International Journal of Community Medicine and Public Health
Sharma R et al. Int J Community Med Public Health. 2021 Nov;8(11):5376-5382
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20214274

Original Research Article

Knowledge and practice of nurses regarding standard precautions in a tertiary care public hospital, North India

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Received: 06 September 2021
Accepted: 18 October 2021

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ABSTRACT

Background: Hospital-acquired infections could occur as a result of lapses in accepted standards of practice on the part of health care personnel (HCP). All individuals, particularly HCPs, are potentially at high risk of infection due to their frequent exposure. This study aimed to assess the knowledge and practices of nurses regarding standard precautions at a tertiary care hospital, North India.
Methods: A cross-sectional study was conducted in a tertiary care hospital, Uttarakhand enrolling 134 nurses purposively from different units of the institute. Data was collected using a pre-structured self-administered questionnaire to seek information on participants' knowledge and practices regarding standard precautions. SPSS version-23 was used to analyse the findings. Descriptive statistics were applied for the analysis of the results.
Results: The mean age of the participants was 27.52±2.93 years, with more than half of the respondents were males (58.21%), and (41.79%) were females. Almost 60.45% had three or fewer years of work experience. Most respondents preferred hand hygiene (97.01%) and the use of PPE (88.06%). Almost 94.03% of participants favored disinfection of frequently touched surfaces. Regarding the practices, 95.52% answered that the right hand-washing is before wearing gloves, after removing the gloves, and after leaving the patient's care area. About 98.51% of them answered that bio-medical waste should be discarded in the right type of color-coded bins.
Conclusions: Findings suggested adequate knowledge and compliance among nurses regarding standard precautions. However, specific training programs may be conducted to attain full adherence to standard precautions. These programs can enhance their awareness and can work as a vital tool to achieve the desired improvement in knowledge and practices of standard precautions.

Keywords: Hand hygiene, Infection control, Knowledge, Nurse, Practice, Standard precaution

INTRODUCTION

Health care-associated infections pose a massive risk to health care workers. Many policies and protocols have been framed by various national and international agencies, but compliance with those set standards is still neglected. Non-adherence to standard precautions, either due to lack of knowledge or carelessness, is the reason for the increase in health care-associated infections. Regardless of the confirmed infection or suspected patient's condition, standard precautions should be applied to all patients. Nurses are among the frontline healthcare workers who are in patient contact for long periods while providing care and are more likely to be exposed to a variety of occupational hazards.[1-3]

One of the major factors behind the increase in the rate of HAI (Hospital Associated Infections) is the lack of knowledge and training among health care workers. Several studies have reported lack of knowledge

regarding standard precautions and poor practice among nurses. There are many other reasons behind non-adherence to these protocols such as lack of resources or equipment and limited monitoring of practices in the clinical field.[4,5] One study aimed to assess the factors influencing nurses' compliance with standard precautions and the results showed that the reasons behind non-compliance are lack of equipment, PPE (personal protective equipment), hinders patient care, previous exposure to infection, lack of professional training, poor role models, perceived low risk to themselves, etc.[6] Nursing schools are the cornerstone of imparting knowledge and training to budding nurses and hence their role in implementing standard precautions and preventing HAIs also cannot be ignored.[7]

Strict adherence to standard precautions, such as proper hand hygiene, use of personal protective equipment, proper disposal of sharps, cough etiquette, careful handling of soiled linens, cleaning and disinfecting equipment used in patient care protects the patients as well as health care workers from exposure to infection.[8,9]

The recent outbreak of COVID-19 has forced all health care workers to follow hand hygiene practices which has been a main factor in reducing the spread of infection. In contrast, inadequate PPE kits were the main reason health care workers were exposed to infection during the outbreak. There are many studies that reported a number of reasons why nurses find it difficult to follow all standard precautions in health care setting and some of the reasons they cited were that using standard precautions could put the patient at risk in an emergency, wearing gloves makes venipuncture difficult, leaving no time to discard and wear a new pair of gloves for another patient.[3,5,10-19]

The purpose of this study was to assess nurses' knowledge and practice with regard to standard precautions as several studies have recommended the need to know the practices followed by healthcare workers in health care settings in order to improve compliance with standard precautions and appropriate measures can be taken and prevent the spread of infection in the hospital setting.

