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ORIGINAL ARTICLE

Knowledge, practice and attitude towards standard isolation precautions in nurses, auxiliary nurses and midwives of Shahid Sadoughi Hospital, Yazd, Iran

Mahmoud Mohammadzadeh[1], Fatemah Behnaz[1,2], Shirin Parsa[1]
1. Shahid Sadoughi University of Medical Sciences, Yazd, Iran
2. Infectious Disease Ward, Shahid Sadoughi Hospital, Ebn-e-Sina Ave., Shahid Ghandi Blvd., Yazd, Iran.

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Abstract

The objective of this study was to evaluate knowledge, practice and attitude of nurses, auxiliary nurses and midwifery staff towards standard isolation precautions.

In a cross-sectional survey 200 nurses, auxiliary nurses and midwifery staff were recruited to complete a questionnaire about their knowledge, attitude and practice towards standard isolation precautions in a teaching hospital in Yazd, Iran. The data were collected and analyzed using SPSS 14.

The initial sample consisted of 230 participants, of whom 200 (87%) responded to the distributed questionnaires. Knowledge and attitudes were moderate but their practice was relatively poor. Mean score of knowledge, attitude and practice towards standard isolation precautions were 11.9 (Maximum = 16.5), 27 (Maximum = 50), 4.6 (Maximum = 9), respectively. Practice scores of women were significantly higher than men (P = 0.028). The score of Knowledge increased significantly with age (P = 0.004). A positive linear correlation was observed between knowledge and practice (P =0.01, correlation coefficient = 0.173).

This study revealed that there were serious defects in knowledge of health care workers regarding hand hygiene, disinfecting endoscopes, avoiding recapping needles and respiratory isolation precautions.

Key words

Hospitals, isolation and standards; Nurses's practice patterns; Attitude of health personnel; Knowledge; Nurses

Corresponding Author

Fatemah Behnaz
Infectious Disease Ward, Shahid Sadoughi Hospital, Ebn-e-Sina Ave., Shahid Ghandi Blvd., Yazd, Iran.
Tel: (+98) 351-8113590 Fax: (+98) 351 8224300.
Email: Fatemah.behnaz@yahoo.com

Introduction

There is growing concern about the transmission of blood-borne pathogens during medical procedures from patients to health care workers (HCW) and among patients.[1] In Iran in addition to increasing risk of infections such as Hepatitis B virus, Hepatitis C virus and Human Immunodeficiency virus, especially among intravenous drug users,[2] some outbreaks of the Arbovirus Crimean Congo Hemorrhagic fever have occurred leading to mortality in HCWs.[3] Universal precautionary measures developed by Centers for Disease Control and Prevention as well as transmission-based isolation precaution can prevent transmission of infections.[4] The application of Universal Precautions (UPs) has been shown to reduce both occupational exposure to body fluids and patient-to-patient transmission of blood-borne viruses (BBVs) via the health care workers.[5]

The objective of this study was to evaluate the level of knowledge, practice and attitude of nurses and midwifery staff towards isolation precautions[6] in Shahid Sadoughi University affiliated hospital in Yazd, a central city in Iran.

Methods and Subjects

A cross-sectional survey was done during August and September 2009 at Shahid Sadoughi University affiliated 350-bed teaching hospitals in Yazd, Iran. The city of Yazd is located in a province in the centre of Iran. A questionnaire was prepared by an infectious disease specialist who was a member of the Hospital Infection Control Committee, and a health education specialist. Items were adopted partly from previous studies, but many of them were designed according to CDC guidelines.[6] In a pilot study the designed questionnaire was distributed among 30 nurses in another hospital to test its practicability and validity. For internal consistency Cronbach's alpha coefficient was measured (0.67).

Questionnaires were distributed to all 230 nurses, auxiliary nurses and midwives working in internal medicine, general surgery, ENT, gynaecology & obstetrics, ICU, NICU, emergency, neurology, orthopaedics, cardiology & Coronary Care Unit (CCU), paediatrics, ophthalmology and infectious diseases departments by an intern in every work shift. Questionnaires were gathered after 1 hour. Two hundred of the total was completed. Ethical clearance was obtained from the University Ethics Committee. Questionnaires were anonymous and it was declared that it has no implication for evaluation of respondents regarding their career. It included demographic variables such as: age, sex, years of professional employment, ward, 14 knowledge questions, 10 attitude questions and 12 items evaluating their practice. Knowledge section included three questions with three choices (yes, no and I do not know), two questions with A, B and A&B, four multiple choice questions and five questions with more than one correct answer. In knowledge questions, depending on type of question, 0.5 to 1 point was assigned to each correct answer and 0 to each incorrect answer. Maximum possible score was 16.5 points.

