

KNOWLEDGE, ATTITUDE AND PRACTICE OF UNIVERSAL PRECAUTIONS AMONG NURSING STAFF OF A TERTIARY CARE MULTISPECIALTY HOSPITAL OF DELHI

Medical Science

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ABSTRACT

INTRODUCTION : Universal precautions include a group of infection prevention practices that apply to all patients, regardless of suspected or confirmed infection status, in any setting in which healthcare is delivered. The group of practices includes Barrier precautions, Hand hygiene, careful handling and disposal of sharp medical instruments.

AIM & OBJECTIVES: The study was conducted with the aim to assess the knowledge of Universal safe precautions and the compliance with Universal safe precautions among nurses of tertiary care multispecialty hospital in Delhi and further to suggest actions for improvements.

MATERIAL AND METHOD: This cross sectional observational study was conducted in February to April 2018 in tertiary care multispecialty hospital in Delhi. A total of 40 participants were drawn from the total population using randomization method. A structured questionnaire was designed. It included three parts; socio-demographic data, 15 questions to assess the level of knowledge and 20 questions designed to collect information about the compliance of nurses towards Universal Precautions. For data analysis, descriptive statistics in the form of frequencies and percentages was used.

RESULTS: All the participants were females with mean age of 29.05 yrs and with mean of 6.24 years of work experience. Among all, only 4 nurses had average knowledge score i.e. < 80%, 31 nurses had good knowledge i.e. 80-87% and only 5 had very good knowledge score i.e. > 90%. So, majority of nurses, 77.5 % attained good knowledge score. It was observed that all of them were aware of Universal precautions but had very sparse knowledge about the main objective of the UPs i.e. only 12.5% nurses were aware of the objectives of UPs. 12.5% participants were in favour of wrong statement 'Universal Precautions should only be used in patients diagnosed with infection or patients who are in the incubation period for a given infection'. The data stated that all of them were well versed with the protocol of hand washing, use of gloves, usage of PPE and precautions to be taken while providing care to patients of tuberculosis, chicken pox, intestinal and skin infections. It was observed that the compliance rate was very low during giving injections i.e. 55% only. Use of protection apron, caps, and shoe covers was also not meticulously being followed by all; the compliance rate was between 65-70%. It was also observed that only 10% of the study population were aware of the precautions to be taken after workplace accidents with potentially contaminated sharp materials. For rest of variables, compliance to UPs was satisfactory among nurses.

CONCLUSION: There was adequate knowledge and a fair level of compliance among nurses towards Universal Precautions. Specific training programs may have to target health care workers to establish acceptance of appropriate practices that will enable them to better adopt and adhere to universal precautions.

KEYWORDS

INTRODUCTION

Health worker's knowledge regarding universal precautions measures is important, as studies show that adherence to these safety measures in health institutions may be related to the knowledge of professionals [1]. Universal precautions intend to prevent in the health care staff parenteral, mucus membrane, intact and non- intact skin exposure to pathogens by preventing their exposure to blood and body fluids from all patients as if they were all potentially infectious with blood-borne pathogens [2]. The CDC proposed a series of procedures to prevent and minimise health care workers exposure to these particular viruses. Universal precautions (UP) practices are important as uncertainties about appropriate safe working practices may lead to occupational hazards and cause injuries to staff. Data from a surveillance report (CDC, 1993) showed that nurses are the most frequently involved in either documented or possible occupationally acquired HIV infection [3].

The literature shows that knowledge regarding universal precautions are lower than desired. Many professionals do not have adequate knowledge about universal precautions and those who have knowledge do not adhere to universal precautions while dealing with patients in health care settings. This is a major concern for various healthcare organisations. There is a necessity to reinforce and clarify the concept of Universal Precautions among nurses. Such information would be useful in identifying specific areas that may need further attention in the continuing education of nursing personnel and in providing feedback to them about improving safe practices.

AIMS AND OBJECTIVES

The objectives of this study were:-

- To assess the knowledge of Universal safety precautions among nurses of tertiary care multispecialty hospital in Delhi.
- To assess the compliance with Universal safety precautions among nurses of tertiary care multispecialty hospital in Delhi
- To suggest for improvements in practice of Universal safety precautions if any.