METHODS

Study design

This cross-sectional online survey was conducted using a structured knowledge and practice questionnaire to assess nurses' knowledge and practice regarding the standard precautions. The online survey was conducted from 25 June 2020 to 25 July 2020.

Ethical consideration

Ethical approval was taken from the ethical committee of institute vide letter no. 207/IEC/IM/NF/2020 dated 11 June 2020. All the participants were well informed on the purpose of online survey and all their obtained information were kept confidential. An informed written consent was obtained electronically from all participants.

Study participants

Nurses working in different departments of intensive care unit (ICU), Medical and surgical units of institute were the part of the study. A total of 134 participants were contacted via online Google Form survey using convenience sampling technique.

Sample size estimation

The sample size was determined using single population proportion formula:

$$n = \frac{z^2 p(1-p)}{d^2}$$

Keeping 95% CI and 50% prevalence which is 384.

As the total population was below 10,000, hence the final corrected sample size selected 128 using the population correction formula.

Study tools

A structured questionnaire was prepared to assess the knowledge and practice of participants. The structured questionnaire to be filled online included demographic characteristics of the nurses and questions to assess their knowledge and practice regarding the standard precautions in their institute. The questionnaire had multiple choice questions as well as yes/no type questions. Participants were instructed to choose more than one options in knowledge and practice questionnaire. Validation of the questionnaire was obtained from five expert from department of microbiology and nursing. Reliability of tool was computed by test-retest method and obtained Cronbach's α coefficient was 0.79.

Data analysis

Data were exported in excel sheet and verified for completeness and analyzed using SPSS version-23 statistical software. Descriptive statistics were used for the analysis of result.

RESULTS

Demographic data

A total of 134 participants completed online form. Among them 58.21% were males and 41.79% were females. The mean age of participants was 27.52±2.93, and one-third were working in medicine departments. Almost 60.45% had three or less years of work experience (Table 1).

Knowledge on standard precautions

A vast number (97.01% and 88.06%) of participants preferred hand hygiene and use of PPE to be included in the standard precautions. In response to *when to perform hand hygiene*, mostly (94.03%) selected most corrected answer for hand hygiene. On asking, *when a health care worker should do hand hygiene?* Where more than half of the participants 94.03% said that hand hygiene must be performed after coming in contact with blood, body fluids, excreta, and before performing any septic procedure and after removing the gloves. When asked *what is the proper way to prevent needle stick and sharp injuries,* 91.04% participants selected that needles and sharp instruments should be disposed of properly. On *how to maintain environmental hygiene in a health care setting*, 94.03% participants favored disinfection of frequently touched surfaces (Table 2).

Table 1: Demographic characteristics of the sample.

Variables	Frequency (n=134)	Percentage
Age in years (mean±SD)	27.52±2.93*	
Gender		
Male	78	58.21
Female	56	41.79
Name of ward/department		
COVID area	38	28.35
CCU	20	14.92
Medicine	44	32.83
Surgery	32	23.8
Academic qualification		
B.Sc. (N) and Post Basic B.Sc. (N)	96	71.64
GNM	30	22.39
M.Sc. (N)	8	5.97
Work experiences (in years)		
≤3	81	60.45
>3-6	37	27.61
>6	16	11.94
Do you have standard precautions for health care policies in your institution?		
Yes	134	100
Don't know	0	0
Have you ever heard word "standard precautions"		
Yes	134	100
No	0	0
If yes, mention the source of information		
Colleague/friend, WhatsApp, others	22	16.42
Formal training	112	83.58

Practice on standard precautions

Participants were also asked some questions on *how they practice standard precautions in their areas.* When asked *what the right time to decontaminate hands is?*, majority 95.52% answered that the right time to wash hands is before wearing gloves, after removing the gloves and after leaving the patient's care area. Regarding method to be adopted for hand hygiene after exposure to patient's body fluid, more than half 53.73% of the participants answered that the hands should be washed with soap water and disinfectant. On asking *what could be the reason for not wearing gloves and coverall while working*, about 67.16% participants cited lack of regular access to PPE as the reason, whereas 23.88% of them mentioned that wearing PPE makes them difficult to work. Regarding bio medical waste management, the majority 98.51% of them chose that bio medical waste should be discarded in the right type of color-coded bins. Most 91.04% participants selected that the reusable devices should be thoroughly cleaned, disinfected and reprocessed before using them on any other patient (Table 3).

