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## **Role of knowledge in practicing universal precautions among staff nurses**

Sharma BK<sup>1</sup>, George S<sup>2</sup>

Associate Professor (Biostatistics),<sup>1</sup> Lecturer<sup>2</sup>

<sup>1</sup>Department of Community Medicine, Sri Aurobindo Institute of Medical Science (SAIMS), Indore, MP, India

<sup>2</sup>Department of Medical Surgical Nursing, SAIMS, Nursing College, Indore, MP, India

## **ORIGINAL RESEARCH**

### **ABSTRACT**

#### **Aim**

Authors aimed to present the importance and association of knowledge with practices of universal precautions.

#### **Background**

Staff nurses are at high risk of exposure to infectious agents. Knowledge and practices towards universal precautions are necessary to prevent hospital associated infections.

#### **Material Methods**

An observational study was conducted at different selected hospitals of Indore city. A total of 130 staff nurses were sought for informed consent considered as subject. The demographic profile had identified and associated with knowledge and practice of universal precautions. The main study tool was self-administered questionnaire.

#### **Results**

Mean practices (49.6%) of universal precautions were significantly lower than mean knowledge (73.35%). 61.5% staff nurses had good knowledge but 43.8% were practicing at good level while none showed the practice excellence. The knowledge were not found associated ( $p>0.05$ ) with practices of universal precautions. The practices of universal precautions reported strongly associated ( $p<0.002$ ) with work experience but significantly ( $p<0.03$ ) associated with knowledge. The workload of a staff nurse was identified as a distracter because no significant association ( $p>0.05$ ) was evidenced between nurse patient ratio with knowledge and practice of universal precautions.

#### **Conclusion**

Various studies have been shown that use of universal precautions lower the risk of hospital associated infection. Staff nurses had good knowledge but low practices of universal precautions. A good practice of universal precaution is a powerful tool to reduce the risk of contracting infections in clinical settings. Age, gender, course taken and clinical experience has their own effect towards knowledge and practice of universal precautions.

#### **Key Words**

Universal Precautions, Knowledge, Infection, Practice, Nosocomial infection.

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## **INTRODUCTION**

Universal precautions (UPs) are designed to prevent health care staff being exposed to blood and body fluids. UPs practices are important, as any health care organization has a responsibility to protect its staff from potential danger and itself from loss of man power if staff suffers occupational injuries or illnesses.<sup>1</sup> UPs are based on the basic principle of infection control through hand-washing, safe handling of needles and utilization of appropriate protective barriers such as gloves, mask, gown, and eyewear. Hand hygiene is

recognized as the leading measure to prevent cross-transmission of microorganisms<sup>2</sup> and to reduce the incidence of health care associated infections.<sup>3</sup> Nurses constitute the largest percentage of the health care workers.<sup>4</sup>

A Nosocomial infection also called "Hospital Acquired Infection" can be defined as an infection occurring in a patient in a hospital or other healthcare facility in whom the infection was not present or incubating at the time of admission.<sup>5</sup> This includes infections acquired in the hospital but appearing after discharge and also occupational infection

among staff of the facility.<sup>6,7</sup> In a press release on 13 October 2005, WHO state that "Preventable Hospital Infections are a major cause of death and disability for the patients". Hospital acquired infections results in higher morbidity, mortality, and additional costs.<sup>8</sup> A world health organization study has shown that the highest prevalence of nosocomial infections occurs in intensive care units and in acute surgical and orthopedic wards<sup>9</sup> since basic knowledge about standard precautions was found insufficient across all hospitals and cadres.<sup>10</sup>

Surveys have shown that the use of UPs significantly decreases the number of incidents of occupation exposure to blood.<sup>11,12</sup> It has been well documented that the level of compliance with the use of proven hospital acquired infections measures by healthcare workers has been disappointing.<sup>13</sup> An urgent need to implement a programme to improve standard precautions adherence among nurses and to increase supply of hand washing and drying materials<sup>14</sup> and improvements in health hazards intervention are needed.<sup>15</sup>

Various studies have been shown that knowledge in practicing the UPs lowers the risk of hospital acquired infection. In this article, the authors aimed to present the importance and association of knowledge with significant practices of universal precautions among staff nurses.

