

PERCEPTION AND PRACTICES OF STANDARD PRECAUTIONS AMONG HEALTH CARE PROFESSIONALS AT TERTIARY CARE HOSPITALS IN COASTAL SOUTH INDIA

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ABSTRACT

Objectives: Health care professionals are constantly exposed to blood and other body fluids in the course of their work. Standard precautions are a simple set of effective practices designed to protect health workers and patients from infections. Hence, the present study was undertaken to know the extent of occupational exposure, perception and the reasons for non-compliance towards practice of standard precautions among the health care professionals.

Methods: A cross sectional study was done among health care professionals working in four tertiary care teaching hospitals. A semi-structured questionnaire was used to collect information related to socio demographic details, history related to occupational exposure to blood/ body fluids, risk perception, perception and practice of standard precautions and the reasons for non-compliance of standard precautions. Data analysis was done by using SPSS Version 11.5 and results obtained were expressed in proportions. Chi square test was used to compare the perception, practices and reasons for non-compliance of standard precautions among doctors and nurses. *P* value <0.05 was considered as statistically significant.

Results: The perception regarding standard precautions was generally observed to be good among health care professionals in the study and the application of this knowledge however, in day to day practice was considerably lower. The most common reason for non-compliance towards practice of standard precautions among healthcare professionals was prioritizing the patient's need in emergency conditions and their busy work schedule.

Conclusion: Non-compliance to standard precautions despite of the knowledge of the possibility of acquiring hazardous infections is a serious cause of concern.

Keywords: Perception and practices; Standard precautions; Health care professionals: South India

INTRODUCTION

Health care professionals are constantly exposed to blood and other body fluids in the course of their work. Hence, they are at a higher risk of acquiring infections such as HIV, Hepatitis B, and Hepatitis C etc. Occupational exposure to blood can result from percutaneous injury (needle stick or other sharps injury), mucocutaneous injury (splash of blood or other body fluids into the eyes, nose or mouth), or contact with non-intact skin [1-4]. According to the WHO, out of 35 million health workers worldwide, about 3 million receive percutaneous exposures to blood borne pathogens each year; two million of those to HBV, 0.9 million to HCV and 170 000 to HIV. These injuries may result in 15 000 HCV, 70 000 HBV and 500 HIV infections. More than 90% of these infections occur in developing countries. Most of these infections however, can be prevented by practicing standard precautions, immunization against Hepatitis B, provision of personal protective equipment and the management of exposures [1].

Standard precautions are a simple set of effective practices designed to protect health workers and patients from infections. US Centre for Disease Control and Prevention (CDC) recommended that standard precautions should be practiced when caring for patients regardless of the diagnosis [5,6]. Standard precautions is based on the principle that all blood, body fluids, secretions, excretions except sweat, non-intact skin, and mucous membranes may contain transmissible infectious agents. Standard precautions include hand hygiene, and depending on the anticipated exposure, use of gloves, gown, mask, eye protection or face shield. It also includes equipment or items in the patient environment that are likely to have been contaminated with infectious fluid and must be handled in a manner to prevent transmission of infectious agents [5]. Despite of the existing

guidelines, the knowledge and understanding of standard precautions among health care professionals has been found to be inadequate even in the developed countries. In India, and in most of the developing world situation is still worse as occupational safety of health care workers remains neglected both by health care workers themselves and hospital management [6,7].

Though studies on occupational exposure among health care professionals have been conducted in the past, not many have assessed the perception and practices of standard precautions among health care professionals. In this background, the present study was undertaken to know the extent of occupational exposure, perception and practices of health care professionals towards standard precautions. Besides, the reasons for non-compliance towards practice of standard precautions in tertiary care teaching hospitals will be determined.

MATERIALS AND METHODS

This cross sectional study was conducted at four tertiary care teaching hospitals attached to Kasturba Medical College (KMC), Mangalore during 2011. Ethics committee approval was obtained from the Institutional Ethics Committee of KMC, Mangalore.