REVIEW OF LITERATURE

The Standard Precautions are measures to prevent healthcare workers'

exposure to infectious agents, like HIV, HBV and HCV, through the routine use of techniques and appropriate barriers that reduce the exposure probability. These measures intend to prevent contact with blood and other fluids, potentially infected, contributing to the reduction of nosocomial infection.

A study carried out by Aires S et al (2010) in Portugal consisted of 58 doctors, 81 nurses and 34 auxiliary medical attendants, making a total of 173 professionals revealed that 7% did not know about the standard precautions, the majority were from medical staff. 21% affirm recapping needles. About 95% considered it important to wash the hands in several different situations but 21% are unaware of alternative alcoholic solutions. There was a precarious knowledge of these measures, enhancing the risk of nosocomial infection [4].

The study conducted by Paiva MHRS et al (2006) aimed at evaluating the adoption of precautionary measures, through the knowledge and attitudes of the professional team. The results showed that nurses and drivers had the highest and lowest level of knowledge about the standard precautions. The possibility of non-adoption of the precautionary measures was 3.76 (95% CI: 1.48 to 9.53) times higher among professionals aged over 31 years and 6.7 (95% CI: 1.81 to 24.75) times greater among workers in crowded unit of basic life support. The conclusion was that it is essential to implement strategies in order to improve the professional knowledge related to infection control and safety recommendations [5].

Beghdadli et al (2008) conducted a survey to examine knowledge and practices regarding standard precautions among nurses in a university hospital in Western Algeria. A questionnaire was administered to 450 nurses in the hospital work place setting. A total of 133 nurses, 81 women and 52 men participated in the survey. Personal and professional data, hand washing frequency, glove-wearing practices were collected. A large majority (95%) of nurses reported washing their hands after removing gloves, and 69% of them reported washing their hands between two patients. Male nurses wear gloves more often than females (77% and 53% respectively). Sharp instruments were correctly disposed of in a puncture resistant container. Recapping has

been reported by two-thirds of survey respondents. Lack of standard precautions adherence is primarily due to the lack of awareness and knowledge, as well as insufficient supply of equipments and materials for good hand hygiene maintenance [7].

Chan et al (2008) conducted a study to examine the relationship on knowledge, attitude and practice levels of operating room staff towards the standard precautions and transmission-based precautions. The study revealed that the nurses' knowledge of UP was inadequate. In addition, UP not only insufficiently and inappropriately applied, but also selectively practised [7].

Gupta et al (2007) conducted a study at Main Hospital, AIIMS to assess the knowledge and practice of staff nurses on infection control measures and the relationship between knowledge and practice. Authors concluded that there exists a positive relationship between knowledge and practice. This indicates that with improved knowledge, we can also improve the practice, which should be of major concern in the present day health care scenario [8].

Kaur R et al in 2007 conducted a study in Government Multi-Specialty Hospital Sector 16 Chandigarh to assess knowledge, attitude and practise regarding universal precautions among nursing personnel. Out of 150 subjects, the needle prick injury during last six months was reported by 16 (10.66%) respondents. Those who got 60-80% marks in knowledge score were 40.67% and only 4.66% of them scored 80-100% marks. In the practice score 38.7% of subjects reported the universal precautions to be time consuming whereas 26% of them did not take it as time consuming [9].

Gammon J et al in 2006 reviewed Thirty-seven studies. Out of these, Twenty-four related to measuring practitioner compliance and 13 studies that evaluated the effect of a research. Compliance to infection control precautions is internationally sub-optimal. The evidence confirms that compliance to specific aspects of standard/UPs varies, and practitioners are selective in their application of recommended practice [10].

A study was conducted on universal precautions' practice among staff nurses in 2002 in Nehru Hospital PGIMER Chandigarh by **Kaur D**. Mean compliance with hand washing was 7.42%, which was poor. Compliance with wearing gloves was poor (14.97%). Mean compliance with wearing gloves was 80.95%. Compliance with safe disposal of sharps was poor i.e. 7%. Seventy eight percent subjects had attained excellent knowledge score and 22% attained good knowledge score [11].

