performance were measured by frequency and percentage. Descriptive statistics was used for result analysis.

Ethical Considerations

While conducting the study, the ethical committee of the University of Lahore followed the norms and regulations, and the rights of the research participants were protected.

- All participants were provided written informed consent (attached).
- All gathered information and data was kept private.
- Throughout the study, participants were remain anonymous.
- The volunteers were informed that there was no danger or drawbacks to the research method.
- Participants were notified that they could withdraw at any moment during the research procedure.
- All data was kept under lock and key. It was password-protected on the laptop.

RESULTS

The questionnaire was divided into three parts: the demographic data, 9 questions of knowledge with Yes and No options and 7 questions of practice with strongly agree, agree, neutral, disagree and strongly disagree options regarding knowledge and practice of nursing students regarding standard precautions at a tertiary care hospital.

The participants in this study were both males and females. Of the 121 questionnaires were given to participants along with the consent forms to participate in this study with the close ended questionnaire.

Table 1

Demographic data of the respondents

Variable	Category	Frequency n= 121	Percentage (%) n= 121
Age	Below 18	0	0 %
	18-20	31	25.6 %
	21-23	90	74.4 %
	More than 23	0	0 %
Gender	Male	41	33.9 %
	Female	80	66.1 %
Residence	Urban	66	54.5 %
	Rural	55	45.5 %
Year of Study	1 st Year	30	24.8 %
	2 nd Year	18	14.9 %
	3 rd Year	38	31.4 %
	4 th Year	35	28.9 %
Marital Status	Married	15	12.4 %
	Un-Married	106	87.6 %

Demographic Data

Table 1 represents the demographic data of the participants. A total of 121 students participated in the study. The section 1 of the questionnaire was used to collect data regarding the demographic characteristics of participants. It contained five questions, i.e. age in years, gender, residence, year of study and marital status. Among them 33.9% were males and 66.1% were females. The participants were of age from 18-20 (25.6%) years; however, more than 74.4% respondents' age was between 21-23 years. The 66 (54.5%) participants were from urban areas while 55 (45.5%) were from rural areas. The 30 students were from 1st year (24.8%), 18 students were from 2nd year (14.9%), 38 students were from 3rd year (31.4%), and 35 students were from 4th year (28.9%). A total of 15 (12.4%) students were married while 106 (87.6%) students were unmarried in the study. The

demographic characteristics of the participants are presented in the (Table 1).

Table 2
Knowledge of nursing students regarding standard precautions at a tertiary care hospital

S. No	Questions	Frequency	Percentage (%)
1	Have you ever heard of standard precautions?	Yes 113	Yes 93.4 %
		No 8	No 6.6 %
2	Standard precautions are applied to patients with HIV and HBV only	Yes 58	Yes 47.9 %
		No 63	No 52.1 %
3	Standard precautions should be applied to all persons regardless of their infection status	Yes 90	Yes 74.4 %
		No 31	No 25.6 %
4	Isolation is necessary for patients with droplet and blood borne infections.	Yes 97	Yes 80.2 %
		No 24	No 19.8 %
5	For decontamination of devices or instruments washing with usual detergent is enough	Yes 55	Yes 45.5 %
		No 66	No 54.5 %
6	Used needles can be recapped after giving an injection	Yes 64	Yes 52.9 %
		No 57	No 47.1 %
7	There is effective vaccine against all type of flu illness	Yes 79	Yes 65.3 %
		No 42	No 34.7 %
8	Infected area should be cleaned promptly with sodium hypochlorite	Yes 91	Yes 75.2 %
		No 30	No 24.8 %
9	Used mask is rap in a tissue paper or polythene bag and immediately discard it in the yellow waste bag	Yes 105	Yes 86.8 %
		No 16	No 13.2 %

Note: Knowledge of nursing students regarding adverse drug reactions.