The sample size was calculated assuming that 50% of health care professionals had a correct knowledge regarding the use of standard precautions. Taking 15% relative precision and confidence interval of 95% the sample size was calculated to be 171. Adding 10% as non-response error, final sample size was taken as 188. Health care professionals were approached individually and explained about the objectives of the study. A written informed consent was taken from those who were willing to participate. Health care professionals

comprising of doctors and nurses were thus, enrolled in the study based on convenient sampling. The data was collected using a pre tested, semi structured questionnaire. The questionnaire consisted of information related to socio demographic details, history related to their occupational exposure to blood or body fluids, their risk perception, perception and practice of standard precautions and finally the reasons for non-compliance of standard precautions. The questionnaire was distributed to study participants included in the study. The questionnaires were assessed for completion and only the completed ones were considered for further analysis. The collected data was analyzed using SPSS (Statistical Package for Social Sciences) Version 11.5 and results obtained were expressed in proportions. Chi square test was used to compare the perception, practices and reasons for non-compliance of standard precautions among doctors and nurses. *P* value <0.05 was considered as statistically significant.

RESULTS

A total of 178 health care professionals were included in this study that comprised of 61.8% doctors (n=110) and 38.2% nurses (n=68). The majority of the health care professionals were aged below 35 years (78.6%, n=140). 57.3% of the participants (n=102) were females and 42.7% of them were males (n=76). Most of the study

participants (60.1%, n=107) had a work experience of less than 5 years, followed by those with an experience of 5 to 10 years (n=38, 21.4%) and more than 10 years (n=33, 18.5%) respectively. The majority of the health care professionals (n=131, 73.6%) reported an occupational exposure in the form of splash of patient's blood / body fluids over face followed by needle stick injury (n=112, 63.0%) and exposure to patient's blood / body fluids on mucous membrane (n=88, 49.4%). The majority of the health care professionals (n=173, 97.2%) felt standard precautions are effective way to protect health care personnel from infections.

Table 1 shows the positive perception of doctors and nurses towards standard precautions. No significant differences were observed for the responses regarding the perceptions of the doctors and the nurses towards the Standard Precautions. Overall a low perception was observed for items relating recapping of used needles (68.0%), and use of masks for all procedures where blood and body fluids may splash (77.0%). For other items in the questionnaire, overall perception ranged between 87.1% and 100%. The majority of the nurses (72.1%) believed that needles should not be recapped after use when compared to the doctors (65.4%). The majority of the participants felt that used needles and other sharp objects should be disposed off separately (97.5%).

Table 1: Positive perceptions of the doctors and the nurses towards standard precautions.

	Doctors (n=110) N (%)	Nurses (n=68) N (%)	Total (n=178) N (%)
Masks should be worn for all procedures where blood and body fluids may splash	88 (80.0)	49 (72.1)	137 (77.0)
Gloves should be used for all procedures which may involve contact with blood and body fluids	110 (100.0)	68 (100.0)	178 (100.0)
Eye protection during procedures which may involve contact with blood and body fluids	106 (96.36)	62 (91.2)	168 (94.4)
Safe to use same pair of gloves for many patients	100 (90.9)	63 (92.6)	163 (91.6)
Hands should be washed after removal of gloves	105 (95.4)	68 (100)	173 (97.2)
Hands should be washed after every procedure involving direct patient contact	106 (96.4)	65 (95.6)	171 (96.1)
Used needles should not be recapped	72 (65.4)	49 (72.1)	121 (68.0)
Used needles and other sharps should be disposed off separately	109 (99.1)	65 (95.6)	174 (97.7)
Need to follow the standard precautions only if patient has an infectious diseases	99 (90.0)	56 (82.3)	155 (87.1)
Standard precautions involve treating the blood/ body fluids of all patients as potentially infectious	107 (97.3)	62 (91.2)	169 (94.9)

