



Original Research Article

A study to assess knowledge regarding universal safe precautions among nurses in a tertiary care hospital

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ABSTRACT

Introduction: Universal precautions (UPs) are safety norms for the health care workers (HCW) against the infections that are being carried by the patients they handle. All HCW must follow these in order to keep them uninfected from various infectious diseases. Taking this into concern whether the presently employed nursing staff is aware of the universal precautions or not, the present study was conducted with the aim to assess their knowledge regarding this.

Materials and Methods: This cross-sectional observational study was conducted in a Tertiary Care Hospital. 100 participants were drawn from the total population using randomization method. A structured questionnaire was designed. It included three parts; socio-demographic data, questions to assess the level of knowledge and compliance of nurses towards UPs. For data analysis, descriptive statistics in the form of frequencies and percentages was used.

Conclusion: There was adequate knowledge and compliance among nurses towards UPs. Specific training programs may have to target health care workers to establish acceptance of appropriate practices that will enable them to adopt and adhere to UPs.

Results: All the participants were females with mean age of 30.530 ± 7.07 years and work experience of 7.33 ± 6.34 years. Only 1 of them has average knowledge score i.e. $< 80\%$ and 58 nurses have good knowledge i.e. $80-87\%$. 41 have very good knowledge score i.e. $> 90\%$. The compliance rate for universal precautions varies from $59-100\%$. For certain variables, 14 out of 20 variables for compliance scored more than 90% adherence. The study revealed that knowledge of UPs among nurses was adequate and their compliance was also fair enough.

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1. Introduction

Infections in health care services represent a global problem and constitute one of the main causes of morbidity and death associated with clinical, diagnostic and therapeutic procedures. Besides their range for patients, healthcare workers are at equal risk of occupational hazards.

Infections, arise in the hospitals are termed as hospital associated infections. Such infections have also been called as 'Nosocomial Infections' and sometimes 'Hospital Acquired Infections'. Nosocomial infections or hospital acquired infections are defined as infections acquired during or as a result of hospitalization. Any patient who develops

an infection after 48 hours of hospitalization is considered to have nosocomial infection. As exposure is a constant premise for professionals as well as patients, intervention measures have been proposed to minimize this situation, with the implementation of Universal Safe precautions as one of the strategies.¹ It may not be possible to eradicate all hospital-related infections. However, knowledge and compliance of Universal safe Precautions provides optimum protection for both the Healthcare Organization's clientele and the staff.

Universal Precautions are vital measures that have been adopted to help prevent health workers from being occupationally infected as well as reduce nosocomial infection. These precautions should be followed in all patient care situations. Certain standard precautions should

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be taken in all healthcare settings such as hand washing, use of barriers (gloves, gown, cap, and mask), care with devices, equipment and clothing used, maintain environmental cleanliness, follow proper waste disposal practices, and patient's accommodation in line with requirement levels as an infection transmission source.

Centre for Disease Control and Prevention (CDC) established these measures in 1996 but implementation of Universal Safe Precautions remains a challenge. One of the reasons is lack of knowledge and low adherence among professionals. Nurses are exposed each day to a variety of health and safety hazards. The use of appropriate infection control precautions to protect against transmission of blood-borne and other occupational microbial pathogens should be a routine component of healthcare provision. Centre for Disease Control and Prevention recommends that everyone should use standard precautions whenever come into contact with body fluids.

World Health Organization (2006) reports that among the 35 million health workers worldwide, about 3 million sustain percutaneous exposures to the blood borne pathogens each year, including 2 million to hepatitis B virus (HBV), 0.9 million to hepatitis C virus (HCV) and 170,000 to human immune deficiency virus (HIV). These injuries may result in 70,000 HBV, 15,000 HCV and 5,000 HIV infections.² If these diseases are contracted by nurses, it may ruin their career, cause loss of interest in the profession and may stimulate nonchalant attitude in carrying out services. So, the present study was conducted to assess the knowledge of and compliance with Universal Safe Precautions among nurses of a Tertiary Care hospital and this information would be useful in identifying the specific areas that may need further improvement to provide safer practices.