**MATERIAL AND METHOD**

An observational study was conducted at different selected hospitals of Indore city between January and February 2012. A total of 130 staff nurses were sought for informed consent selected by non-probability sampling technique that met inclusion-exclusion criteria during specified schedule considered as subject. The demographic profile of subject had identified and associated with knowledge as well as practice towards universal precautions. The main study tool was self-administered questionnaires modified from valid and reliable measures, structured to observe the knowledge and practice towards universal precautions among staff nurses. After explaining the purpose of the study the questionnaire was administered to 130 staff nurses and was asked to answer (fill up) the questions in prescribed format so as to assess their knowledge and practices of universal precautions. To enhance the response rate, the nurses were requested to complete the questionnaire and hand it back immediately and those who were busy at that moment, were requested to return back the duly filled questionnaires.

The knowledge questionnaire consisted of twenty questions that covered standard precaution, hand washing, gloves, eye wear glasses, mask, apron, boots, disinfection and sterilization of patient care equipment and bio-medical waste and HIV/AIDS while practices questionnaire consisted of forty questions which covered hand hygiene, disinfection sterilization, use of personal protective equipment, disposal

of used syringes, niddles, scalpels and blades, standard precautions for blood collections and steps of cleaning of blood spills on the floor.

For analysis of questionnaire, the category of knowledge and practice was allocated on the basis of total (100.0%) obtained marks by a subject that divided into four parts. Every correct answer carried one mark while wrong carried zero mark. Subjects who scored from 0.0% to 24.9% treated as poor, from 25.0% to 49.9% as average, from 50.0% to 74.9% as good and greater than or equal to 75% as excellent category of knowledge as well as of practice. The empirical findings had been synthesized which further analyzed by using statistical software SPSS Version 11.0 in order to observe the descriptive statistics while Chi-square test was carried out to identify the association of knowledge and practice with demographics

**RESULT**

All the selected health care workers fully completed the questionnaire, giving a response rate of 100%. Table 1 presents demographic information. Out of 130 nurses, B. Sc. Nursing degree was acquired by 47.7% while General Nursing Midwifery course by 52.3% nurses. The male nurses were 48.5% and previous exposure in caring in infected patients reported by 76.9% nurses while 70.0% had followed UPs.

**Table 1: Demographic characteristics**

Parameter	Population Particulars	Frequency (N=130)	Percentage (%)
Age (years)	21-25	89	68.5
	26-30	24	18.5
	31-35	10	7.7
	>35	7	5.4
Work experience (years)	0-5	103	79.2
	5-10	13	10.0
	> 10	14	10.8
Nurse patient ratio	1 : 5	69	53.1
	≥1 : 10	61	46.9
Previous exposure of UPs in attending in-service education	Work shop	52	40.0
	Seminar	63	48.5
	None	15	11.5

Table 1 projected the demographic profile of the subjects. Most of the staff nurses (89, 68.5%) were belonged to 21-25 years age group. 24 (18.5%) and 10 (7.7%) staff nurses were from 26-30 and 31-35 years age group respectively. Few (7, 5.4%) staff nurses included in this study were more than 35 years of age. 103 (79.2%) staff nurses had 0-5 years of working experience in their respective field while 13 (10.0%) had 5-10 years of working experience while few (13, 10.0%) had a vast working experience of more than 10 years. Most of the nurses (69, 53.1%) were working in the set-up of 1:5 nurse patient ratio while remaining (69, 53.1%) were working in 1:10 nurse patient ratio.