Details of the practice of standard precautions among healthcare professionals are shown in Table 2. For most of the practices of standard precautions, the positive responses were high among nurses than doctors. The majority of the participants disposed the needles and sharp objects into designated containers (87.6%), used gloves while handling blood or body fluids (77.5%), washed hands after removing gloves (75.8%) and took extra care while handling sharp objects like needles (77.5%). A considerably lower proportion of the participants followed the standard practice of protecting eyes while handling blood and body fluids (31.5%), wearing of surgical

mask while handling blood and body fluids (46.6%), not recapping used needles (51.7%) and covering of broken skin before coming to work (58.4%). Statistically significant differences were observed for washing of hands after removing gloves ($\chi^2=5.36$, *P* value <0.05), not recapping used needles ($\chi^2=21.03$, *P* value <0.001), taking extra care while handling sharp objects like needles ($\chi^2=3.81$, *P* value <0.05), and covering of broken skin before coming to work ($\chi^2=5.18$, *P* value <0.05). For other items, the responses did not show any significant difference between doctors and nurses.

Table 2: Positive practice of standard precautions among health care professionals

	Doctors (n=110) N (%)	Nurses (n=68) N (%)	Total (n=178) N (%)
Protection from the blood and body fluids of all patients regardless of their diagnosis	61 (55.4)	43 (63.2)	104 (58.4)
Protecting eyes while handling blood and body fluids	34 (30.9)	22 (32.3)	56 (31.5)
Wearing surgical mask while handling blood and body fluids	52 (47.3)	31 (45.6)	83 (46.6)
Wearing of gloves while handling blood or body fluids	84 (76.4)	54 (79.4)	138 (77.5)
Washing of hands after removing gloves	77 (70.0)	58 (85.3)	135 (75.8)*
Covering of broken skin before coming to work	57 (51.8)	47 (69.1)	104 (58.4)*
Taking extra care while handling sharp objects like needles	80 (72.7)	58 (85.3)	138 (77.5)*
Not recapping used needles	42 (38.2)	50 (73.5)	92 (51.7)**
Disposal of needles and sharps into designated container	95 (86.4)	61 (89.7)	156 (87.6)

* *P* ≤ 0.05 ** *P* ≤ 0.001

The most common reason for non-compliance towards practice of standard precautions among healthcare professionals was prioritizing the patient's need in emergency conditions (44.4%). Nearly one-third (35.4%) of the participants attributed the non-compliance towards standard precautions to their busy work schedule (35.4%). A significantly larger proportion of nurses felt that practicing standard precautions might offend the patients and cited the same ($\chi^2=23.88$, *P* value <0.001) along with a busy work schedule ($\chi^2=3.66$, *P* value <0.05) as the reasons for non-compliance of standard precautions (Table 3).

Table 3: Reasons for non-compliance towards practice of standard precautions

	Doctors (n=110) N (%)	Nurses (n=68) N (%)	Total (n=178) N (%)
Too busy to follow recommended standard precautions	33 (30.0)	30 (44.1)	63 (35.4)*
Workmates don't follow the standard precautions	23 (20.9)	20 (29.4)	43 (25.1)
It might offend the patients	12 (10.9)	29 (42.6)	41 (23.0)**
In emergency situations keeping patient's need as priority	45 (40.9)	34 (50.0)	79 (44.4)
Not necessary to follow standard precautions, as patients in this hospital are not infected with blood borne viruses such as HIV/HBV	06 (05.4)	04 (05.9)	10 (05.6)