2. Aims and Objectives

The study was conducted

1. To assess the knowledge of Universal safe precautions among nurses in a Tertiary care hospital.
2. To suggest action for better compliance with Universal safe precautions among nurses in the hospital.

3. Materials and Methods

3.1. Study area

The study was conducted in a Tertiary care Hospital in Punjab. This hospital is attached with a medical college and has school of nursing also. A total of 669 nursing personnel work in the hospital, out of which 589 are staff nurses, 52 are sister in-charge, 18 are Assistant Nursing Superintendent, 5 are Deputy Nursing Superintendent and 5 are nursing superintendent.

3.2. Study design

The study was descriptive cross-sectional hospital based study. The information was collected from nurses working in various departments, ICUs, and OTs at various hierarchical levels.

3.3. Study period

The study was conducted in period of three months after taking approval from the ethical committee of the institute.

3.4. Study population/ Sample size/ Mode of selection

Out of 669 nurses, 100 nurses were selected for the study by randomisation through the random number generator computer software. 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.

3.5. 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.

3.6. 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 version 17.0. The primary data was compiled. For data analysis, descriptive statistics in the form of frequencies and percentages was used and based on the findings, necessary recommendations and conclusions were made.

3.7. Type of interview

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

3.8. 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. The limitation of the study was that the compliance of Universal Safe precautions could not be observed but evaluated based on indirect interview through structured questionnaire.

4. Results

The study population comprised of one hundred nurses from various departments, ICUs and O.T of a Tertiary Care Hospital. The study population comprised of all females. The demographic details of the study population are shown in Tables 1 and 2. The data given in Tables 1 and 2 shows that the age of the nurses ranged from 24-50 years with mean of 30.53 ± 7.07 . Majority of the nurses; about 69% of the total were in the age group of 24-30 years.

The data given in Table 3 shows that the years of experience of the nurses ranged from 1.5-27 years with mean \pm SD of 7.3 ± 6.3 . Table 4 shows that 45% of nurses having experience between 2-4 years and 36% of nurses having experience between 5-10 years. Majority of the nurses are having work experience of 3-4 years.

The data shows that the knowledge score of the study population ranged from 11-15 marks out of total 15 marks which were expressed in percentage as 73-100% with mean \pm SD of 88.13 ± 5.26 (Table 5). Only 1% of nurses have average knowledge score i.e. < 80% which was 73% and 58 nurses have good knowledge i.e. 80-87%. Out of 100 nurses, 41 have very good knowledge score i.e. > 90%. Out of this 41, 2 nurses have excellent i.e. 100% knowledge score (Table 6).

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 nurses have very poor knowledge about the main objective of the UPs i.e 14% only. For variable 2 and 12, nurses had average knowledge i.e. between 70-80% and for 6, 13 and 15 knowledge variables they had good knowledge (80-90%). The knowledge score for the rest variables was excellent approx. 100%. (Table 7)

Table 8 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 likert scale i.e. always, often, sometimes, seldom and never. It was observed that the compliance rate was low (<80%) for the variables 6, 9, 14, 15, and 18 which was 79, 69, 59, 69, and 79% respectively. It was also observed that the compliance for 20 variable was very low, only 5% 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.

Table 1: Demographic details of the study population by age

Number (N)	100
Mean \pm SD (years)	30.530 ± 7.07
Minimum age (years)	24
Maximum age (years)	50

Table 2: Distribution of study population according to age

Age (years)	Frequency	Percentage
24	8	8.0
25	15	15.0
26	18	18.0
27	7	7.0
28	10	10.0
29	6	6.0
30	5	5.0
31	3	3.0
32	4	4.0
35	3	3.0
36	1	1.0
37	1	1.0
38	4	4.0
39	1	1.0
40	1	1.0
42	1	1.0
43	2	2.0
45	4	4.0
46	1	1.0
47	2	2.0
48	1	1.0
49	1	1.0
50	1	1.0
Total	100	100.0

Table 3: Details of study population according to experience

Number (N)	100
Mean \pm SD (years)	7.33 ± 6.34
Minimum years of experience	1.5
Maximum years of experience	27