A study was undertaken by **Kermode M et al** during late 2002, involving 266 HCWs (response rate, 87%) from 7 rural north Indian health care settings regarding compliance with UPs and a range of other relevant variables that potentially influence compliance. The study revealed that knowledge and understanding of universal safe precautions were partial. More than one tenth of the HCWs (12%) were unfamiliar with the term "Universal Precautions," and only 36% had ever received any training in UPs. Although the HCWs had a good level of knowledge regarding the practice of UPs, their understanding of the underlying principles was partial at best. Overall compliance with UPs (only 11%) was relatively poor. Self-reported compliance with some practices such as hand washing and waste disposal was good, but compliance with several other practices such as the use of eye protection and not recapping needles was poor [12].

MATERIALS AND METHOD

Study area: The study was conducted in tertiary care multispecialty hospital in Delhi with bed strength of 400.

Study Design: The study was descriptive cross-sectional hospital based study. The information was collected from nursing staff of tertiary care multispecialty hospital in Delhi.

Study period: The study was conducted between February 2018 and April 2018 after taking approval from the ethical committee of the institute.

Study population/ Sample size/ Mode of selection: Out of 234 nurses, 40 nurses were selected for the study by Random- lottery method of randomisation. Sample population was selected through randomization to eliminate any bias due to qualification, position and

number of years of experience. All participants were apprised of the study to be carried out on them and their informed consent was obtained. All participants have been professionally active for one year or more, in direct patient care, hospital hygiene, processing of clothing and waste materials.

Method of data collection: The data was collected from the participants with the use of pre validated structured questionnaire to assess the knowledge and compliance of Universal Safe precautions. The questionnaire was distributed to the participants during their duty hours. The participants were required to fill the questionnaire and return it on the same day to avoid any response bias because of any collaboration amongst them. Only questionnaires that were complete were included for the final analysis and incomplete ones were excluded from the final analysis.

Type of data collection: The data was collected through questionnaire based on knowledge and compliance of Universal safe precautions. The survey also collected socio-demographic details including age, sex, professional qualification and years of experience, along with the questions related to knowledge and compliance of universal safe precautions.

Data analysis: The data was collected and analysed statistically using SPSS software. The primary data was compiled, analysed and based on the findings, necessary recommendations and conclusions were made.

Type of interview: The data collection was done by indirect interview through a structured questionnaire.

Type of questionnaire: In this study, a structured questionnaire guided by the research objectives, considering the study population was taken. The questionnaire was in English, using simple basic questions and statements to enhance clarity. The questionnaire had three main parts, namely, socio-demographic information, questions regarding knowledge of universal safe precautions and questions to assess the compliance of Universal safe precautions among nurses.

OBSERVATIONS

Demographic characteristics of the study population:

The study population comprised of 40 nurses from various parts of the country working in the tertiary care hospital of Delhi. The study population comprised of all females. The demographic details of the study population are shown below:

Table 1 a : Demographic details of the study population by age

Number (N)	40
MeanSD (years)	29.05 5.46
Minimum age (years)	24
Maximum age (years)	46

Graph 1 a): Demographic details of the study population by age

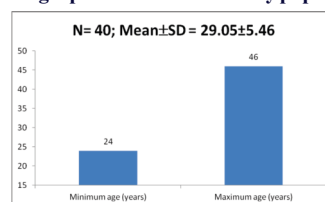
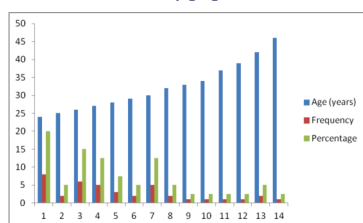


Table 1 b : Distribution of study population according to age

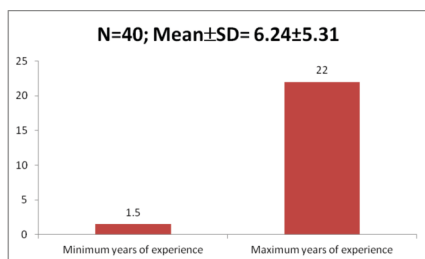
Age (years)	Frequency	Percentage
24	8	20.0
25	2	5.0
26	6	15.0
27	5	12.5
28	3	7.5
29	2	5.0
30	5	12.5
32	2	5.0
33	1	2.5
34	1	2.5
37	1	2.5
39	1	2.5
42	2	5.0
46	1	2.5
Total	40	100.0

