Compliance with universal precautions among health care workers at Base Hospital, Negombo.

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Abstract

Objectives: To assess self-reported compliance with universal precautions and its determinants, and to describe the occupational exposures to blood and body fluids among health care workers at Base Hospital Negombo.

Methodology: A cross sectional study was conducted among 215 health care workers using a self-administered questionnaire.

Results: Nurses frequently reported high levels of compliance with disposal of needles into sharp bins (88.9%) and hand washing following contamination (73.8%). Medical Officers reported lower compliance rates than nurses. Compliance rates for wearing personal protective equipment were lower among all categories of respondents who were expected to wear them. A higher proportion of respondents recapped and unscrewed used needles.

The factors significantly associated with poor compliance were younger age, lack of relevant training, poor knowledge and poor access to personal protective equipment. Approximately 50% of all respondents had at least one needle-stick injury during the previous six months. Occupational exposure to blood and body fluids was inversely related to the compliance with universal precautions.

Conclusions: This study identified certain modifiable determinants of poor compliance. Therefore, intervention programmes addressing those determinants will probably succeed in facilitating compliance with universal precautions among health care workers.

Key words : universal precautions , occupational exposure, blood and body fluids

Introduction

The strategy of "universal blood and body fluids precautions" was introduced by the Centers for Disease Control and Prevention (CDC), Atlanta in 1985 to address concerns regarding transmission of human immunodeficiency virus (HIV) and other blood-borne pathogens in the health care setting. The concept, now referred to simply as "universal precautions" stresses that all patients should be assumed to be infectious for HIV and other blood-borne pathogens (1).

To bring the concept of universal precautions (UPs) into practice, guidelines were introduced by the CDC, and World Health Organization (WHO) on several occasions (1, 2, 3, 4, 5). According to them, the main principles of UPs were: prevention of accidents through safe handling and disposal of sharps: use of personal protective equipment (PPE); and proper practice of disinfection and sterilization techniques (5).

Several studies have shown that there had been a significant reduction in occupational exposure to blood-borne pathogens with the introduction of UPs (6, 7). However, the majority of the studies at different health care settings, globally, have found that compliance was still poor due to many reasons (7, 8, 9). A few studies related to UPs have been conducted in Sri Lanka but the identification of the determinants of compliance was poorly dealt with (10, 11, 12).

Therefore, this study was carried-out with the following objectives: (i) to assess the self-reported compliance with universal precautions among health care workers (HCWs); (ii) to identify the factors associated with poor compliance; (iii) to describe the occupational exposures to blood and body fluids among participants, (iv) to determine the relationship between compliance and occupational exposures.

Methodology

A cross sectional study was carried out at Base Hospital Negombo in the year 2000. The study population of 239 HCWs comprised Medical Officers (MOs), Nurses, Midwives and Medical Laboratory Technologists (MLTs).

A pre-tested self-administered questionnaire was used as the study instrument. The dependent variable, compliance with UPs was derived from 12 single compliance behaviour items. These items were adapted from previously designed and validated study instruments used in USA (7, 8). The items were modified to suit the Sri Lankan setting. The response for each item was measured using a 5-point Likert scale, i.e. never,

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rarely, sometimes, often, always and scored accordingly.

Table 1. Demographic and work-related characteristics

Variable	n	%
Gender		
Female	156	72.6
Male	59	27.4
Occupation		
Nursing Officer	126	58.6
Medical Officer	67	31.2
Midwife	14	6.5
MLT	8	3.7
Training on universal precautions		
received	139	64.7
not received	76	35.3
Hepatitis B vaccine (at least one dose)		
received	145	67.4
not received	70	32.6

Variable	Mean	SD
Age (in years)	36.9	7.4
Duration of employment (in years)	11.2	9.0

Independent variables comprised socio-demographic characteristics, work-related factors, awareness about UPs and availability of PPE. Information about percutaneous (needlestick and cut injuries) and mucocutaneous (splashes to eyes or mouth and contact with open wounds) exposure was also obtained.