Attitude questions were based on a five-point Likert scale (*I totally agree*, *I agree*, *I have no idea*, *I disagree* and *I totally disagree*) which received 1 to 5 points. Maximum possible score was 50. Twelve questions assessing practice were also coded on Likert scale: always, often, sometimes, seldom, never. In practice questions, 1 point was given only to correct answers, all other answers received zero. We designed Likert scale for practice questions to make answering questions easier for the study subjects, however, assuming standard isolation practices as necessary critical tasks, we assigned score 1 only to the correct answers like "always" or "never" and zero to all other answers. This concept has already been applied.[2,7]

Data were analyzed by SPSS 14 and $\alpha = 0.05$ was taken as significant. For evaluation of gender effect on knowledge, attitude and practice, Mann-Whitney test was used, and to determine the effects of age, duration of employment and departments on scores, Krusskal Wallis was applied. Correlation between knowledge, attitude and practice was computed by Spearman's coefficient. Total scores obtained were categorized into 3 Levels: Poor (<50%), Moderate (50% to 75%), and Good (>75%) of maximum possible scores.

Results

Two hundred out of 230 nurses, auxiliary nurses and midwives responded to the distributed questionnaires (87%), from whom 172 (86%) were female and 28

Table I. Mean (SD) scores of knowledge, practice and attitude towards standard isolation precautions in nurses, auxiliary nurses and midwives with regard to age.

Age (years) variable	20-29	30-39	40-50	*P* value
Knowledge†	11.56 ± 1.3	12.26 ± 1.3	12.4 ± 1.28	0.004
Attitude ‡	26.5 ± 3.4	27 ± 3.03	27.7 ± 3.2	0.3
Practice§	4.6 ± 1.2	4.5 ± 1.6	4.7 ± 1.85	0.815

† Maximum possible score = 16.5
‡ Maximum possible score = 50
§ Maximum possible score = 9
Kruskal-Wallis test applied.

(14%) were male. Their age range was 20 to 50 years, 26.5% of the subjects had been employed for <5 years, 30.5% for 5 to 9 years and 33% for >10 years.

Knowledge level of the subjects was poor in 10%, moderate in 55.5% and high in 34.5%, mean score of which was 11.9. Attitude level of the subjects was poor in 30.5% and moderate in 68%. Three nurses (1.5%) did not respond to the attitude items. The mean score was 27. Practice level was poor in 49%, moderate in 43% and high in 8% of them (Mean score = 4.6).

Practice score in women (4.70 ± 1.50) was significantly higher than men (4.08 ± 1.37) (P = 0.028). Their knowledge score (11.95 ± 1.40) was higher than men (11.55 ± 1.41) as well, but it was not statistically significant (P = 0.194). Attitude scores of men and women were the same (27.13 ± 2.30 and 27.01 ± 3.5, respectively) (P = 0.963). Analysis was done using Mann-Whitney test.

Knowledge score of the study subjects increased significantly with age (P = 0.004). Also their attitude score increased with age but it was not statistically significant (Table I).

Both knowledge and attitude scores increased significantly with years of employment (P = 0.002 and 0.032, respectively) and those with <5 years of employment had the lowest score, although the practice score was not statistically significant (Table II).

There was no statistically significant difference between knowledge, attitude and practice scores of nurses in the following departments: internal medicine, general surgery, ENT, gynaecology obstetrics, labour, ICU, NICU, emergency, neurology, orthopaedics, cardiology & CCU, paediatrics, ophthalmology and infectious diseases (P = 0.12, 0.11 and 0.13, respectively).

Table II. Mean (SD) scores of knowledge, practice and attitude towards standard isolation precautions in nurses, auxiliary nurses and midwives regarding duration of employment.

