ORIGINAL ARTICLES

The Compliance of Healthcare Workers with Universal Precautions in the Emergency Room at the University Hospital of the West Indies

K Watson[1], J Williams-Johnson[1], H Watson[2], C Walters[3], EW Williams[1], D Eldemire-Shearer[4]

ABSTRACT

Objectives: *The study assessed compliance among health workers in the Emergency Room at the University Hospital of the West Indies with universal precautions. This was done by determining the knowledge, practices and perceptions of staff of universal precautions and by assessing compliance. Reported adherence with universal precautions was compared with observed practice.*

Methods: *This was a cross-sectional study conducted over a one-year period. It was approved by the University Hospital of the West Indies/University of the West Indies/Faculty of Medical Sciences Ethics Committee. Data were analysed using Stata version 11.1.*

Results: *During the study period, 67 persons gave consent for the study; data were obtained for 62 of these participants and 52 of the respondents were observed. All of the participants were aware that universal precautions related to blood. Eighty-six per cent erroneously thought that universal precautions applied to urine. Seventy-nine per cent of the participants reported always washing their hands after performing a procedure and 43.5% reported always washing their hands before a procedure. Just over half of the participants reported always wearing gloves while doing procedures (56.5%). Only 9% reported always using a gown with a trauma patient. However, 31% and 43.3% reported wearing a gown when placing a chest tube and when anticipating splashes, respectively. Of those participants who reported washing their hands often after a procedure, over 30% did not perform hand-washing when observed. Fifty per cent of persons that reported never recapping needles were observed to recap needles by hand.*

Conclusion: *The study revealed that compliance among staff in the Emergency Room with universal precautions was unsatisfactory. The need for education in this area was recognized.*

Keywords: Compliance, emergency room, universal precautions

El Cumplimiento de las Medidas de Precaución Universales por los Profesionales Sanitarios en la Sala de Emergencias del Hospital Universitario de West Indies

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RESUMEN

Objetivos: *El estudio evaluó el cumplimiento de las medidas de precaución universales entre los trabajadores de la salud en la sala de urgencias del Hospital Universitario de West Indies. Esto se realizó mediante la determinación de los conocimientos, prácticas y percepciones del personal con respecto a las precauciones, y mediante la evaluación del cumplimiento de normas. El cumplimiento de las normas universales de precaución se comparó con la práctica observada.*

Métodos: *Se trató de un estudio transversal llevado a cabo durante un período de un año. Fue aprobado por el Hospital de la Universidad de West Indies, la Universidad de West Indies, y el Comité*

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de Ética de la Facultad de Ciencias Médicas. Los datos se analizaron utilizando el programa estadístico Stata versión 11.1.

Resultados: *Durante el período de estudio, 67 personas dieron consentimiento para el estudio; se obtuvieron datos de 62 de estos participantes, y 52 de los encuestados fueron observados. Todos los participantes conocían que las precauciones universales guardaban relación con la sangre. El 86 por ciento pensaba erróneamente que las precauciones universales se aplicaban a la orina. Setenta y nueve por ciento de los participantes reportaron que siempre se lavaban las manos después de realizar un procedimiento, y un 43.5% reportó que siempre se lavaba las manos antes de un procedimiento. Un poco más de la mitad de los participantes reportó que siempre usaban guantes mientras hacían los procedimientos (56.5%). Sólo el 9% reportó usar siempre batas en pacientes con traumas. Sin embargo, el 31% y el 43.3% reportó usar batas a la hora de insertar un tubo torácico o cuando anticipaban salpicaduras, respectivamente. De aquellos participantes que reportaron lavarse las manos a menudo después de un procedimiento, más del 30% no realizó el lavado de manos al ser observados. Al cincuenta por ciento de las personas que reportaron que nunca recapuchaban las agujas, se les observó tapar las agujas a mano.*

Conclusión: *El estudio reveló que el cumplimiento del personal de la sala de emergencias con las precauciones universales, no era satisfactorio. Se reconoció la necesidad de educación en esta área.*

Palabras claves: Cumplimiento, sala de emergencias, precauciones universales

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INTRODUCTION

In order to reduce the risk of exposure to blood-borne pathogens, the Centers for Disease Control and Prevention (CDC) recommends compliance with universal precautions among all healthcare workers (1). According to a World Health Organization estimate in 2002, sharp injuries resulted in 16 000 hepatitis C virus, 66 000 hepatitis B virus and 1000 human immunodeficiency virus (HIV) infections in healthcare workers worldwide (2). Due to the nature of both traumatic injuries and the urgent, invasive procedures that unstable patients often require, emergency room healthcare providers may be at greater risks of exposure. Emergency room healthcare workers can be protected against the transmission of blood-borne pathogens through the use of gowns, gloves, eyewear and other personal protective equipment (PPE) that provide barriers against percutaneous and mucocutaneous contact with blood or body fluids.