The question 1 explained that have you ever heard of standard precautions?, the 93.4% of the participants said yes and 6.6% said no. The question 2 was 'Standard precautions are applied to patients with HIV and HBV only' and the participants had different opinions 47.9% participants said yes and 52.1% said no. The question 3 described that standard precautions should be applied to

Table 4
Practice of nursing students regarding standard precautions at a tertiary care hospital

S. No	Questions	Strongly Agree Frequency (%)	Agree Frequency (%)	Neutral Frequency (%)	Disagree Frequency (%)	Strongly Disagree Frequency (%)
1	I assume that blood and all body fluids of patients are infectious	58 (47.6%)	36 (29.8%)	8 (6.6%)	14 (11.6%)	5 (4.1%)
2	I wear mask, gown and eye wear if procedures and patient care activities are likely to causesplashing of blood and body fluids.	54 (44.6%)	39 (32.2%)	15 (12.4%)	8 (6.6%)	5 (4.1%)
3	I dispose of used needles into a sharp box after injection	63 (52.1%)	28 (23.1%)	18 (14.9%)	8 (6.6%)	4 (3.3%)
4	I wear gloves as the first step for cleaning contaminated surfaces	51 (42.1%)	37 (30.6%)	22 (18.2%)	9 (7.4%)	2 (1.7%)
5	Washing with soap and water for 5 minutes is my first step after contact with infective material	37 (30.6%)	51 (42.1%)	18 (14.9%)	10 (8.3%)	5 (4.1%)
6	I apply standard precautions in situations that might lead to contact with sweat	36 (29.8%)	49 (40.5%)	20 (16.5%)	11 (9.1%)	5 (4.1%)
7	If I have a wound, I wear gloves before caring for patients	58 (47.9%)	36 (29.8%)	10 (8.3%)	8 (6.6%)	9 (7.4%)

Note: Practice of nursing students regarding standard precautions

all persons regardless of their infection status?, and the responses were positive 74.4% participants said yes and 25.6% said no. The overall response for this question was positive. Another question that "For decontamination of devices or instruments washing with usual detergent is enough" and negative responses with no 54.5% and yes 45.5%.

Figure 1
Overall knowledge of the nursing students

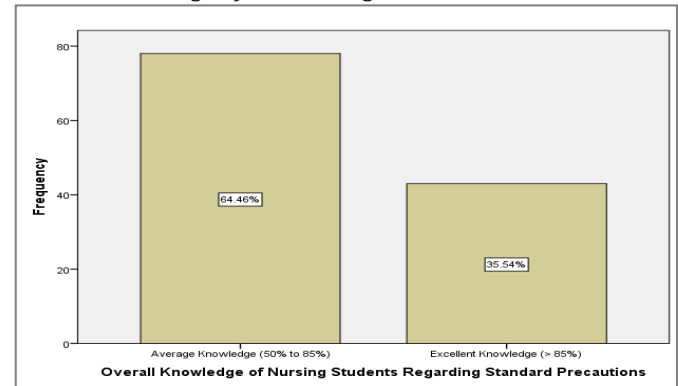


Table 3
Overall knowledge of the nursing students.

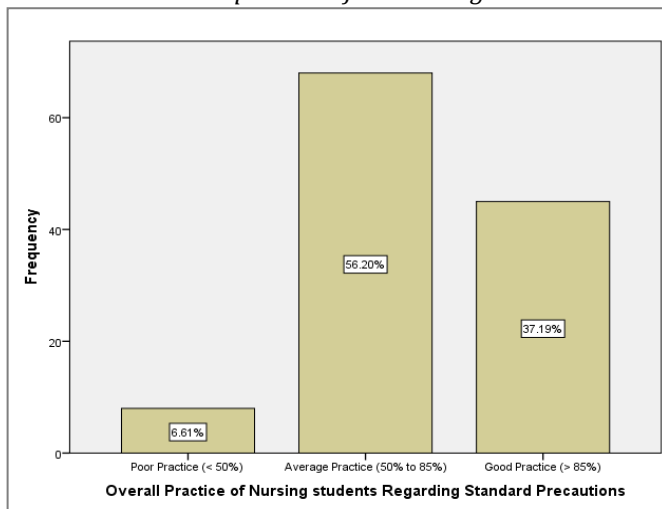
Variables	Frequency (f)	Percentage %
Excellent knowledge (> 85%)	43	35.5%
Average knowledge (50% to 85%)	78	64.4%
Total	121	100%