Duration of employment variable	<5 years Mean ± SD	5-9 years Mean ± SD	≥10 years Mean ± SD	*P* value
Knowledge†	11.35 ± 1.46	11.93 ± 1.33	12.25 ± 1.28	0.002
Attitude‡	25.98 ± 3.55	27.76 ± 2.69	27.15 ± 3.68	0.032
Practice§	4.47 ± 1.21	4.7 ± 1.48	4.6 ± 1.69	0.483

† Maximum possible score = 16.5
‡ Maximum possible score = 50
§ Maximum possible score = 9

Table III. Frequency distribution of correct answers to specific knowledge questions. n = 200

Questions	Correct	Incorrect
1- Hands should be washed: A: before patient care B: after patient care C: both	96.5%	3.5%
2- Hands should be washed: A: before using gloves B: after using gloves C: both	73%	27%
3- Hands should be washed after: - Taking off gown - Touching wet skin lesions - Touching patients wound dressing - Lifting or drawing patient on the bed	 69% 84% 81.5% 52%	 31% 16% 18.5% 48%
4- Gloves should be worn before: (yes, no, I do not know) - vein puncture - Touching mucosal surface - Taking out NG tube	 97% 99% 95.5%	 3% 1% 4.5%
5- Alcohol rub is adequate for hands hygiene when they are not visibly contaminated with blood or proteinaceous secretions	37%	63%
6- Antibacterial soap and water are adequate for disinfecting hands when they are visibly contaminated with blood or proteinaceous body secretions.	52%	48%
7- Gown is necessary when changing: patients dressings if she/he has urinary or fecal incontinence NG tubes	60.5% 40.5%	39.5% 59.5%
8- During respiratory infection outbreaks, warnings regarding respiratory secretions isolation and hand washing after contact with secretion should be available in waiting rooms and Emergency rooms.	83%	17%
9- Wearing face masks and goggles are necessary for: Taking out NG tube Suctioning tracheal tube	58.5% 88%	41.5% 12%
10- Endoscope should first be washed with water then be disinfected.	24%	76%
11-If you have only one room available for isolating contagious patients, which patient do you allocate it to? A- shigellosis B- cholera C- amoebic colitis D- tetanus	27%	73%
12- Patient's table, door handles of patient's room and bathroom should be disinfected during a week repeatedly.	85%&67%	15%&33%

Kruskal-Wallis test applied.

Regarding distribution of correct answers to knowledge questions (compatible with CDC and prevention guidelines),[6] the most frequent correct answer was to a question about putting on gloves while touching patient's mucosal surfaces (99%). The most frequent wrong answer (76%) was to a question about technique of disinfection of endoscopes after use (Table III).

A question assessing attitude of respondents about wearing face masks while suctioning patient's secretions, received the highest mean score (3.8). The lowest mean score (1.3) was received by a question about wearing gloves for vein puncture (Table IV).

Regarding distribution of correct answers to practice questions, the highest correct answer (87.5% of respondents) was to a question about washing hands after accidental contact with blood, liquids and secretions of patients. The lowest correct answer (20.5%) was to a question about keeping 90 cm away from patients suspicious of having respiratory infections and a question about wearing gown and gloves for housekeeping staff in charge of washing and decontaminating instruments (Table V).

A weak positive linear correlation was observed only between knowledge and practice (P = 0.01 and correlation coefficient = 0.173).

Discussion

Standard isolation precautions are important measures for preventing nosocomial infections and protecting health care workers from infection through occupational exposure. In the present study, knowledge, practice and attitude of nursing and midwifery staff towards standard isolation precautions at Shahid Sadoughi

Table IV. Mean score of attitude towards standard isolation precautions in nurses, auxiliary nurses and midwives regarding specific questions n = 200

Attitude item	Mean± SD	Score range
1- One should wear gloves while taking blood or touching patient's secretions.	1.3 ± 0.68	1-5
2- While one is taking care of a contagious patient, wearing gown would be inconvenient to act quickly so he/she prefers not to wear gown.	3.4 ± 1.4	0-5
3- One needs to wear gloves when he/she is going to put in or take out NG tube.	1.4 ± 0.68	1-5
4- One may think that it is not necessary to wear respiratory mask and goggles for intubation/extubation and suctioning tracheal tube because they limit his/her efficiency.	3.8 ± 1.16	0-5
5- Wearing gown is not necessary when entering ICU.	3.4 ± 1.14	1-5
6- Getting infected with a contagious disease may be accidental (can depend on chance).	3.7 ± 1.16	0-5
7- Hand washing is a trivial action before wearing gloves.	3.4 ± 1.09	1-5
8- It is not logic to assume all patients contagious unless their infection has been confirmed.	2.14± 1.14	0-5
9- It is not necessary to begin precautions about communicable patients from reception and waiting room.	2.17± 1.12	1-5
10- One may not care for keeping him/her 90 cm apart from patients because it is not so effective for transmission.	2.15± 0.99	1-5

Hospital were assessed as moderate. The response rate of 87% in the present study was higher than rates in two similar studies from Iran (51.5% and 84.4%) and a Greek study (71.6%) involving doctors and nurses.[2,7,8] The knowledge score was similar to or in the range of other studies some of which performed in Iran.[2,10-14] In another Iranian study published locally, practice scores of nurses towards control of healthcare associated infections have been reported at the same level.