The CDC released guidelines for universal precautions in 1987 which were updated in 1996 (1). The CDC recommended the use of gloves during patient contact that requires handling of blood, body fluids, mucous membranes, and non-intact skin, and the additional use of surgical masks, protective eyewear and impermeable gowns for situations where contact with blood or body fluids might occur through droplets, aerosols, or splashes (1).

In the healthcare setting, the three primary modes of transmission of pathogens are contact (direct or indirect), droplet and airborne transmission (3). Direct transmission of infected blood or blood-containing body fluid can occur through contact with mucous membranes (4) or non-intact skin (5). Another example of direct transmission of a pathogen is the development of herpetic whitlow in a healthcare provider who handles mucous membranes infected with herpes simplex virus without glove use (6). During indirect transmission, an intermediate object or person is involved in the transmission of a pathogen. The contaminated hands of healthcare providers are significant contributors in indirect transmission of pathogens (7). In droplet transmission, infected respiratory droplets are transmitted to the mucosal surface of the healthcare provider over short distances such as when the infected person coughs, sneezes or talks (3). On the other hand, airborne transmission results from dissemination of infectious material that remains infectious over time and long distances (3).

Studies have shown that poor compliance with the use of barrier precautions in emergency and trauma settings remain widespread (8, 9). This trend persists despite the knowledge that adherence with universal precautions decreases the rate of infection transmission (3). Surveys that have been done reveal that self-reported adherence was higher than adherence reported in observational studies (3). Additionally, increasing years of experience negatively affected compliance among physicians and nurses (3). Educational interventions incorporating videotaping and performance feedback improved adherence in the short term, however, long term effects were not elucidated (3). Voice prompts to remind healthcare workers to perform hand hygiene was found to improve adherence in one study (3).

In a survey done on hepatitis B among health workers in Jamaica by Figueroa *et al* in 1994, it was found that one or more needle stick accidents were reported by 60% of the 1537 health staff presenting for hepatitis B vaccine. Blood or amniotic fluid splashing on the face during birth canal delivery was reported by 48% (10). This reaffirms the importance of adhering to universal precautions in patient care. A second study was done by Smith on the "knowledge, attitudes and practices of nursing personnel with regards to caring for HIV/AIDS patients at selected hospitals in

Kingston and St Andrew, Jamaica" in 1996. It was found that 70% of the individuals had knowledge of universal precautions but did not practise them on a continuous basis (11). A more recent study done in 2010 by Foster *et al* at two Jamaican hospitals examined the knowledge, compliance and practice of occupation infection control among healthcare workers (12). The conclusion was that even though healthcare workers were aware of the risk of transmitting infection, there was inadequate compliance to universal precautions (12). In that study, it was recommended that comprehensive educational programmes be instituted to improve knowledge and therefore compliance rates to universal precautions among healthcare workers (12).

In light of the abovementioned decline in compliance with universal precautions among medical personnel, this study seeks to assess the compliance rates among healthcare workers at the Emergency Medicine Division at the University Hospital of the West Indies (UHWI), Kingston, Jamaica, with universal precautions set out by the CDC guidelines. Other objectives included the determination of knowledge, practices and perceptions of staff members of universal precautions in the emergency room at the UHWI. An assessment of the compliance with universal precautions among staff members and the reported adherence with universal precautions compared with observed practices was also done.

SUBJECT AND METHODS

This was a descriptive cross-sectional study of the compliance of all physicians, nurses and emergency room technicians (ERTs) at the Emergency Medicine Division at UHWI with universal precautions. The study was approved by the Ethics committee of the University Hospital of the West Indies/University of the West Indies/Faculty of Medical Sciences. It was conducted over a one-year period at the Emergency Medicine Division of the UHWI which operates on a 24-hour basis and has three subdivisions: levels one and two or the main emergency room, level three or intermediate and levels four and five or casualty area. Patients are triaged to the various subdivisions based on their emergency severity index (ESI). The physicians, nurses and ERTs operate on a shift system in their delivery of care to the public. All physicians, nurses and ERTs who gave consent and who were assigned to work in the Emergency Department over the one-year period (July 2010 to June 2011) were included. Excluded from the study were the persons who did not consent to be a part of the study.