**Table 2-Assessment of knowledge of Universal Precautions and its practices**

Knowledge (Out of 20 Marks)			Practice (Out of 40 Marks)		
Scores	Frequency (N=130)	Percent (%)	Scores	Frequency (N=130)	Percent (%)
Poor (0-5)	0	0.0	Poor (0-10)	1	0.8
Average (6-10)	4	3.1	Average (11-20)	72	55.4
Good (11-15)	80	61.5	Good (21-30)	57	43.8
Excellent (16-20)	46	35.4	Excellent (31-40)	0	0.0
Mean±SD	14.67±2.307 [73.35%] <sup>*</sup>		Mean±SD	19.84±4.302 [49.60%] <sup>*</sup>	

<sup>\*</sup>The curly parenthesis [ ] showed the corresponding percentage of mean.

The table 2 showed that the percent of mean practices (49.6%) of Universal Precautions (UPs) were significantly lower than percent of mean knowledge (73.35%) which further documented that staff nurses had knowledge but their practices are lowered. A gap between knowledge and practices of UPs was reported as 61.5% staff nurses had good knowledge but 43.8% nurses were practicing their knowledge at good level but none (0.0%) of the staff nurse showed the practice excellence. More than half (55.4%) of the staff nurse were identified with average practices of UPs.

**Table 3-Association of knowledge with practice of Universal Precautions (UPs)**

Knowledge	Practice of UPs			Total
	Poor	Average	Good	
Average	0 (0.0%)	2 (2.8%)	2 (3.5%)	4 (3.1%)
Good	1 (100.0%)	46 (63.9%)	33 (57.9%)	80 (61.5%)
Excellent	0 (0.0%)	24 (33.3%)	22 (38.6%)	46 (35.4%)
Total	1 (100.0%)	72 (100.0%)	57 (100.0%)	130 (100.0%)

$\chi^2_4 = 1.12^{\otimes}$   
p>0.05 (Insignificant)

<sup>⊗</sup> The association isn't significant (Insignificant) for 1 degree of freedom at the 0.05 levels of significance.

Table 3 reported that the knowledge of Universal Precautions (UPs) of staff nurses were not found associated (p>0.05) with practices of UPs reflected that knowledge mayn't be influenced the practices among staff nurses. 46 (63.9%) staff nurses had good knowledge of UPs but their practices were at average level. Knowledge of 24 (33.3%) staff nurses was excellent but practices of UPs were at average level. 38.6% staff nurses were practicing UPs well (good) with excellent knowledge. Only 2 (3.5%) staff nurses were practicing UPs at good level but they had average knowledge.

**Table 4: Association of different parameters with levels of Knowledge and Practice**

		Poor		Average		Good		Excellent	
		Know <sup>*</sup>	Pract <sup>#</sup>	Know <sup>*</sup>	Pract <sup>#</sup>	Know <sup>*</sup>	Pract <sup>#</sup>	Know <sup>*</sup>	Pract <sup>#</sup>
Age (years)	21-25	-	0	1	50	60	39	28	-
	26-30	-	0	1	11	9	13	14	-
	31-35	-	1	1	6	6	3	3	-
	>35	-	0	1	5	5	2	1	-
	p-value	Knowledge: $\chi^2 = 13.40$ ; p<0.05				Practice: $\chi^2 = 14.16$ ; p<0.03			
Qualification	GNM	-	1	3	47	48	20	17	-
	B. Sc. (N)	-	0	1	25	32	37	29	-
	p-value	Knowledge: $\chi^2 = 7.07$ ; p<0.03				Practice: $\chi^2 = 12.54$ ; p<0.002			
Work Experience (years)	0-5	-	0	2	53	69	50	32	-
	5-10	-	0	1	9	3	4	9	-
	>10	-	1	1	10	8	3	5	-
	p-value	Knowledge: $\chi^2 = 10.50$ ; p<0.03				Practice: $\chi^2 = 12.30$ ; p<0.002			
Nurse patient Ratio	1:5	-	0	3	42	46	27	20	-
	≥1:10	-	1	1	30	34	30	26	-
	p-value	Knowledge: $\chi^2 = 3.10$ ; p>0.05				Practice: $\chi^2 = 2.68$ ; p>0.05			