Table 4: Distribution of study population according to experience

Years of experience	Frequency	Percentage
1.5	1	1.0
2	13	13.0
2	1	1.0
3	15	15.0
3.5	1	1.0
4	15	15.0
5	8	8.0
5.5	1	1.0
6	7	7.0
7	3	3.0
8	8	8.0
9	6	6.0
10	3	3.0
12	6	6.0
14	1	1.0
15	1	1.0
20	1	1.0
21	2	2.0
22	2	2.0
24	1	1.0
26	1	1.0
27	3	3.0
Total	100	100.0

Table 5: Knowledge score of the study population about Universal Safe Precautions:

Number (N)	100
Mean±SD (score %)	88.13±5.26
Minimum score (%)	73
Maximum score (%)	100

Table 6: Distribution of Knowledge score regarding Universal Safe Precautions among the study population

Score (out of 100)	Frequency	Percentage
73	1	1.0
80	19	19.0
87	39	39.0
93	39	39.0
100	2	2.0
Total	100	100.0

5. Discussion

Hospital acquired infection is a common problem all over the world. Therefore, up to date knowledge, awareness and practices can play important roles in prevention of these infections. Health care workers should have the opportunity to practice Universal Safe Precautions on a day to day basis as an integral part of patients care. That is why the current study was carried out to assess the knowledge of UPs among nurses in a Tertiary care hospital and also to check their compliance to UPs so that the safe work environment can be provided to all the stakeholders. Also, in India together

with the few studies³⁻⁶ which have already been done on Universal safe Precautions knowledge and compliance, this study aims and contributes to determine knowledge and compliance of nurses towards Universal safe Precautions.

In the light of the above facts, the present study was conducted in 100 nurses who were selected by randomization. All the participants were females. In the present study, mean age of participants was 30.53 ± 7.07 years ranged from 24-50 years. Out of 100, 69 nurses were in age group of 24-30 years (Tables 1 and 2). Among the participants, 45% of nurses having experience between 2-4 years and 36% of nurses having experience between 5-10 years. Majority of the nurses are having work experience of 3-4 years (Tables 3 and 4).

All the participants were given a questionnaire that contained 15 questions regarding the knowledge of UPs, marks obtained ranged from 11-15 marks. Regarding the knowledge of Universal precautions, one participant got less than 80% scores. 58 nurses have good knowledge i.e. 80-87%. Out of 100 nurses, 41 have very good knowledge score i.e. > 90%. Out of this 41, 2 nurses have excellent knowledge score (Table 6). It was observed from the present study that the nurses were aware of UPs and had good knowledge of UPs because among 100 nurses, 99 nurses scored $\geq 80\%$ on knowledge based questionnaire. It was also observed from the study that nurses have very poor knowledge about the main objective of the UPs. The adherence to the UPs measures is for the safety of all the stakeholders like health workers, patients, attendants and surroundings. But only 14% could correctly state the objectives. This finding was in accordance with the study conducted by Zaveri J et al⁷ among medical laboratory technicians to assess the knowledge, attitude and practice of UPs. The author stated that only 37.5% know the objectives of UPs. 24% participants wrongly stated that Universal Precautions should only be used in patients diagnosed with infection or patients who are in the incubation period for a given infection while 76% nurses predict this statement false. 82% nurses were in favour of hand washing after removing gloves and 18% were of the view that there was no need to wash hands after removing gloves. Similar results were reported by Ogonia D et al.⁸ Among all, 79% nurses stated that in situations where blood splatters, body fluids, secretion or excretion may occur, disposable caps and hats should be used. 15% did not know about the proper disposal of needles while 13% didn't know about the standard precautions to be taken during care of patients with intestinal infections or skin infections. The knowledge score for the rest nine variables was excellent 100% (Table 7). They were all well versed with hand hygiene performance while providing care to different patients, PPE should not to be shared, standard precautions to be taken while blood collection and in procedures where exposure to body