In this study, participants (physicians, nurses and ERTs) were administered consent forms initially. Those who gave consent were each observed at a time unknown to them. They were blinded to the observers. Each subject was observed twice to ensure consistency. Each day that the study was conducted, a list of available PPE was generated. Each study participant was assigned an identification number. Trained observers were given checklists on which they indicated which PPE was used by each participant. No names were attached to any of the checklists in order to maintain confidentiality. Instead, identification numbers were used. The observation was conducted in the entire Emergency Department. Questionnaires were also administered to the study participants. Only those who gave consent initially were included to receive questionnaires. Data were analysed using Stata version 11.1. A knowledge "index" to summarize the total number of body fluids correctly identified for which universal precautions applied (positive knowledge "index" or PKI) and did not apply (negative knowledge "index" or NKI) was calculated. A total knowledge "index" (TKI) was calculated as the sum of these two indices. A one-way analysis of variance (ANOVA) or its non-parametric equivalent, Kruskal-Wallis, was used to compare the average values of these separate (positive and negative) as well as combined indices across the three categories of respondents (physicians, nurses and ERTs).

RESULTS

During the study period (July 2010 to June 2011), the number of physicians, nurses and ERTs assigned to the Emergency Department ranged from 70 to 85. Sixty-seven persons gave consent for the study, however, data were obtained for 62 of these participants and 52 of the respondents were observed. The participants included 26 nurses, 26 physicians and 10 ERTs. There were 48 females and 14 males. The ages ranged from 24 to 48 years with a median age of 28 years.

All of the participants were aware that universal precautions were to be applied to blood, but there was some degree of uncertainty with the other body fluids. Eighty-six per cent erroneously thought that universal precautions applied to urine, and 85.3% to faeces. Most of the participants were aware that universal precautions did not apply to sweat (63.9%) and tears (68.9%). A summary of the responses is given in Table 1.

Table 1: Knowledge of study participants of the body fluids to which universal precautions apply

	Yes (%)	No (%)
Blood	61 (100.0)	–
Semen	53 (86.9)	8 (13.1)
Vaginal secretions	55 (90.2)	6 (9.8)
Cerebrospinal fluid	51 (83.6)	10 (16.4)
Synovial fluid	45 (73.8)	16 (26.2)
Pleural fluid	49 (80.3)	12 (19.7)
Peritoneal fluid	51 (83.6)	10 (16.4)
Pericardial fluid	47 (77.1)	14 (22.9)
Amniotic fluid	52 (85.3)	9 (14.7)
Faeces	52 (85.3)	9 (14.7)
Nasal secretions	38 (62.3)	23 (37.7)
Sputum	51 (83.6)	10 (16.4)
Sweat	22 (36.1)	39 (63.9)
Tears	19 (31.1)	42 (68.9)
Urine	53 (86.9)	8 (13.1)
Vomitus	50 (82.0)	11 (18.0)
Saliva	44 (72.1)	17 (27.9)

Within the work environment, gloves were the most commonly available PPE; 79% of the study participants reported that gloves were always available. Sixty-four per cent reported that sharp containers were always available. Only 24% reported that gowns were always available and 62% reported that eye shields were never available. Of the participants, 34% reported that masks were always available.

Hand-washing was more often performed after a procedure compared with before. Seventy-nine per cent of the participants reported always washing their hands after performing a procedure whereas 43.5% reported always washing their hands before a procedure. Of note, up to 21% of participants denied always washing their hands after a procedure, however, they admitted to hand-washing "often". Just over half of the participants reported always wearing gloves while doing procedures (56.5%). Only 9% reported always using a gown with a trauma patient. However, 31% and 43.3% reported wearing a gown when placing a chest tube and when anticipating splashes, respectively. The majority of participants reported never wearing eye shields (66.7%). Forty-eight per cent (48.3%) reported occasionally recapping needles by hand. Ninety-eight per cent of participants thought it was always risky to take blood without gloves and 67% thought it was always risky to handle mucous membranes without gloves. Just over half of the participants (59.3%) reported that wearing PPE never interfered with patient management. These results are summarized in Table 2.

Figures 1–3 show the distributions of the positive knowledge, negative knowledge and total knowledge indices.

