To Study the Awareness about Universal Health Precautions among Nursing Professionals in a Medical College Hospital of India

Sukhbir Singh, Madan Gopal Vashisht, Ishwanti Malik, Pushpa Dahiya, Brij Mohan Vashisht
Departments of Hospital Administration, General Surgery, Nursing Superintendent, Medical Superintendent, and Community Medicine, Pt. B. D. Sharma PGIMS, Rohtak, Haryana, India

Abstract

Background: The universal health-care precautions (UHPs) aim at preventing health-care workers contact with blood and other body fluids by performing various infection control practices such as handwashing, wearing gloves and mask, safe disposal of infectious waste, and safe cleansing of used instruments. Objective: The study was conducted to assess the knowledge and awareness among nursing professionals regarding UHPs. Methodology: It was a cross-sectional study done on nursing professionals across all seniority and from various specialties including superspecialties. A pretested questionnaire consisting of 25 questions was used as a study tool. Results: There were a total of 550 respondents. The mean knowledge score of the respondents was 17.31 (range: 6–24). The mean score was 69.25% of the total achievable score. In the subgroup analysis, respondents above 60 years of age, married, females, urban residents, and nursing sisters scored better than the middle-aged professionals, unmarried, males, rural residents, and staff nurses. Conclusion: The study concludes important clues for further research and interventions. As the nursing professionals are learning about UHPs from practical exposure rather than formal teaching, it is pertinent to address this issue through well-planned formal sessions of training workshops and lecture discussions.

Keywords: Health-care worker, hospital-acquired infection, knowledge, nursing professionals, personal protective equipment kit, universal health-care precautions

Introduction

The universal health-care precautions (UHPs) aim at preventing health-care workers (HCWs) contact with blood and other body fluids by observing various infection control practices such as handwashing, wearing of gloves and mask, safe disposal of infectious waste, and safe cleansing of used instruments. Any body fluid may have injurious microorganisms and hence the scope of universal precautions is expanded and this term is replaced with standard precautions.[1] The poor compliance to universal precautions may cause harm to patients and simultaneously may lead to occupational illness/injury to HCWs.[2,3] The developing nations account for the maximum prevalence of HIV-infected patients and needlestick injury in the world.[4] The WHO estimates that 2.5% of HIV cases and 40% of hepatitis B virus and hepatitis C virus cases in health-care professionals are due to work-related hazards.[5] A study[6] has revealed that correct use of UHPs has resulted in substantial decline in professional exposure to blood. However, another study[7] reported that compliance with universal precautions among HCWs is usually poor. The poor compliance was attributed to poor knowledge about various facets of universal precautions.[8] Among HCWs, the nursing professionals are most affected by occupational hazards, being exposed to potentially contaminated items including sharps during patient care activities.[9-11] In a study carried out at urban...
and rural health settings of Ahmedabad city, it was found that 80% of study participants were aware about different hand hygiene approaches and merely 30% of doctors and 7% of nursing professionals were mindful about the use of personal protective equipment (PPE). \[12\] However, in some other research work carried among HCWs of rural North India, the knowledge and understanding of UHPs was found partial and their compliance was testified as suboptimal. \[13\] The study carried out in Ethiopia reported that 65.0% of HCWs showed compliance with UHPs. \[14\] However, on the other hand, the study carried out in Nigeria reported that 95% of HCWS followed hand hygiene practices, 33% of HCWs practiced recapping of used needles, and 64% of HCWs used PPE. \[11\]

Hence, awareness among nursing staff regarding various aspects of UHPs is vital for preventing these hazards. On review of indexed literature, very few studies are available on this topic, particularly in relation to developing countries like India. With this background in mind, this study was planned to assess the awareness regarding UHPs among nursing professionals. The study also aimed to find an association between the knowledge differential and selected variables for assessing the future needs of training (if any). The permission was obtained from the institute ethics committee before conducting this study.