* $P \leq 0.05$ ** $P \leq 0.001$

DISCUSSION

Health care professionals are under a continuous threat for acquiring needle stick injuries and blood borne pathogens as a result of occupational hazard in health care settings. Standard precautions are designed to protect patients and health care professionals from wide range of pathogens. The majority of the health care professionals reported an occupational exposure in the form of splash of patient's blood / body fluids over face followed by needle stick injury, and exposure to patient's blood / body fluids on mucous membrane. Health care professionals in the previous studies from India and abroad had experienced needle stick injuries, and splashes during the course of their work [8-12]. Adhering to the principles of standard precautions by the health care professionals is considered as an effective way to protect health workers and patients from infection with a range of pathogens including blood borne viruses. The present study makes a similar observation where the majority of the health care professionals felt that standard precautions are effective way to protect health care personnel from infections. Our study findings on perceptions regarding use of mask, gloves, eye protection, and disposal of used needles and other sharps into designated container has been corroborated by a study done in a tertiary care hospital at Delhi [7]. As per a study conducted in two tertiary care hospitals at Iran [13], 92.6% and 94.3% of health care workers were of the opinion that standard precautions should be applied to all persons regardless of their infection status which is similar to the findings of our study. Doctors had a better perception than nurses in treating the blood/body fluids of all patients as potentially infectious. Similar observations are made in a study from Delhi [7].

In our study, more than 3/4th of the health care professionals followed the practice of wearing gloves while handling blood or body fluids, and washing the hands after removal of gloves which was higher to that observed in a study from Iran [14]. Our study finding related to compliance with hand washing practices and covering of broken skin before coming to work were similar to that observed in a study from Delhi, India [7]. Practice of covering the broken skin in our study was however significantly lower to that reported in a study from Iran [14] whereof 85.5% of the health care professional had covered the broken skin before providing care to the patients. In a study done at Iran [13], more than 90% of the health care workers disposed used needles into designated container, which was higher to that reported in our study. Nurses were observed to be more compliant than doctors in disposing of needles and sharp objects into designated container in our study which was contrary to the study observations at Delhi [7]. Regarding practice of standard precautions, a significantly larger proportion of nurses showed a positive practice of not resorting to recapping of used needles than doctors which was similar to another study done at Nigeria [15]. However, contrary observations were made in a study done at Delhi [7]. When compared to our study, the practice of recapping used needles was more commonly reported in a study from rural North India [16]. Our observations with regard to the use of protective gears are similar to that reported in a study from rural India [16]. A study from the USA, on compliance with universal precautions among health care workers showed a considerably higher percentage of professionals resorting to use of protective gears and disposal of sharps when compared to our study from a developing region [17]. Similarly, a larger proportion of health care

professionals are reported to use eye protection in a study from New Zealand [10].

In our study most common reason cited for non-compliance towards the practice of standard precautions was giving priority to the patient's needs in emergency conditions. The perceived barrier to follow standard precautions during emergency in our study was lower than that reported in Delhi [7]. In a focus group discussion on factors influencing nurse's compliance with standard precautions in order to avoid occupational exposure to microorganisms, many participants described an emergency situation acts as a major obstacle in following standard precautions [18]. Other reasons for non-compliance of the participants included their busy schedule, following the non-compliant workmates, and that following the standard precautions might offend the patients. Similar observations are made in the study done at Delhi [7]. A heavy workload in hospitals and a lack of time to put on protective gears is cited as a reason for non-compliance in a study from China [19]. Few participants believed that it is not necessary to follow standard precautions, as the patients attending the hospitals included in the study are not infected with blood borne viruses such as HIV/HBV.

CONCLUSION

Even though the perception regarding standard precautions was generally good among health care professionals, the application of this knowledge in day to day practice was considerably lower. The main problem for non-compliance towards standard precautions faced by the health care professionals in the developing world is mostly related to their busy work schedule. Non-compliance to standard precautions despite of the knowledge of the possibility of acquiring hazardous infections is a serious cause of concern. Every attempt should be made at all the levels of patient care to ensure an enhanced compliance of health care professionals towards the practice of standard precautions, thus reducing the risk of occupational exposure among them. Hospital management in this regard, has a larger role to play in devising stringent and well-defined work place policies.