[\*Frequency for Knowledge, # Frequency for Practice]

It was easily seen in table 4 that age of staff nurse was significantly associated with knowledge (p<0.05) and practice (p<0.03) of universal precautions. Professional qualification of staff nurses reported essential for significant association of knowledge (p<0.03) but strongly impacted their practices (p<0.002) of universal precautions that confirmed on statistical ground. The practices of universal precautions by staff nurses reported strongly associated with work experience (p<0.002) but the knowledge was significantly (p<0.03) associated with work experience. The workload of a staff nurse was identified as a distractor because no significant association (p>0.05) was evidenced for nurse patient ratio with knowledge and practices of universal precautions among staff nurses (Table 4).

## DISCUSSION

This article offers an introduction to the understanding of Universal Precautions (UPs) since staff nurses are exposed each day to a variety of health and safety hazards. An integrated approach by undertaking the knowledge with practices of UPs in-depth would ensure the prevention from hospital associated infections to patients, health-care providers and regulatory agencies, and a more effective protection of public safety and promotion of nursing sciences.

A gape between knowledge and practices of UPs was reported as 61.5% staff nurses had good knowledge while 35.4% had excellent knowledge. Despite it, less than half (43.8%) nurses were practicing their knowledge at good level but none (0.0%) of the staff nurse showed the practice excellence which is in agreement with Buerhaus PI et al<sup>4</sup> reported that there was no significant difference between knowledge of nurses regarding standard precautions with regard to their age, professional qualification, and experience.

Center for Disease Control and Prevention recommends that everyone should use standard precautions whenever come into contact with body fluids. Internationally, standard precautions are regarded as fundamental in prevention and control of infection and effective in protecting patients and nursing professionals. The mean practices (49.6%) of UPs were significantly lower than mean knowledge (73.4%). A similar opinion reflected in the study conducted by Gamer P & Salehi AS,<sup>7</sup> stated that basic knowledge about standard precautions was found insufficient across all hospitals and cadres and seventy three percent of staff reported sharps injury in the preceding 12 months. However, Shinde MB & Mohite VR<sup>8</sup> found that the knowledge on hand hygiene was moderate (74%) among the total study population. The majority of students had poor attitudes with regard to hand hygiene. Nursing students had significantly ( $p < 0.05$ ) better attitudes (52%) compared to nursing staff (12%).

Study highlighted that staff nurses had knowledge but their practices are lowered but Gupta S et al<sup>16</sup> concluded that there exists a positive relationship between knowledge and practice. Both are directly proportional to each other. Knowledge of UPs of staff nurses were not found associated ( $p > 0.05$ ) with practices of UPs which is in agreement with Adencia C et al<sup>17</sup> observed that there was no statistical difference between knowledge and practice. In order to address the problem of health care associated infections, the cause needs to be identified. It was strongly suspected that there could be a link between a lack of knowledge of and inadequate practice of the UPs, and therefore a rise in hospital associated infections. There may be other contributing factors involved, such as a lack of proper equipment, space and supplies as well as fatigue. Recently, in a study Eskander HG et al<sup>18</sup> concluded that in spite of having satisfactory performance level regarding infection control standard precautions critical care nurses had unsatisfactory knowledge level.

Age of staff nurse was significantly associated with knowledge ( $p < 0.05$ ) and practice ( $p < 0.03$ ) of UPs. Changing current behavior requires knowledge of the factors that may influence nurse's compliance with UPs reported by Efstathiou et al<sup>19</sup> The present study correlated with the findings of Labrague et al<sup>20</sup> that vast majority (89.7%) of the student nurses have good knowledge but knowledge alone

may not be the determining factor for the compliance of the UPs practices.