Table 7: 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
2. Universal Precautions should only be used in patients diagnosed with infection or patients who are in the incubation period for a given infection	76	24
3. The adherence to the Universal Precautions measures has main objective to protect the health care workers	14	86
4. When in contact with blood or any other potentially contaminated materials, wash hands immediately	100	0
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	82	18
7. Personal Protective Equipment (PPE) should not be shared	99	1
8. In blood collection or venipuncture procedures, the use of gloves is required	100	0
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	100	0
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	100	0
12. In situations where blood splatters, body fluids, secretion or excretion may occur, disposable caps and hats should be used	79	21
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	85	15
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	87	13

fluids is possible. The study showed an overall good understanding and knowledge of UPs in certain areas. These findings were in accordance with the results observed by Bolaji-Osagie SO et al⁹ and Vaz K et al.¹⁰

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 the compliance rate was low (<80%) during the procedures involving the possibility of touching a patient's non-intact skin. Only 79% nurses followed UPs always but 12% of them reported that they had stick to UPs not always but sometimes. Regarding the compliance of UPs during giving injections only 69% wear gloves while 9% nurses confessed that they were not wear gloves while giving injections. Strict compliance of wearing protection mask and glasses when there is possibility of touching drops of blood, bodily fluids or discharges was 59% and 69% respectively. It was also observed that only 5% study population was aware regarding the precautions to be taken after workplace accidents with potentially contaminated sharp materials. With regard to the practice of hand hygiene, 98, 97, and 100% always practiced hand hygiene in treating different patients, after taking off gloves and immediately after touching potentially-contaminated biological materials

respectively. The similar findings were also observed in the study conducted by Ogoina D et al.⁸

In relation to sharp disposal, 100% had always disposed needles, blades and other sharp materials in puncture proof containers. The study revealed that the knowledge of universal precautions among nurses is satisfactory. The findings of this study also showed that the compliance of UPs is also good except few elements. This finding is consistent with Ferguson et al.¹¹ Thus the knowledge and compliance of Universal safe Precautions among nurses was found to be overall good in the study conducted here. This was found to be similar to the findings reported in a study conducted by Alrubaiee G.¹²

6. Conclusion

The present study showed adequate knowledge and fair level of compliance among nurses towards Universal Precautions. This study points out that there is always scope for improvement in the Universal precautions to be followed. It should be beneficial for all health care workers to receive formal training regarding the same. Our findings indicate the need for institutional investments in nursing competency training for this purpose, using different strategies, particularly permanent and continuing education. It should be emphasized that making possible permanent

Table 8: 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.	98	0	2	0	0
2. Sanitizes hands after taking off gloves.	97	1	2	0	0
3. Sanitizes hands immediately after touching potentially-contaminated biological materials.	100	0	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.	95	1	4	0	0
5. Procedures involving the possibility of touching urine or feces.	92	2	6	0	0
6. Procedures involving the possibility of touching a patient's non-intact skin.	79	9	12	0	0
7. Procedures involving the possibility of touching a patient's mucous membrane.	92	2	2	4	0
8. Procedures involving the possibility of touching a patient's airway discharges.	93	2	5	0	0
9. Intramuscular or subcutaneous injections.	69	10	11	1	9
10. Dressing of wounds.	96	0	0	1	3
11. Cleaning for blood removal.	96	0	0	1	3
12. Venipunctures.	91	2	3	1	3
13. Contact with blood samples.	94	2	4	0	0
14. Wears a protection mask when there is a possibility of touching drops of blood, bodily fluids, discharges	59	21	12	0	8
15. Wears protection glasses when there is a possibility of touching drops of blood, bodily fluids, or discharges	69	0	19	4	8
16. Wears a protection apron when there is a possibility of touching drops of blood, bodily fluids, or discharges	92	1	3	4	0
17. Wears disposable caps and shoe covers when there is a possibility of touching drops of blood, bodily fluids, or discharges	91	1	4	4	0
18. Does not recap used needles or uses the one-hand recapping method.	79	2	1	0	18
19. Disposes needles, blades, and other sharp materials in containers that are specific for that purpose.	100	0	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.	95	0	0	0	5

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. Strengthening and integrating Universal Precautions with the routine services through provision of training and preparing and introducing HAI prevention standard of practice, protocol, rules, regulation and opportunities to promote the desired team spirit at all health facility levels are all measures which would prove useful.

7. Source of funding

None.

8. Conflict of interest

None.

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