**Methodology**

This was a cross-sectional study. The study population included nursing professionals working in various specialties of a tertiary care hospital of northern India. In our study, 50% of the nursing personnel on roll of the institute were included. Sampling frame consisted of a list of all nursing professionals obtained from nursing superintendent’s office. By following a convenient sampling technique, a requisite number of participants were selected from each department. A self-administered questionnaire was used as a study tool. The questionnaire was pilot tested among 20 different experts for checking its validity and modified accordingly. The experts involved in pilot testing were excluded from the study. Written informed consent from selected nursing professionals was taken individually, and they were given the questionnaire to fill at their earliest available time, preferably within a week. The participants who failed to fill the questionnaire in 1-week time were reminded once every week, till a maximum of three times, to get the filled questionnaire back. Participants who still failed to respond were dropped and the next participants were chosen from the list by convenient sampling technique. All questions were scored. Each correct response was given a score of one. Wrong answers and unanswered questions were given zero marks. The overall mean score (95% confidence interval) was calculated for all participants.

**Results**

There were a total of 550 respondents. It was observed that 40% of participants were in the age group of 31–40 years followed by 34% participants in the age group of 20–30 years, 93% were females, 91% were married, 88% were from urban backgrounds, 55% were nursing diploma holders followed by 31% of BSc nursing degree holders, and 76% were staff nurses.

The mean knowledge score of the respondents was 17.31 (range: 6–24). The mean score was 69.25% of the total achievable score [Table 1].

The ANOVA test was applied for evaluating the knowledge differential among different subgroups. The knowledge score varied from 66% (41–50 years’ age group) to 75% (>60 years’ age group). The respondents in the age group of more than 60 years had higher knowledge than the respondents in the age group of 41–50 years \(P = 0.104413\). Females had higher knowledge score (70%) compared to males (63%), and the difference was statistically significant \(P = 0.000029\). Knowledge score was higher for married participants (69.5%), compared to unmarried (67%), and was not statistically significant \(P = 0.063733\). The respondents from urban areas had a statistically higher knowledge score (70%) than those from the rural background \(P = 0.000095\). Postgraduate degree holders had the highest knowledge score of 19 (76%), which was statistically significant \(P = 0.014664\). The nursing sisters had significantly higher knowledge than staff nurses \(P = 0.001509\) [Table 2].

It was found that knowledge of nursing professionals about various components of infection chain, importance of universal precautions, nosocomial infection, hand hygiene, and hospital waste classification was very good (score more than 70%). Knowledge was good about ideal duration of medical and surgical handwashing and doffing order of PPE (score between 60 and 70%). However, knowledge was fair (score: 50%) about the disposal of used PPE kit and was average (score between 40 and 50%) about handwashing practice in labor room, different steps involved in handwashing, correct sequence of donning of PPE, and treatment of hospital sharp waste.

**Discussion**

All HCWs must fully understand different aspects of universal precautions. However, not many studies are available on this subject related to nursing professionals of developing countries. Therefore, this study was conducted among nursing professionals of tertiary care, teaching, research, and referral hospital of northern India. We found that the overall mean knowledge score in our study was 69.25% of the total achievable score. This score was higher than that of Fayaz \textit{et al.}, \[15\] wherein the mean knowledge score of doctors and other staff for UHP was 47%. The score was less than that achieved by nursing professionals at Punjab in a study by Kaur \textit{et al.} \[16\]

The present study has generated some important differentials in the knowledge scores. Respondents above 60 years of age, married, females, urban residents, and nursing sisters scored better than the middle-aged professionals, unmarried, males,
The finding that respondents above 60 years of age had higher knowledge about UHP than their younger colleagues was in conformity with the finding of a study by Abdulraheem et al. which reported that female HCWs had better knowledge of UHP compared to male HCWs. Similar findings were also reported by Yassi et al., which reported that respondents in the age group of 20–30 years had the highest knowledge of UHP. However, this finding was contrary to the findings of a study conducted by Motamed et al., which showed that the age group of 20–30 years had the highest knowledge of UHPs. Better knowledge scores in some categories compared to others could be because of greater exposure to the subject in the former compared to the latter. This exposure can be due to better training or/and practical exposures.

It is encouraging to note that in the present study, the knowledge score was very good for various components of infection chain, importance of universal precautions for nursing professionals, nosocomial infection, hand hygiene, etc., The findings of the present study are supported by few other studies, where every participant knew that appropriate handwashing diminished the likelihood of spread of infection. The present study showed fair knowledge about treatment of hospital sharp waste among respondents which was in agreement with the finding of Chaudhuri et al., which revealed that respondents had little knowledge about safe disposal of needle sharp.

Limitation of this study
This was a single-center-based study. Furthermore, most of the respondents had undergone similar kinds of training sessions, so the uniformity could have been attributed to the same.