Intense efforts to improve the response rate resulted in 215 respondents of the 239 eligible participants (response rate was 90%). Data were analysed using EPIINFO 6.0 software.

Results

Demographic and work-related characteristics

A summary of the demographic and work-related characteristics is presented in Table 1. The majority of the respondents (72.6%; n =156) were female and were employed either as nurses (58.6% ; n=126) or medical officers (31.2% ; n=67). The average age and duration of employment of a responding HCW were 36.9 years and 11.2 years respectively. Approximately 35% (n = 76) of the total respondents had not received any training on precautions to prevent exposure to blood and body fluids. Of the total respondents, 67.4% (n = 145) had received at least one dose of the hepatitis B vaccine. Only one third of them (n = 47) had completed all three doses.

Knowledge about universal precautions

Almost all respondents knew the concept of UPs. The risk of transmission of HIV and HBV was known to everyone but only 35% knew the risk of HCV transmission in the health care setting.

Compliance with universal precautions

The compliance rate for a behaviour item was defined as the proportion of respondents who strictly comply with it. Self-reported compliance rates with each of the 12 behaviour items among MOs and nurses are presented in Table 2. Nurses frequently reported high levels of compliance with the following items: disposal of needles into sharp bins (88.9%), hand washing immediately after a contamination (73.8%), and taking precautions to prevent injuries when using sharp objects (68.3%). Medical Officers reported lower compliance rates than nurses. Compliance rates for wearing PPE were lower among all categories of HCWs. Recapping and unscrewing of needles used for blood drawing were also reported by many HCWs.

Associations with compliance

Each compliance behaviour item was given a score according to the response. Scores obtained in each item were added to arrive at the overall compliance score. The overall compliance scores were analysed against the independent variables for nurses and medical officers separately. Among the demographic characteristics, only age was significantly associated with compliance. Nurses aged ≥38.7 years (mean age for nurses) were more likely to comply than those aged less than 38.7 years ($P<0.05$).

Nurses who were trained on UPs complied better than those who had not received any training ($P<0.01$) But, the compliance among medical officers was not significantly associated with the status of training. Those medical officers who had received at least one dose of the hepatitis B vaccine reported a significantly lower compliance than those who did not receive it (P

<0.05) Compliance was highly associated with the availability of gloves, masks, aprons etc. The knowledge about UPs was positively correlated with compliance among nurses (r^2=0.1089, P<0.01). No such linear relationship was found among MOs. Those factors associated with compliance are presented in Table 3.

i.e., a pair of goggles, which was not available in this setting.

A higher proportion of HCWs in every unit had ready access to sharp bins. Nurses were twice as likely to dispose needles into sharp bins than doctors. This might be related to the usual practice of doctors leaving the sharps for others

Table 2. Compliance rates among nurses and doctors.

Compliance behaviour item	Compliance Rate (%) Nurses (n=126)	Doctors (n=67)
1. Discard disposable needles into a sharps disposal container after use	88.9	46.3
2. Wash your hands immediately after getting contaminated	73.8	62.7
3. Wear a protective outer garment whenever there is a chance of soiling your cloths with patients' blood and body fluids	6.3	4.5
4. Wear gloves whenever there is a possibility of exposure to blood and body fluids	32.5	16.4
5. Wear an eye protective device whenever there is a possibility of splashes of such fluids to your eyes	0	0
6. Wear a face mask whenever there is a possibility of splashes of such fluids to your mouth	27.8	7.5
7. Dispose all potentially contaminated waste into a waste disposal polythene bag	25.4	9.0
8. Promptly wipe up all spills of blood and body fluids with a disinfectant	50.0	13.4
9. Do not recap needles that have been contaminated with blood	53.2	31.3
10. Take special cautions to prevent injuries when using sharp objects	68.3	37.3
11. Do not unscrew needles from the syringes that have been used to draw patients' blood	59.5	32.8
12. Wear gloves while drawing a patient's blood	15.1	7.5

Occupational Exposures

Approximately 50% (n = 108) of all respondents had experienced at least one needle-stick injury during the previous six months. The corresponding percentages for cut injuries, splashes to eyes or mouth, and open wound contacts were 11.2% (n = 24), 16.7% (n=36), and 19.5% (n = 42) respectively. The occurrence of needle-stick injuries during the previous six months among nurses was inversely related to compliance (P<0.05). No such relationship was found among medical officers.