Graph 1 b): Distribution of study population according to age

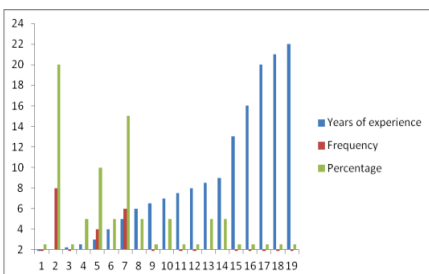
The data given in Table 1a and b shows that the age of the nurses ranged from 24-46 years with mean of 29.05. Majority of the nurses; about 77.5% of the total were in the age group of 24-30 years.

Table 2 a: Details of study population according to experience:

Number (N)	40
MeanSD (years)	6.24 5.31
Minimum years of experience	1.5
Maximum years of experience	22

Graph 2 a): Details of study population according to experience**Table 2 b : Distribution of study population according to experience:**

Years of experience	Frequency	Percentage
1.50	1	2.5
2.00	8	20.0
2.20	1	2.5
2.50	2	5.0
3.00	4	10.0
4.00	2	5.0
5.00	6	15.0
6.00	2	5.0
6.50	1	2.5
7.00	2	5.0
7.50	1	2.5
8.00	1	2.5
8.50	2	5.0
9.00	2	5.0
13.00	1	2.5
16.00	1	2.5
20.00	1	2.5
21.00	1	2.5
22.00	1	2.5
Total	40	100.0

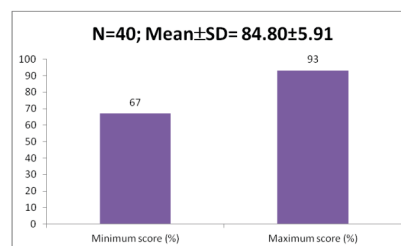
Graph 2 b): Distribution of study population according to experience**Table 4: Knowledge of study population about Universal Safe Precautions on selected variables:**

Universal Precautions knowledge variables	Response of nurses (%)	
	True	False
1. Do you know what the Universal Precautions measures are?	100	0

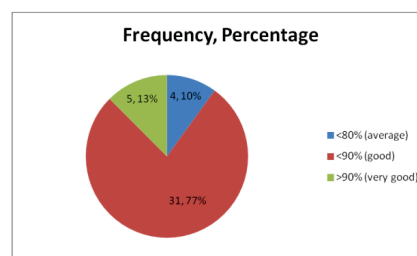
The data given in Table 2a shows that the years of experience of the nurses ranged from 1.5-22 years with meanSD of 6.24 5.31. Table 2 b shows that 57.5% of nurses having experience between 2-5 years. Majority of the nurses are having work experience of 2 years (8/40) and 5 years (6/40).

Table 3 a : Knowledge score of the study population about Universal Safe Precautions:

Number (N)	40
MeanSD (score %)	84.80 5.91
Minimum score (%)	67
Maximum score (%)	93

Graph 3 a): Knowledge score of the study population about Universal Safe Precautions**Table 3 b : Distribution of Knowledge score regarding Universal Safe Precautions among the study population:**

Score (%)	Frequency	Percentage
<80% (average)	4	10
<90% (good)	31	77.5
>90% (very good)	5	12.5
Total	40	100.0

Graph 3 b): Distribution of Knowledge score regarding Universal Safe Precautions among the study population

The data shows that the knowledge score of the study population ranged from 10- 14 marks out of total 15 marks which were expressed in percentage as 67-93% with meanSD of 84.80 5.92 (Table 3a). Among all, only 4 nurses have average knowledge score i.e. < 80% and 31 nurses have good knowledge i.e. 80 - 87%. Out of 40 nurses, only 5 have very good knowledge score i.e. > 90% (Table 3b). So, majority of nurses, 77.5 % attained good knowledge score.