Conclusion
Subgroup analysis scores and differences generated in the study should be absorbed with caution as sample size was not calculated for this subgroup analysis and thus was not sufficient for valid interpretations. Nonetheless, this explorative analysis has shed some important clues for further research and interventions. First, as probably nursing professionals are learning about UHP from their practical exposure rather than formal teaching, it is pertinent to address this issue through well-planned formal sessions. Seminars at regular intervals on UHP should be conducted so that nurses across all levels of seniority can learn about the universal precautions. It should be made a mandatory topic of induction training of the nurses. Further, a system of regular medical audit should be instituted to document whether nurses are correctly practicing UHP.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

References
1. Sadoh WE, Fawole AO, Sadoh AE, Oladimeji AO, Sotiloye OS. Practice of universal precautions among healthcare workers. J Natl Med Assoc 2006;98:722–6.
2. Chan R, Molassiotis A, Chan E, Chan V, Ho B, Lai CY, et al. Nurses’ knowledge of and compliance with universal precautions in an acute care hospital. Int J Nursing Stud 2002;39:157–63.
3. Walsh G. AIDS: Fear of contagion among nurses. Br J Nurs 1992;1:66–8.
4. Pruss-Üstün A, Rapiti E, Hutton Y. Sharp injuries: Global burden of disease from sharps injuries to health-care workers. Geneva: World Health Organization; 2003.
5. The World Health Report 2002: Reducing Risks, Promoting Health Life. Geneva: World Health Organization; 2002.
6. Beckmann SE, Vlahov D, Kozol DE, McShalley ED, Schmitt JM, Henderson DK. Temporal association between implementation of universal precautions and a sustained, progressive decrease in

Table 1: Descriptive statistics showing overall mean knowledge score

| Parameter                  | n   | Minimum-maximum | Mean   | SEM   | SD   | 95% CI of mean |
|----------------------------|-----|-----------------|--------|-------|------|----------------|
| Knowledge score            | 550 | 6.00-24.00      | 17.31  | 0.11  | 2.53 | 17.10-17.52    |

SD: Standard deviation, SEM: Standard error of mean, CI: Confidence interval

Table 2: Analysis of variance for association of knowledge scores with age group, sex group, marital status, place of residence, designation, and educational qualification

| Parameter            | n    | Mean  | SD   | F/t  | P    |
|----------------------|------|-------|------|------|------|
| Age group (years)    |      |       |      |      |      |
| 20-30                | 184  | 17.27 | 2.69 | 1.93 | 0.10 |
| 31-40                | 218  | 17.37 | 2.38 |      |      |
| 41-50                | 52   | 16.58 | 2.72 |      |      |
| 51-60                | 89   | 17.57 | 2.33 |      |      |
| >60                  | 7    | 18.71 | 2.98 |      |      |
| Sex group            |      |       |      |      |      |
| Male                 | 39   | 15.70 | 2.27 | -4.21| 0.00 |
| Female               | 511  | 17.44 | 2.51 |      |      |
| Marital status       |      |       |      |      |      |
| Married              | 501  | 17.38 | 2.46 | 1.86 | 0.06 |
| Unmarried            | 49   | 16.68 | 3.15 |      |      |
| Place of residence   |      |       |      |      |      |
| Urban                | 485  | 17.47 | 2.53 | 3.93 | 0.00 |
| Rural                | 65   | 16.17 | 2.25 |      |      |
| Designation          |      |       |      |      |      |
| Staff nurses         | 420  | 17.30 | 2.48 | 6.57 | 0.00 |
| Nursing sister       | 120  | 17.58 | 2.67 |      |      |
| Others               | 10   | 14.60 | 1.35 |      |      |
| Educational qualification |  |       |      |      |      |
| GNM                  | 304  | 17.32 | 2.48 | 3.54 | 0.02 |
| B.Sc.                | 172  | 17.23 | 2.51 |      |      |
| M.Sc.                | 20   | 19.00 | 2.41 |      |      |
| Others               | 54   | 16.91 | 2.71 |      |      |