The figure 1 indicates the total knowledge of the nursing students regarding standard precautions. As the part 1 of the questionnaire was used to collect data regarding the questions based to assess the knowledge of the participants and the responses were similar in some way from each other due its characteristics. It contained nine questions that described the knowledge of the participants. 64.4% participants had average knowledge regarding standard precautions while 33.5% participants had excellent knowledge regarding standard precautions. The result shows that students have average knowledge regarding standard precautions.

The third section contained questions regarding practices, question 1 that what are the participants opinion about the "I assume that blood and all body fluids of patients are infectious" and the responses are different 11.6% were disagree while 47.6% were strongly agree and that mean that participants have average practice towards standard precautions. Another question "I dispose of used needles into a sharp box after injection" responses with 52.1% were strongly agrees and 23.1% were agreeing while 6.6% were disagreeing.

Figure 2

Indicates the overall practice of the nursing students.



The figure 2 indicates the overall practice of nursing students regarding standard precautions. The part 3 of the questionnaire was used to collect data regarding the questions based to assess the practice of the participants and the responses were similar in some way from each other due its characteristics. It contained seven questions that described the practice of the participants. 56.2% participants had average practice regarding standard precautions and 37.2% participants had excellent practice while only 6.6% had poor practice regarding standard precautions. The result shows that students have average practice regarding standard precautions. The sample characteristics are present in the 4.6 Table 5.

Table 5

Overall practice of the nursing students.

Variables	Frequency (f)	Percentage %
Good practice (>85%)	45	37.2%
Average practice (50% to 85%)	68	56.2%
Poor practice (<85%)	8	6.6%
Total	121	100%

DISCUSSION

This analysis is a descriptive cross-sectional study. The University of Lahore is the place where this research survey has being completed. Data was collected through questionnaire from the nursing students. Both males 41 (33.9%) and females 80 (66.1%) participated in this study. Participants in this study (n = 31) range in age from 18 to 20 years and (n = 90) from 21 to 23 years. All the (n=121) participants were from 1st year, 2nd year, 3rd year and final year were involved in this study.

The previous study's goals included assessing Allied Health Professionals' knowledge, attitudes, and practices

surrounding Universal Precautions; this data would be used to highlight areas that could benefit from additional emphasis in the continuing education of Allied Health Students; and finally, the study's participants would receive feedback on how to further enhance their safety in the workplace in that study 64% of the participants were male while 35% were the females (Sarika et al., 2020).

The question 1 explained that have you ever heard of standard precautions?, the 93.4% of the participants said yes and 6.6% said no. The question 2 was 'Standard precautions are applied to patients with HIV and HBV only' and the participants had different opinions 47.9% participants said yes and 52.1% said no. The question 3 described that standard precautions should be applied to all persons regardless of their infection status?, and the responses were positive 74.4% participants said yes and 25.6% said no. The overall response for this question was positive. Another question that "For decontamination of devices or instruments washing with usual detergent is enough" and negative responses with no 54.5% and yes 45.5%.

The question 'Infected area should be cleaned promptly with sodium hypochlorite' the participants with 75.2% had positive response and 24.8% had negative. Another question 'Used mask is rap in a tissue paper or polythene bag and immediately discard it in the yellow waste bag?' The students answer regarding this question was positive with 86.8% and negative with 13.2%. The overall results show that students have average knowledge regarding standard precautions. There is a need to increase hand hygiene compliance and practice among nursing students, according to a prior study conducted in Turkey (Öncü et al., 2018). The importance of educating nursing students about proper hand hygiene during clinical rotations was also highlighted in a study conducted in Norway (Sundal et al., 2017).