Table 2: Structured knowledge questionnaire on standard precautions (n=134).

Statements	Frequency	Percentage
1. What are the components should be included in the standard precautions?		
(a) Hand hygiene	130	97.01
(b) Use of PPE	118	88.06
(c) Safe injection practices	60	44.78
(d) Hospital disinfection	64	47.76
(e) Respiratory etiquettes	62	46.27
2. What are the advantage of standard precautions?		
(a) Protects both health worker and patient	128	95.52
(b) Reduced spread of communicable disease	118	88.06
(c) Looks more professional at work	30	22.39
(d) To fulfil hospital policy	34	25.37
3. When should a health care provider must perform hand hygiene?		
(a) After contact with blood, body fluids and excreta	46	34.33
(b) Before performing any aseptic procedure	42	31.34
(c) After glove removal	40	29.85
(d) All of the above	126	94.03
4. Which of the following is/are correct to prevent needle stick and sharp injuries?		
(a) Avoiding using sharp items.	10	7.46
(b) Cleaning used articles	14	10.45
(c) Disposing of used needles and other sharp instruments	122	91.04
(d) Handling needles, scalpels, and other sharp instruments or devices	76	56.72
5. What is/are measures to ensure Environmental Hygiene in health care setting?		
(a) Disinfection of environmental and other frequently touched surfaces	126	94.03
(b) Following professional ethics	14	10.45
(c) Provided with health education	76	56.72
(d) Using adequate procedures for the routine cleaning	96	71.64
6. Which of the following is/are correct method for handling, transportation, and processing of used linen in the ward?		
(a) Avoids transfer of pathogens to other patients and or the environment	38	28.36
(b) Person feels easy and convenient	16	11.94
(c) Prevents skin and mucous membrane exposures and contamination of clothing	32	23.88
(d) All of the above	108	80.6
7. Which of the following statement is/are TRUE for biomedical waste management		
(a) Discard single use items properly	94	70.15
(b) Disposal of office waste generated in hospital	38	28.36
(c) Human tissues and laboratory waste that is directly associated with specimen processing should also be treated as clinical waste	114	85.07
(d) Treat waste contaminated with blood, body fluids, secretions and excretions as clinical waste, in accordance with local regulations	90	67.16
8. What is the best way of handling patient care equipment in a hospital?		
(a) Clean, disinfect, and reprocess reusable equipment appropriately before use with another patient	120	89.55
(b) Instructing group D workers to clean and replace	44	32.84
(c) Preventing skin and mucous membrane exposures, contamination of clothing, and transfer of pathogens to other patients or the environment	104	77.61
(d) Simply discarding everything in to yellow bin.	8	5.97

Table 3: Structured practice questionnaire on standard precautions (N=134).

Statements	Frequency	Percentage
1. What is the right time to wash or decontaminate hands in health care setting?		
(a) After removal of gloves	2	1.49
(b) Before leaving the patients care area	2	1.49

Continued.

Statements	Frequency	Percentage
(c) Before wearing gloves	2	1.49
(d) All the above	128	95.52
2. Which of the following method for hand hygiene should be performed, after a recent contact with patient's body fluid?		
(a) Wash with soap water and disinfectant	72	53.73
(b) Wash with soap and water alone	50	37.31
(c) Use only an alcohol based sanitizer	10	7.46
(d) Wash with only water	2	1.49
3. What are the PPE should be worn before entering into a infectious disease ward?		
(a) Gloves or coveralls	56	41.79
(b) Gloves only	4	2.99
(c) Gown only	0	0
(d) Glove and coveralls	74	55.22
4. What could be a reason for not wearing both gloves and coveralls while working?		
(a) Do not have regular access to PPEs	90	67.16
(b) Do not have time to wear them	4	2.98
(c) Wearing them make it difficult to do my work	32	23.88
(d) Do not believe they are really protective	8	5.97
5. What is the standard method of disposing a used needles and syringes?		
(a) By recap needle and discard both syringe and needle	14	10.45
(b) By discard both syringe and needle into the safety box without recapping	114	85.07
(c) By discard only needle and replace with new needle for next usage on the same patient	6	4.48
(d) By telling patient attender to discard safely	0	0
6. How can you practice respiratory hygiene and cough etiquette?		
(a) Covering and Hand hygiene, both should be done	74	55.22
(b) Covering mouth and nose when coughing or sneezing	46	34.33
(c) Hand hygiene after contact with respiratory secretions	12	8.96
(d) No hand hygiene necessary, only covering will work	2	1.49
7. Which of the following is correct option for biomedical waste (BMW) management?		
(a) Discard biomedical waste in right colour coded bins	132	98.51
(b) Choose any colour of bins for all the biomedical waste	0	0
(c) No colour code just normal bin	0	0
(d) All of the above	2	1.49
8. What is the correct method of sterilization and disinfection of patient-care devices?		
(a) Washing with plan running water	8	5.97
(b) Cleaning, disinfecting, and reprocessing reusable equipment appropriately before use with another patient	122	91.04
(c) No cleaning and disinfecting is required	0	0
(d) Wait for 24 hours to reuse the same devices	4	2.99