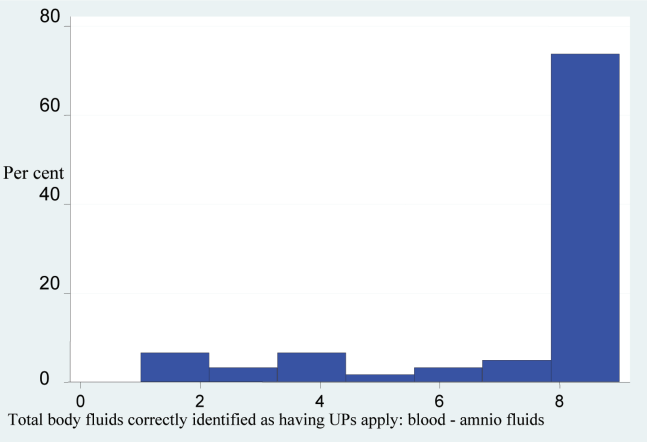

Fig. 1: Distribution of positive knowledge index among participants. UPs – universal precautions

The PKI ranged from one to nine with a significantly negatively skewed distribution ($p < 0.001$). Median (interquartile range or IQR) for this index was 9 [7–9]. Using the Kruskal-Wallis test, no significant difference was found

Table 2: Work environment, reported practices and perceptions of participants

	Total respondents (number not applicable)	Always (%)	Often (%)	Occasionally (%)	Never (%)
Work environment					
Sharp containers	62 (---)	40 (64.5)	19 (30.7)	3 (4.8)	---
Gloves	62 (---)	49 (79.0)	13 (21.0)	---	---
Gowns	62 (---)	15 (24.2)	19 (30.7)	25 (40.3)	3 (4.8)
Eye shields	60 (2)	1 (1.7)	2 (3.5)	19 (32.8)	36 (62.1)
Masks	61 (1)	21 (34.4)	19 (31.2)	20 (32.8)	1 (1.6)
Work practices					
Wash hands before	62 (---)	27 (43.5)	28 (45.2)	7 (11.3)	---
Wash hands after	62 (---)	49 (79.0)	13 (21.0)	---	---
Wear gloves when taking blood	62 (---)	35 (56.5)	22 (35.5)	5 (8.1)	---
Wear gown when placing chest tube	62 (33)	9 (31.0)	10 (34.5)	6 (20.7)	4 (13.8)
Wear eye protection when placing chest tube	62 (35)	---	4 (14.8)	5 (18.5)	18 (66.7)
Recap needles by hand	61 (1)	1 (1.7)	11 (18.3)	29 (48.3)	19 (31.7)
Wear gown with trauma patient	62 (1)	6 (9.8)	11 (18.0)	31 (50.8)	13 (21.3)
Wear eye protection with trauma patient	62 (1)	2 (3.3)	1 (1.6)	9 (14.7)	49 (80.3)
Experience splash while not wearing gown	62 (1)	---	8 (13.1)	45 (73.8)	8 (13.1)
Wear gown when splash anticipated	61 (1)	26 (43.3)	18 (30.0)	13 (21.7)	3 (5.0)
Wear eye protection when splash anticipated	59 (5)	12 (22.2)	7 (13.0)	10 (18.5)	25 (46.3)
Perceptions					
Interferes with time to attend to emergency	61 (1)	3 (5.0)	12 (20.0)	26 (43.3)	19 (31.7)
Interferes with management of patients	61 (2)	2 (3.4)	4 (6.8)	18 (30.5)	35 (59.3)
When is it risky to take blood without gloves?	62 (---)	61 (98.4)	1 (1.6)	---	---
When is it risky to handle mucous membranes without gloves?	61 (---)	41 (67.2)	11 (18.0)	5 (8.2)	4 (6.6)

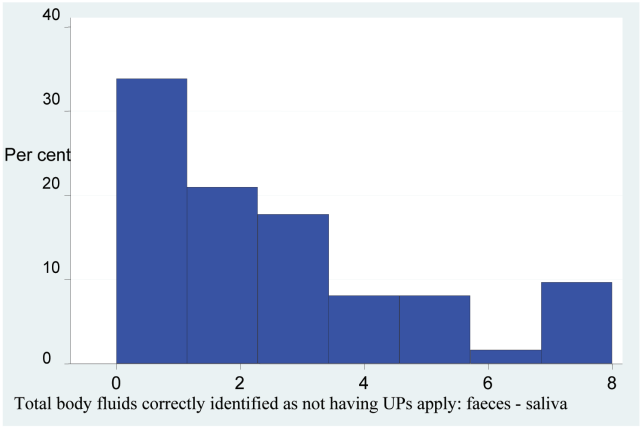

Fig. 2: Distribution of negative knowledge index among participants. UPs – universal precautions