The third section contained questions regarding practices, question 1 that what are the participants opinion about the "I assume that blood and all body fluids of patients are infectious" and the responses are different 11.6% were disagree while 47.6% were strongly agree and that mean that participants have average practice towards standard precautions. In the previous study, over two-thirds of the nurses display competence in the safe disposal of human tissues and laboratory waste. Also, compared to other medical professionals, nurses demonstrate superior knowledge on how to properly dispose of human tissue remnants and blood and blood products (Olaniyi et al., 2021).

Another question "I dispose of used needles into a sharp box after injection" responses with 52.1% were strongly agrees and 23.1% were agreeing while 6.6% were disagreeing. Other studies also support this result in such a way that the highest rate of compliance in this investigation was observed when participants were instructed to dispose of discarded sharp objects in designated containers. This agrees with findings from South Korean research (Cheung et al., 2015). While research in Saudi Arabia found the lowest compliance with emptying the sharps box only when it was full, we found

the opposite to be true in this study (Akinwaare et al., 2020).

The practice of this study has compared to other researchers that are lower level of practice of the participants. The practice of the participants and the responses were similar in some way from each other due its characteristics. It contained seven questions that described the practice of the participants. But the results of this study were better than those of a 50.5% study done in South Korea (Ja Moon et al., 2019) and in Egypt, 15% of them had good compliance. (Lawend et al., 2019). Possible explanations for this discrepancy include the fact that the study in South Korea was conducted in a single location and the fact that the current study was conducted at multiple sites in Egypt using a different sampling method and a smaller sample size.

The findings of this study revealed that majority of the participants 64.5% have an average knowledge (50% to 85%) regarding standard precautions, while 35.5% of the participants have an excellent knowledge (>85%). Similarly a study conducted in Palestine suggested that it was assumed that 77 people (37.8%) had an excellent knowledge of standard precautions and that 38.2% had at least a passing knowledge level. On the other hand, twenty-four percent of the population tested exhibited a low degree of knowledge. 52.9% were at a good level of practice, 45.6% were at a moderate level, and 1.5% was at a low level (Ayed, 2015).

In this study 56.2% of the participants had an average practice (50% to 85%), while only 37.2% of the participants have good practice (>85%), and 6.6% of the participants have poor practice (<50%) regarding standard precautions. The result shows that students have average practice regarding standard precautions. As compared with the descriptive research conducted in Nepal the participants had greater awareness that action when preventing the spread of infection. The findings of this study highlight the importance of routine training, monitoring, developing, and implementing guidelines to enhance nurses' knowledge and practice in the area of infection prevention in healthcare settings. Only 48.2% of respondents had good practice in areas such as hand hygiene, personal protective equipment, decontamination,

cleaning of instruments, sterilization, use of antiseptics, disposal of sharps, and waste disposal, while 57.1% had appropriate knowledge. Similarly, 88.8 percent of respondents said they had never gotten any education on how to prevent infection (Niraula and Thapa, 2018).

CONCLUSION

In conclusion, this study's results shows that nursing students at a tertiary care hospital have an average level of knowledge and practice. However, the findings suggest that more work needs to be done to ensure that students fully grasp the concepts of hospital acquired infections and strictly adhere to the standard precautions in the hospital settings. Standard precautions should be applied under strict surveillance and established norms with the aid of well developed interventions that raise awareness and encourage the adoption of safe practices. In addition, nursing educators might have to develop a setting that demonstrates and promotes the enforcement of standard precautions during various workshops.

Recommendations

The study suggests emphasizing the importance of standard precautions in continuing education programs and hospital settings in order to continue updating the knowledge and practice of nursing students as well as registered nurses regarding standard precautions. Standard precautions training should be a regular component of the curriculum for nursing students in education program and in the hospital settings.

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