DISCUSSION

This cross-sectional online survey was conducted to assess the knowledge and practice of nurses regarding standard precautions to be followed during coronavirus disease at a tertiary care hospital, North India. Findings revealed that most participants believe that hand hygiene and personal protective equipment (PPE) should be included in standard precautions. Further, they mentioned that hand hygiene must be performed before coming to contact with the patients. These study findings align with the earlier work conducted by Hammoud et al on nurses reporting that hand hygiene should be done before and after touching a patient, and standard precautions will help protect the patient and health care workers (HCWs).[20] Further findings emphasized that an alcohol-based hand rub is better than a traditional hand-wash to cut down the infection rate. These findings are consistent with the work on health care workers by Duarte et al conducted for standard precautions as a chief strategy to prevent the transmission of occupation-related infection in patients and health care workers.[21]

Further, nurses reported that infected needles and sharp instruments should be disposed of properly. These opinions matched the work of Jahangiri et al, in which nurses emphasized on one hand recapping technique, use

of adequate safety box for disposing of needle and receiver to carry sharp instruments.[22] However, it cannot be denied that most needle stick injuries in nurses fail to show compliance to biomedical safety checklist, higher workload and lack of sensitization on disposal waste management.[23-25] Many nurses believed that environmental hygiene should be managed by disinfecting the frequently touched surfaces. These findings are in accordance with the guidelines for disinfection and sterilization in healthcare facilities.[26]

A more significant number of nurses responded that using a correct method for handling, transportation, and processing of used linen in the ward help to prevent further infection in the area. Similar close findings mentioned in work conducted by Baharom et al reported a fair knowledge on safe handling and disposal and patient care equipment processing.[27] Conversely, nurses reported poor awareness of safe linen handling in the same work.

More than two-thirds of the nurses show knowledge on handling human tissues and laboratory waste in the present study. Similarly, nurses show a better understanding of safe disposal of blood and blood products and managing human tissue remains than other health care workers.[28] Such difference in knowledge among nurses might be due to changes in education and training on infection prevention and control policies and level of in-service education as highly educated nurses shows better awareness on the issue.[29]

In terms of the practice of nurses towards standard precautions while working with the patient, it has been found that a reasonable number of nurses reported good practices to hand washing, methods of hand-washing, wearing personal protective equipment, cough etiquettes, disposing of used needles, and disinfection and sterilization of patient care services. The above aspect of standard precautions is similar to the earlier studies from India and Turkey, which reported a desirable level of hand-washing practices; however, these studies mentioned sore hands, insufficient resources, and dense working conditions as barriers to hand-washing.[30-33] Further, Further, nurses show higher compliance to use personal protective equipment and dealing sharp instruments correctly.[31] However, this compliance was reported high in the research of Shang et al, which might be the use of a different measuring device for observation.[31] Further, the findings on cough etiquettes to prevent infection transmission and personal protective equipment to avoid cross-infection were reported sensible in our study. These findings are in line with the work of Ibrahim et al, which noted a greater number of nurses are sensitized on a protocol to cough and sneeze on a napkin and wash hands; however, a less number of nurses said the use of shoulder or elbow to sneeze in case of napkin unavailability.[33]