Designation Others: Assistant nursing superintendent, deputy nursing superintendent, DNS. Education qualification Others: Ph.D., post basic. GNM: General nursing and midwifery, SD: Standard deviation

rural residents, and staff nurses. The postgraduates also scored better than the graduates. The findings are compatible with the study conducted by Abdulraheem et al., which reported that female HCWs had better knowledge of UHPs compared to male HCWs. Similar findings were also reported by Yassi et al. The finding that respondents above 60 years of age had higher knowledge about UHP than their younger colleagues was in conformity with the findings of a study by Mohd-Nor et al. However, this finding was contrary to the findings of a study conducted by Motamed et al. which showed that the age group of 20–30 years had the highest knowledge of UHPs. Better knowledge scores in some categories compared to others could be because of greater exposure to the subject in the former compared to the latter. This exposure can be due to better training or/and practical exposures.
Singh, et al.: Knowledge of universal health-care precautions among nursing professionals

7. Gershon RR, Karkashian C, Felknor S. Universal precautions: An update. Heart Lung 1994;23:352-58.
8. Salehi AS, Garner P. Occupational injury history and universal precautions awareness: A survey in Kabul hospital staff. BMC Infect Dis 2010;10:19.
9. Pinho DL, Rodrigues CM, Gomes GP. Profile of occupational accidents at the University Hospital of Brasilia. Rev Bras Enferm 2007;60:291-4.
10. Lima FA, Pinheiro PN, Vieira NF. Accidents with sharps: knowing the feelings and emotions of nursing professionals. Esc Anna Nery 2007;11:205-11.
11. Spagnuolo RS, Baldo RC, Guerrini IA. Epidemiological analysis of accidents with biological material registered at the Occupational Health Reference Center - Londrina-PR. Rev Bras Epidemiol 2008;11:315-23.
12. Devaliya JJ, Niti TJ, Bansari C. Knowledge, attitude and practice of universal precautions: A comparative study between urban and rural health care settings. Natl J Community Med 2018;9:37-41.
13. Kermode M, Jolley D, Langham B, Thomas MS, Holmes W, Gifford SM. Compliance with universal/standard precautions among health care workers in rural North India. Am J Infect Control 2005;33:27-33.
14. Beyamo A, Dodicho T, Fach W. Compliance with standard precaution practices and associated factors among health care workers in Dawuro Zone, South West Ethiopia, cross sectional study. BMC Health Serv Res 2019;19:381.
15. Fayaz SH, Higuchi M, Hirosawa T, Sarker MA, Djabbarova Z, Hamajima N, et al. UPs knowledge and practice of HCWs in Afghanistan. J Infect Dev Ctries 2014;4:535-42.
16. 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;6:263-9.
17. Abdulraheem IS, Amodu MO, Saka MJ, Bolariinw OA, Uthman MM. Knowledge, awareness and compliance with standard precautions among health workers in North Eastern Nigeria. J Community Med Health Edu 2012;2:131-5.
18. Yassi A, Lockhart K, Copes R, Kerr M, Corbiere M, Bryce E, Saunders S. Determinants of health care workers’ compliance with infection control procedures. HealthQ 2007;10:44-52.
19. Mohd-Nor N, Bit-Lian Y. Knowledge, Attitude and practices of standard precaution among nurses in middle-east hospital. Sci Med J 2019;1:189-98.
20. Motamed N, BabaMahmoodi F, Khalilian A, Peykanheirati M, Nozari M. Knowledge and practices of health care workers and medical students towards universal precautions in hospitals in Mazandaran Province. East Mediterr Health J 2006;12:653-61.
21. Mukherjee S, Bhattacharyya A, Biswanath SharmaSarkar, Goswami DN, Ghosh S, Samanta A. Knowledge and practice of standard precautions and awareness regarding post-exposure prophylaxis for HIV among interns of a medical college in West Bengal, India. Oman Med J 2013;28:141-5.
22. Chopra S, Walia I, Verma P, Vati J. Knowledge and practices related to compliance with universal precautions: A study among staff nurses of PGIMER, Chandigarh. Nurs Midwifery Res J 2008;4:59-67.
23. Askarian M, Memish Z, Khan A. Knowledge, practice and attitude among Iranian nurses, midwives and students regarding standard isolation precautions. Infection Control Hosp Epidemiol 2007;28:241-4.
24. Chaudhuri S, Baidya OP, Gambhir Singh T. Knowledge and attitude of universal precaution among nursing staff in a tertiary hospital of Manipur. Int J Community Med Public Health 2016;3:451-4.