The knowledge score of the nurses was calculated by their responses to the questionnaire which comprised of 15 questions based on knowledge regarding UPs. Every right response to the question carried 1 mark and then total percentage was calculated for each question by getting the responses of all the participants to that one particular question. From the below data it was observed that all of them were aware of Universal precautions but they have very sparse knowledge about the main objective of the UPs ie only 12.5% nurses were aware of the objectives of UPs. 87.5% nurses were not in favour with the statement 'Universal Precautions should only be used in patients diagnosed with infection or patients who are in the incubation period for a given infection' whereas 12.5% participants were having wrong information regarding this. All of them have satisfactory knowledge about other knowledge variables of UPs. The data stated that all of them were well versed with the protocol of hand washing, use of gloves, usage of PPE and precautions to be taken while providing care to patients of tuberculosis, chicken pox, intestinal and skin infections (Table 4).

2. Universal Precautions should only be used in patients diagnosed with infection or patients who are in the incubation period for a given infection	87.5	12.5
3. The adherence to the Universal Precautions measures has main objective to protect the health care workers	15	85
4. When in contact with blood or any other potentially contaminated materials, wash hands immediately	97.5	2.5
5. Hand hygiene should be performed while providing care to different patients	100	0
6. Since gloves may prevent hand contamination, it is not necessary to wash hands after removing gloves	95	5
7. Personal Protective Equipment (PPE) should not be shared	100	0
8. In blood collection or venipuncture procedures, the use of gloves is required	97.5	2.5
9. In procedures where hand contact with secretion or excretion occurs, glove use is required	100	0
10. Gloves should be changed between care of different patients	97.5	2.5
11. In procedures where there is a possibility of blood, body fluids, secretion or excretion spilling, protective masks, goggles, apron or face shield should be used	95	5
12. In situations where blood splatters, body fluids, secretion or excretion may occur, disposable caps and hats should be used	92.5	7.5
13. It is forbidden to bend or recap needles. When necessary, perform the one-hand recapping method. Disposal containers should be near the handling area	97.5	2.5
14. When providing nursing care to patients with active tuberculosis or chickenpox, it is necessary to adopt the Standard precautions measures in addition to the droplet precautions measure	100	0
15. When providing nursing care to patients with intestinal infections or skin infections, Standard precautions should be taken in addition to contact precautions	95	5

Graph 4: Knowledge of study population about Universal Safe Precautions on selected variables

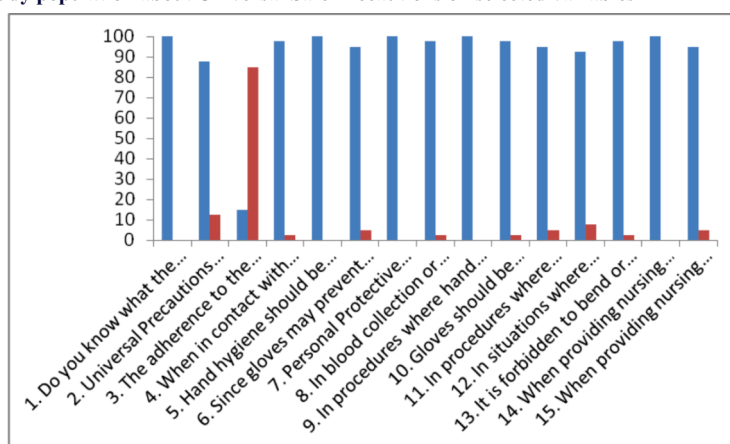


Table 5: Compliance of study population to Universal Safe Precautions on selected variables:

Universal Precautions compliance variables	Response of nurses (%)				
	Always	Often	Sometimes	Seldom	Never
1. Sanitizes hands in between treating different patients.	90	10	0	0	0
2. Sanitizes hands after taking off gloves.	80	15	2.5	0	2.5
3. Sanitizes hands immediately after touching potentially-contaminated biological materials.	95	5	0	0	0
Wearing gloves in procedures in which there are possibilities for getting in contact with the potentially-contaminated biological materials listed below:					
4. Blood collection.	92.5	5	2.5	0	0
5. Procedures involving the possibility of touching urine or feces.	87.5	10	0	0	2.5
6. Procedures involving the possibility of touching a patient's non-intact skin.	82.5	12.5	2.5	0	2.5
7. Procedures involving the possibility of touching a patient's mucous membrane.	95	2.5	2.5	0	0
8. Procedures involving the possibility of touching a patient's airway discharges.	95	2.5	2.5	0	0
9. Intramuscular or subcutaneous injections.	55	25	5	5	10
10. Dressing of wounds.	97.5	2.5	0	0	0
11. Cleaning for blood removal.	97.5	2.5	0	0	0
12. Venipunctures.	92.5	5	2.5	0	0
13. Contact with blood samples.	92.5	7.5	0	0	0
14. Wears a protection mask when there is a possibility of touching drops of blood, bodily fluids, discharges	87.5	2.5	7.5	0	2.5
15. Wears protection glasses when there is a possibility of touching drops of blood, bodily fluids, or discharges	75	2.5	0	12.5	10
16. Wears a protection apron when there is a possibility of touching drops of blood, bodily fluids, or discharges	65	10	10	12.5	2.5
17. Wears disposable caps and shoe covers when there is a possibility of touching drops of blood, bodily fluids, or discharges	67.5	0	17.5	12.5	2.5
18. Does not recap used needles or uses the one-hand recapping method.	77.5	2.5	7.5	2.5	10
19. Disposes needles, blades, and other sharp materials in containers that are specific for that purpose.	97.5	2.5	0	0	0
20. After workplace accidents with potentially-contaminated sharp materials, immediately squeezes the affected part, washes it, disinfects it, and dresses the wound.	82.5	5	2.5	0	10

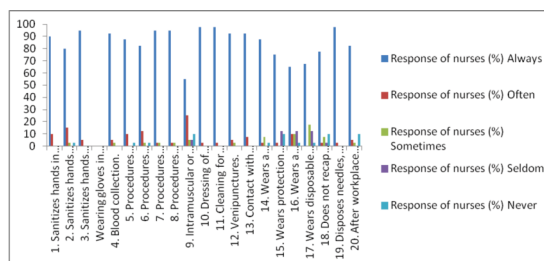
Graph 5: Compliance of study population to Universal Safe Precautions on selected variables

Table 5 shows the percentage of the nurses' response for the compliance to UPs. The compliance score was assessed as per their response on the questionnaire regarding compliance of UPs which was described in 5 point likart scale i.e. always, often, sometimes and never. It was observed that they have adequate knowledge of wearing gloves in procedures where there is possibility of getting in contact with contaminated biological material but the compliance rate was very low during giving injections i.e. 55% only. Use of protection apron, caps, and shoe covers was also not meticulously being followed by all; the compliance rate was between 65-70%. It was also observed that the compliance for 20th variable was very low, only 10% study population was aware regarding the precautions to be taken after workplace accidents with potentially contaminated sharp materials. For rest of variables, compliance to UPs was satisfactory among nurses.

DISCUSSION

Nurses are the largest occupational group in any health care agency. By virtue of their job responsibility they are frequently exposed to blood and body fluids. The nurses' risk of exposure to health hazards and the nurse as a cause of iatrogenic infection to the patients are equally challenging issues to the nurses all over the world. By using simple techniques of universal precautions nurse can avoid dangerous occupational hazards and the knowledge of Universal precautions can make nurses confident to deal with the patients having various infections. Thus, it is a need to educate the nurses regarding Universal precautions as an effective strategy to prevent HAI.