CONCLUSION

In conclusion, this study has shown that there is a reasonably good level of knowledge and practice of standard safety precautions among nurses working in the tertiary care hospital. However, based on the need of desired improvement, it is recommended to conduct tailored interventions to achieve higher adherence to these practices. Specifically designed interventions will help sensitizing on appropriate knowledge and practices of standard precautions and their needs in health care system. Also, a constant and regular supply of resources is required to maintain the safety standards along with a strict supervision, standard operational guidelines and regular courses and orientation.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Kaur A, Singh T, Kukreja S. A study to assess knowledge regarding universal safe precautions among nurses in a tertiary care hospital. Int J Clin Biochem Res. 2019;6(3):263-9.
2. Hesse A, Adu-Aryee N, Entsua-Mensah K, Wu L. Knowledge, Attitude and practice universal basic precautions by medical personnel in a teaching hospital. Ghana Med J. 2006;40(2):64.
3. Kumar R, Singh V, Mohanty A, Bahurupi Y, Gupta PK. Corona health care warriors in India: knowledge, attitude, and practices during COVID-19 outbreak. J Edcv Health Promot. 2021;10:44.
4. Nugmanova Z, Patel N, Nurbakhyt A, Akhmetova G, Kovtunenko N, Trumova Z, et al. Universal precautions in Central Asia: the need for multiple strategies in this window of opportunity. J Hosp Infect. 2015;89(3):197-201.
5. Arinze-Onyia S, Ndu A, Aguwa E, Modebe I, Nwamoh U. Knowledge and practice of standard precautions by health-care workers in a tertiary health institution in Enugu, Nigeria. Niger J Clin Pract. 2018;21(2):149-55.
6. Efstathiou G, Papastavrou E, Raftopoulos V, Merkouris A. Factors influencing nurses' compliance with Standard Precautions in order to avoid occupational exposure to microorganisms: A focus group study. BMC Nurs. 2011;10:1.
7. Wu CJ, Gardner G, Chang AM. Nursing students' knowledge and practice of infection control precautions: an educational intervention. J Adv Nurs. 2009;65(10):2142-9.
8. McCauley L, Kirwan M, Matthews A. The factors contributing to missed care and non-compliance in infection prevention and control practices of nurses: a scoping review. Int J Nurs Stud Adv. 2021;100039.
9. Porto JS, Marziale MHP. Reasons and consequences of low adherence to standard precautions by the