Mean attitude score in this study was lower than a study in Shiraz,[11] while mean practice score was in the range of some other studies in Iran.[11,13] The same practice score was reported by another locally published study in the same country.

There was a positive weak linear correlation between knowledge and practice scores of the subjects in the present study, which is similar to the findings of Okaro *et al.*[1] and Askarian *et al.*[7]; this discordance may be due to lack of motivation for improving their practice. There was no significant difference in mean knowledge score between genders, which is in contrast with another study in Iran.[7] Higher practice score was obtained by women; this finding is similar to a Greek and an Indian study.[5,9] It seems that women are more compliant with what they have learned during their profession in this hospital.

Older age and longer duration of employment were associated with higher scores of knowledge in all study subjects which is in line with two other studies,[5,8] also attitude and practice scores were higher in those with longer duration of employment which can be due to effect of continuous education during their career. Relationship between longer job experience and more awareness of infection risks has previously been emphasized by Gould and Ream.[17]

Regarding specific precaution, questions assessing knowledge about washing hands after contact with blood and body secretion as well as putting on gloves before touching mucosal surfaces and the third practice question elicited the largest number of

Table V. Frequency distribution of correct answers to practice questions regarding standard isolation precautions. n =200. Indicate your situation as: always, often, sometimes, seldom, never

Questions	correct	incorrect
1 Needles should not be recapped /bent after use of syringes.	22%	78%
2 Hands hygiene is needed after touching patient's surroundings.	38.5%	61.5%
3 Hands hygiene is needed after accidental contact with blood, mucosal surfaces, fluids or patient's body secretions.	87.5%	12.5%
4 Gloves should be worn before touching wet instruments, skin wounds, mucosal surfaces, blood or any body fluid, and invasive procedures.	54.5%	45.5%
5 Have you worn gown in case there has been risk of splashing blood or body secretions to you? If not, what was the cause?	22%	78%
6 Did you use mask in the last occasion which splashing of blood to your face was possible? If not, what was the cause?	49%	51%
7 One should keep himself/herself 90 cm far from the patient who is suspicious of having respiratory infection.	20.5%	79.5%
8 Housekeepers who are in charge of decontamination of devices should wear gloves and gown for washing them.	20.5%	79.5%
9 Separate sterile syringe and needle should be used for aspirating multi-dose vials for each episode.	80.5%	19.5%

correct answers. This can be partially due to religious faith which dictates cleanliness after touching blood or body secretions while a practice question about hand washing after contact with patient's surroundings revealed correct answer in only 38.5% of respondents, which is similar the findings of another study in Iran (31.9%) and in line with some other studies.[2,18-19] Paying no attention to patient's surroundings as a source of nosocomial infection in the present study subjects is in contrast with a study in Birmingham evaluating attitudes of nurses about washing hands before and after patient contact in which 88.8% of the subjects considered it as a very important task after patient contact.[20]

Cross-infection via endoscopy should be addressed in future educational programs. Also it is recommended to encourage putting on gloves. Keeping away (90 cm) from patients with respiratory symptoms needs to be emphasized especially regarding the concern about pandemic 2009 H1N1 virus. In another study involving attending physicians, residents and students of dentistry faculty in Iran, only 36.7% of the subjects practiced keeping far this distance.[7] Personnel in charge of decontamination of devices should be supervised regarding wearing gloves and gown. Finally hand washing technique should be corrected and applied in different situations including touching fomites surrounding the patients.

The most important limitation of this study lies in the fact that the questions in three parts were not exactly assessing same concepts of standard isolation precautions; therefore, we could not find a correlation between knowledge, practice and attitude specifically. Another limitation was that practice was evaluated by self-assessment, not by observation which may not reflect their real practice.

Conclusion

Attitude and practice scores of HCWs towards standard isolation precautions are almost moderate, but serious defects in knowledge of health care workers regarding hand hygiene, disinfecting endoscopes, avoiding recapping needles and respiratory isolation precautions are present. More educational courses before graduation are needed and more continuing educational programs should be arranged during their career.

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