The knowledge of UPs with its practices in order to maintain appropriate infection control precautions to protect against transmission of blood-borne and other occupational microbial pathogens should be a routine component of healthcare provision. Professional qualification of nurses reported essential for significant association of knowledge ( $p < 0.03$ ) but strongly impacted their practices ( $p < 0.002$ ) of UPs that confirmed on statistical ground. Nurses in practice need to be more aware of how their attitudes towards infection prevention and control can be perceived by nursing students and the possible consequences of this for student learning and practice recommended by Ward DJ<sup>21</sup> (2012). Research findings revealed that knowledge of UPs were not found associated ( $p > 0.05$ ) with practices of UPs. This is corroborated by Gruber et al<sup>22</sup> and Talan & Baraff,<sup>23</sup> supported the present results that there is no relationship between knowledge and compliance with UPs.

The practices of UPs by staff nurses reported strongly associated with work experience ( $p < 0.002$ ) but the knowledge found to be significantly ( $p < 0.03$ ) associated with work experience. The workload of a staff nurse was identified as a distractor because no significant association ( $p > 0.05$ ) was evidenced between nurse patient ratio with knowledge and practice of universal precautions among staff nurses which is in agreement with Elbouzedi H M<sup>24</sup> identified that compliance with specific aspects of standard/UPs varies, and practitioners are selective in their application of recommended practice. Nurses are professionally and ethically accountable for the care and safety of their patients and should adopt effective and frequent use of UPs. The reporting of Van der Berg L & Daniels F<sup>25</sup> highlighted that more structured educational programmes are needed to improve both knowledge and practice of the UPs. This is a fundamental aspect of healthcare system, necessary to reduce the risk and spread of infection. Despite it, during a research Rajinder K et al<sup>26</sup> observed in the practice score that 38.7% respondents reported the universal precautions to be time consuming.

Significant practices of UPs along with improved hand hygiene practices need a multifaceted approach involving both individual and facility factors. This should include improved training programmes for all associated health care providers. However, educational interventions and training should be implemented with nurses of different disciplines in order to improve their knowledge and practice proficiency highlighted by Lugg GR & Ahmed HA.<sup>27</sup>

Moreover, it is worth advisable that with improved knowledge, nurses can also improve the practice, which should be of major concern in the present day health care scenario. Adequate knowledge in practicing the universal precautions may significantly lower the incidence of hospital

associated infections amongst staff nurses and even protect all associated medical professionals with patients.

## CONCLUSION

This article is dedicated to an understanding of reducing the risk of contracting infections in clinical settings. Studies have shown that use of the universal precautions lowers the risk of infection. Staff nurses had good knowledge but practices of universal precautions were lower. A good practice of universal precaution is a powerful tool to reduce the risk of contracting infections in clinical settings.

Age, gender, course taken and clinical experience has their own effect towards knowledge and practice of universal precautions. In order to overcome this problem it is essential to plan an improved awareness programme for practicing the UPs among staff nurses. Authors do hope that this article will enable health care providers including staff nurses to enhance the practices of universal precautions by utilizing their knowledge in objective manner.

**Implication of the study:** This article provides guidelines to reducing the risk of contracting infections in clinical settings that motivates for more improved educational interventions and training programs among staff nurses. The programs should be implemented with nurses of different disciplines in order to improve their knowledge and practice proficiency. Among the different strategies, the adherence to guidelines for strictly practicing along with knowledge of universal precautions is an essential ingredient for activities aimed at preventing staff nurses being exposed to hospital associated infections.

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## CORRESPONDENCE ADDRESS

**Dr Balkishan Sharma,**

Associate Professor (Biostatistics),

Department of Community Medicine,

Sri Aurobindo Institute of Medical Science (SAIMS) and

P. G. Institute, Indore (M. P.), India; PIN-453111

E-Mail: bksnew@rediffmail.com

E-mail: bksnew@gmail.com

Phone: (+91) 9926049820; Fax: (0731) 4231010

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