Discussion

In general, compliance with the use of PPE, when indicated, was found to be very poor among all categories. The possible reasons for this include poor availability of PPE when needed, negligence and urgency of care. None of the respondents used an eye protective device, to dispose. The same explanation can be given for the discrepancies in disposal of waste and wiping of spills of blood and body fluids between the two groups. The delay in disposal and cleaning may enhance the risk of exposure to HCWs.

HCWs had a high rate of recapping contaminated needles possibly due to the fact that needle recapping were encouraged before the guidelines of CDC (1, 2, 3, 4). The rates of unscrewing of contaminated needles from the needle hub showed a similar pattern, but at a slightly lower level. To prevent needle-stick injuries, needles should not be recapped, unscrewed from the syringe or otherwise manipulated by hand. In situations where recapping is unavoidable the single-handed method should be utilized (5).

The proportion of nurses who had at least one needle-stick injury during the previous six months was 50% in the present study setting.

Table 3. Factors associated with poor compliance with universal precautions among nurses and /or doctors

Correlate	Level of significance (P value)	
	Nurses (n=126)	Doctors (n=67)
Lower age [a]	P<0.05	P>0.05
Not received any training [a]	P<0.01	P>0.05
Having received hepatitis B vaccine [a]	P>0.05	P<0.05
Lack of access to gloves [a]	P<0.01	P<0.05
Lack of access to masks [a]	P<0.01	P<0.01
Lack of access to aprons [a]	P<0.05	P>0.05
Poor knowledge regarding UPs [b]	P<0.01	P>0.05

Note: test of significance applied
a : t test

b : Simple linear regression

The corresponding proportion for nurses working in hospitals in Gampaha district in 1996 was 72% (10). In a study in correctional health settings in USA, it was 13% (7). This indicates that compliance among nurses in the present study setting is better than that for the whole district and worse than correctional health care settings in USA.

The risk for occupationally acquired infection depends on three factors; the prevalence of infection in the population concerned, the frequency of occupational exposures and the probability of developing the disease once exposed (8). To date the frequency of occupational exposure is the only parameter that HCWs can consistently influence.

There were a number of limitations to this study. As the results of this study were based on a sample of HCWs at Base Hospital, Negombo, the findings may not be generalizable to all hospital-based HCWs. The results may have been affected by recall bias especially as inquiry was made about occupational exposures during the previous six months. Respondents may have exaggerated their compliance behaviours as self-reports may overstate the desirable responses. The known and unknown confounding variables might have influenced the findings requiring a multivariate analysis.

Recommendations

The following recommendations will probably be useful in planning and implementing infection control programmes to enhance the compliance with UPs in similar settings.

Any health care worker who is expected to perform tasks involving contact with blood and body fluids (to which UPs apply) or handling sharps, should be given the complete course of hepatitis B immunization (13). Immunization should be completed at training institutions before trainees have contact with blood and body fluids. HCWs should be properly motivated for getting subsequent doses of the vaccine and practising UPs despite immunization.

Education and training about UPs should be further strengthened to develop necessary skills among trainees during the basic training of HCWs. Continuing education appears to be an important factor in the effort to improve compliance with UPs. Therefore, more in-service training programmes related to UPs should be carried out at health institutions. Knowledge regarding the possibility of HCV transmission and the risk of recapping needles should be emphasized during the education of HCWs.

Adequate and regular supplies of gloves, masks, and protective outer garments should be provided to all health care settings based on the requirements. HCWs should have easy access to them when necessary. Eye protective devices (i.e. goggles) should be provided to settings where splashes to eyes are common, such as operating theatres, obstetric units and emergency departments. Biohazard bags should be readily available for disposal of biomedical waste.

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