In view of importance for prevention of occupational hazards and minimizing the spread of blood borne diseases, the present study was conducted in 40 nurses working in tertiary care multispecialty hospital in Delhi. They were selected by random sampling technique. All the participants were females. In the present study, mean age of participants was 29.055.46 years ranged from 24-46 years. Majority of the nurses; about 77.5% of the total were in the age group of 24-30 years (Table 1a and 1b). The data shows that 57.5% of nurses were having work experience of 2-5 years. (Table 2a and 2b)

All the participants were given a questionnaire that contained 15 questions regarding the knowledge of UPs, marks obtained ranged from 10-14 marks. Regarding the knowledge of Universal precautions, only 4 nurses have average knowledge score i.e. <80% while 31 nurses have good knowledge i.e. 80-87%. Out of 40 nurses, only 5 have very good knowledge score i.e. >90% (Table 3b). So, majority of nurses, 77.5% attained good knowledge score. It was observed that all of them were aware of Universal precautions but they have very sparse knowledge about the main objective of the UPs i.e. only 12.5% nurses were aware of the objectives of UPs. This finding was in accordance with the study conducted by Zaveri J et al [13] among medical laboratory technicians to assess the knowledge, attitude and practice of UPs. 87.5% nurses were not in favour with the statement 'Universal Precautions should only be used in patients diagnosed with infection or patients who are in the incubation period for a given infection' whereas 12.5% participants were having wrong information regarding this. All of them have satisfactory knowledge about other knowledge variables of UPs. The data stated that all of them were well versed with the protocol of hand washing, use of gloves, usage of PPE and precautions to be taken while providing care to patients of tuberculosis, chicken pox, intestinal and skin infections (Table 4). These findings were in accordance with the results observed by Ogoia D [14], Bolaji-Osagie SO et al [15] and Vaz K et al [16]. This study showed that the knowledge and awareness of universal precautions among some of the participants was variable. The adequate knowledge of UPs among nurses may reflect the fact that universal precautions have been

incorporated in the curriculum of nursing students and in- job training and orientation programmes to be conducted.

The level of practice of UPs by health care workers may differ from one type of health care worker to another. In the present study, the compliance score was assessed as per their response on the questionnaire consist of 20 questions regarding compliance of UPs which was described in 5 point likert scale i.e always, often, sometimes, seldom and never. It was observed that they have adequate knowledge of wearing gloves in procedures where there is possibility of getting in contact with contaminated biological material but the compliance rate was very low during giving injections i.e. 55% only. Use of protection apron, caps, and shoe covers was also not meticulously being followed by all; the compliance rate was between 65-70%. It was also observed that only 10% study population was aware regarding the precautions to be taken after workplace accidents with potentially contaminated sharp materials. For rest of variables, compliance to UPs was satisfactory among nurses. These findings were in accordance with the various studies conducted by researchers Kotwal A et al [17], Dhaliwal B et al [18] and Jawaid M et al [19].

The present study has its own limitations, to begin with; the study assessed the self reported compliance of practice of 'Universal precautions', while the actual practice may be even lower. The results of this study could not be extrapolated to other groups of health care workers because they had not been included in the study. However, this study has to some extent been able to assess the training needs of the nurses. Similar studies on different groups of healthcare workers are needed to determine whether knowledge and compliance differ in different groups and data from such studies will be useful for hospital authorities for improvement of health care facilities.

CONCLUSION

The present study showed satisfactory knowledge and low level of compliance among nurses towards Universal Precautions. UPs are vital measures that have been adopted to help prevent health care workers from being infected in the line of duty. There is a necessity to reinforce and clarify the concept of Universal Precautions among nurses. The data collected from the study would be useful in identifying specific areas that may need further attention in the continuing education of nursing students and in providing feedback to them about improving safe practices. It should be emphasized that making possible permanent and continuing education activities is not sufficient. There is need to review how these are realized. If the nurses have sufficient knowledge, it is obvious that the compliance for the same is increased with supportive supervision and continuous monitoring.

RECOMMENDATIONS

Based on the findings of this study the following recommendations were made:

- 1) Strategies to promote the use of universal precautions which take into account behaviour change and accrual of knowledge including its integration into practice should be incorporated into nursing students' curriculum.
- 2) Nurses and occupational health workers should take a leadership role to ensure that safe practices are used in the care of patients.
- 3) Obligatory training programme in universal precautions for nurses should be provided in all healthcare organizations.
- 4) Implementation of policies on universal precautions for strict adherence is essential.
- 5) A system for monitoring the appropriate use of personal protective equipment is essential in nurses' programmes.

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