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REFERENCES

- World Health Organization. Health care worker safety. Available at: http://www.who.int/injection_safety/toolbox/en/AM_HCW_Safety_EN.pdf. (Accessed 14 January 2014).
- Beltrami EM, Williams IT, Shapiro CN, Chamberland ME. Risk and management of blood-borne infections in health care workers. *Clin Microbiol Rev* 2000;13(3):385-407.
- Gerberding JL. Incidence and prevalence of human immunodeficiency virus, hepatitis B virus, hepatitis C virus, and cytomegalo virus among health care personnel at risk for blood exposure: final report from a longitudinal study. *J Infect Dis* 1994;170(6):1410-7.

4. Ruben FL, Norden CW, Rockwell K, Hruska E. Epidemiology of accidental needle-puncture wounds in hospital workers. *Am J Med Sci* 1983;286(1):26-30.
5. Siegel JD, Rhinehart E, Jackson M, Chiarello L and the Healthcare Infection Control Practices Advisory Committee. Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings. 2007. Available at: <http://www.cdc.gov/ncidod/dhqp/pdf/isolation2007.pdf> (Accessed 10 January 2014).
6. Vaz K, McGrowder D, Alexander-Lindo R, Gordon L, Brown P, Irving R. Knowledge, awareness and compliance with universal precautions among health care workers at the University Hospital of the West Indies, Jamaica. *Int J Occup Environ Med* 2010;1(4):171-81.
7. Kotwal A, Taneja D. Health Care Workers and Universal Precautions: Perceptions and Determinants of Non-compliance. *Indian J Community Med* 2010;35(4):526-8.
8. Sari SYI, Ibrahim K, Haroen H, Afriandi I, Sunjaya DK, Hinduan ZR et al. Knowledge, attitude and perceived adherence with universal precautions among health care workers in the obstetrics and gynaecology department of an Indonesian teaching hospital. *Int J Infect Control* 2011;7(4). Available at: <http://www.ijic.info/article/view/5465/6621> (Accessed 23 January 2014).
9. Ferguson KJ, Waitzkin H, Beekmann SE, Doebbeling BN. Critical Incidents of Nonadherence with Standard Precautions Guidelines Among Community Hospital-based Health Care Workers. *JGIM* 2004;19:726-31.
10. Maharaj D, Lawton B, Garrett S. Poor compliance with Standard Precautions against infections during minor gynaecological procedures. *Australian and New Zealand Journal of Obstetrics and Gynaecology* 2012;52: 262-65.
11. Salelkar S, Motghare DD, Kulkarni MS, Vas FS. Study of needle stick injuries among health care workers at a tertiary care hospital. *Indian J Public Health* 2010;54(1):18-20.
12. Reda AA, Fisseha S, Mengistie B, Vandeweerd JM. Standard Precautions: Occupational Exposure and Behavior of Health Care Workers in Ethiopia. *PLoS ONE* 2010;5(12): e14420.
13. 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(5):653-61.
14. Vaziri S, Najafi F, Miri F, Jalalvandi F, Almasi A. Practice of standard precautions among health care workers in a large teaching hospital. *Indian J Med Sci* 2008;62(7):292-4.
15. Sadoh WE, Fawole AO, Sadoh AE, Oladimeji AO, Sotiloye OS. Practice of Universal Precautions among Healthcare Workers. *J Nati Med Assoc* 2006;98(5):722-26.
16. Kermode M, Jolley D, Langkham 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(1):27-33.
17. Gershon RR, Vlahov D, Felknor SA, Vesley D, Johnson PC, Delcols GL. Compliance with universal precautions among health care workers at three regional hospitals. *Am J Infect Control* 1995;23(4):225-36.
18. Efstathiou G, Papastavrou E, Raftopoulos V, Merkouris A. Factors influencing nurse's compliance with Standard Precautions in order to avoid occupational exposure to microorganisms: A focus group study. *BMC Nurs* 2011 21;10:1.
19. Wu S, Li L, Wu Z, Cao H, Lin C, Yan Z. Universal precautions in the era of HIV/AIDS: perception of health service providers in Yunnan, China. *AIDS Behav* 2008;12(5):806-14.