nursing team. Rev Gauch Enferm. 2016;37(2):e57395.
10. Jelly P, Sharma R, Bhatt A, Arazoo, Painuly D, Butola H, et al. Occurrence and knowledge about needle stick injury in nursing students. J Ayub Med Coll Abbottabad. 2015;27(2):430-3.
11. Sharma R, Mohanty A, Singh V, AS V, Gupta PK, Jelly P, et al. Effectiveness of video-based online training for health care workers to prevent COVID-19 infection: an experience at a tertiary care level institute, Uttarakhand, India. Cureus. 2021;13(5):e14785.
12. Ogoina D, Pondei K, Adetunji B, Chima G, Isichei C, Gidado S. Knowledge, attitude and practice of standard precautions of infection control by hospital workers in two tertiary hospitals in Nigeria. J Infect Prev. 2015;16(1):22.
13. Haile TG, Engeda EH, Abdo AA. Compliance with standard precautions and associated factors among healthcare workers in Gondar University Comprehensive Specialized Hospital, Northwest Ethiopia. J Environ Public Health. 2017;2017:2050635.
14. Kasa AS, Temesgen WA, Workineh Y, Tesfaye TD, Kerie S, Amsalu E, et al. Knowledge towards standard precautions among healthcare providers of hospitals in Amhara region, Ethiopia, 2017: a cross sectional study. Arch Public Health. 2020;78(1):1-8.
15. Asmr Y, Beza L, Engida H, Bekelcho T, Tsegaye N, Aschale Y. Assessment of knowledge and practices of standard precaution against blood borne pathogens among doctors and nurses at adult emergency room in Addis Ababa, Ethiopia. Emerg Med Int. 2019;2019:2926415.
16. Henderson J, Willis E, Roderick A, Bail K, Brideson G. Why do nurses miss infection control activities? A qualitative study. Collegian. 2020;27(1):11-7.
17. Afolaranmi TO, Hassan ZI, Bello DA, Oyebode T, Chingle MP. Assessment of knowledge and practice of standard safety precautions among Primary Health Care Workers in Plateau State North Central Nigeria. Int J Biomed Res. 2017;8(4):187-93.
18. Rochwani R, Sharma M. Assessment of the knowledge and practices regarding standard precaution among nursing staff at a tertiary care hospital of Raipur city, Chhattisgarh. Int J Community Med Public Health. 2019;6(4):1516-21.
19. Sharma R, Gupta P, Jelly P. Pattern and serological profile of healthcare workers with needle-stick and sharp injuries: a retrospective analysis. J Fam Med Prim Care. 2020;9(3):1391.
20. Hammoud S, Khatatbeh H, Zand A, Kocsis B. A survey of nurses' awareness of infection control measures in Baranya County, Hungary. Nurs Open. 2021;00:1-7.
21. Valim MD. Instruments and impacting factors on standard precautions knowledge among health workers. Enfermería Glob. 2016;15(1):305-21.
22. Jahangiri M, Rostamabadi A, Hoboubi N, Tadayon N, Soleimani A. Needle stick injuries and their related safety measures among nurses in a university hospital, Shiraz, Iran. Saf Health Work. 2016;7(1):72-7.
23. Shah R, Mehta H, Fancy M, Nayak S, Donga B. Knowledge and awareness regarding needle stick injuries among health care workers in tertiary care hospital in Ahmedabad, Gujarat. Nat J Community Med. 2010;1:93-6.
24. Ilhan MN, Durukan E, Aras E, Türkçüoğlu S, Aygün R. Long working hours increase the risk of sharp and needlestick injury in nurses: the need for new policy implication. J Adv Nurs. 2006;56(5):563-8.
25. Sarani H, Balouchi A, Masinaeinezhad N, Ebrahimitabas E. Knowledge, attitude and practice of nurses about standard precautions for hospital-acquired infection in teaching hospitals affiliated to Zabol University of Medical Sciences (2014). Glob J Health Sci. 2015 J;8(3):193-8.
26. Rutala WA, Weber DJ. Guideline for Disinfection and Sterilization in Healthcare Facilities, 2008. 2019. Available at: https://stacks.cdc.gov/view/cdc/47378. Accessed on 4 July 2021.
27. Alrubaiee G, Baharom A, Shahar HK, Daud SM, Basaleem HO. Knowledge and practices of nurses regarding nosocomial infection control measures in private hospitals in Sana'a City, Yemen. Saf Health. 2017;3(1):1-6.
28. Olaniyi FC, Ogola JS, Tshitangano TG. Challenges of effective management of medical waste in low-resource settings: perception of healthcare workers in Vhembe district healthcare facilities, South Africa. Trans R Soc South Africa. 2021;76(1):81-8.
29. Girgis Eskander H, Youssef W, Morsy M, Ali H, Elfeky A. Intensive care nurses' knowledge and practices regarding infection control standard precautions at a selected Egyptian Cancer Hospital. J Educ Pract. 2013;4(19):160-74.
30. Bischoff WE, Reynolds TM, Sessler CN, Edmond MB, Wenzel RP. Hand-washing compliance by health care workers: The impact of introducing an accessible, alcohol-based hand antiseptic. Arch Intern Med. 2000;160(7):1017-21.
31. Akyol AD. Hand hygiene among nurses in Turkey: Opinions and practices. J Clin Nurs. 2007;16(3):431-7.
32. Kumar R, Gupta PK, Sharma P, Kaur R, Verma R, Saini R. Hand hygiene, attitude and barriers among health care workers at a tertiary care teaching hospital, Uttarakhand. Int J Heal Sci Res. 2017;7(9):159.
33. Sharma R, Rohilla KK, Chadha L, Malhotra P, Sharmila S, Jelly P. Strategy to prevent infection from Covid-19 among security officers of tertiary care centre: A preexperimental study. J Family Med Prim Care 2021;10:3257-61.

Cite this article as: Sharma R, Kumar R, Sharma P, Verma D, Sharma MK, Sharma A, et al. Knowledge and practice of nurses regarding standard precautions in a tertiary care public hospital, North India. Int J Community Med Public Health 2021;8:5376-82.