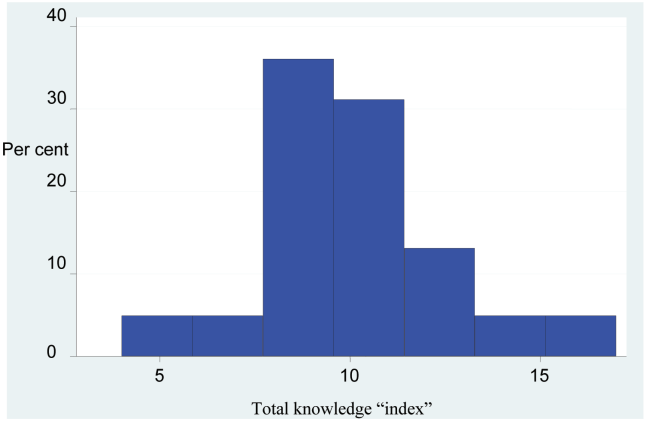

Fig. 3: Distribution of total knowledge index among participants.

across the three respondent categories. On the other hand, the distribution of NKI was significantly negatively skewed (p = 0.012), ranging from 0 to 8 and with median (IQR) of 2 [0–4]. As for the PKI, the Kruswal-Wallis test also yielded no significant difference across occupational categories (p = 0.343). The TKI was normally distributed, ranging from four to 17 with median (IQR) of 10 [9–11]. The ANOVA revealed a significant difference across occupation categories (p = 0.009). Tukey honestly significant difference pair-wise post-estimation comparisons showed that the difference was between the ERTs and physicians.

Among the 52 participants that were observed, there were 40 females and 12 males. The participants were observed in three subdivisions in the Emergency Medicine Division. Location was obtained for 51 of these participants (Fig. 4).

Attempts were made to observe each participant twice. During the study, the participants were observed for use of personal protective gears such as gowns, goggles, masks and gloves where each applied. Furthermore, they were also

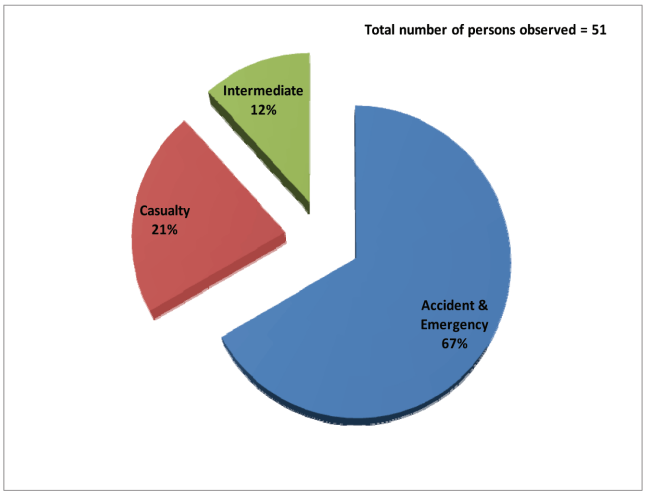

Fig. 4: The location of the participants observed in the Emergency Medicine Division (EMD).

observed for needle recapping, needle disposal and hand-washing practices. Of note, goggles were never available for use. A summary of the results obtained from the first set of observations is shown in Table 3. The table shows a list of procedures along with the total number of times the procedures were observed and the number of times each protective gear was used. A needle stick injury was observed while a participant was recapping a needle by hand during the reduction of a paraphimosis. Gloves were the most commonly used personal protective gear. Masks were least commonly used. Hand-washing was more commonly observed after compared with before a procedure. During intravenous access insertion, sharps were immediately disposed of less than 50% of the times; however, sharps were disposed of immediately more than 80% of the times when intramuscular injections were done (Table 3).

The reported needle-recapping practices were compared with the practices in the first set of observations (Fig. 5). Of the number of persons that reported that they often recapped needles by hand, 10% were observed recapping needles by hand. Of the persons who reported that they occasionally recapped needles by hand, just over 20% were observed to recap needles by hand and of the persons that reported that they never recapped needles by hand, 50% were observed to recap needles by hand. As mentioned previously, there was one needle-stick injury observed while a study participant was recapping a needle by hand (Table 3).

The observed hand-washing practices before and after procedures were also compared with the reported practices. Figure 6 highlights the hand-washing practices before a procedure. Of the participants who reported that they always washed their hands before doing a procedure, none of them was observed washing their hands before a procedure. Of those who reported that they often washed their hands before a procedure, less than 10% were observed washing their

Table 3: Use of protective gears and practices of participants during procedures (first set of observations)

Procedure	# of times observed	Mask	Gown	Gloves	HWB	HWA	Needle recapped by hand	Immediate disposal of sharps
Bedside glucometer	1	---	---	---	---	1	---	---
Cleaning abrasion	3	---	2	3	---	1	---	---
Cleaning patient soiled with stool	1	---	---	1	---	1	---	---
Dressing wounds	2	---	---	2	---	2	---	---
Gastric lavage by NG tube	1	---	---	1	---	1	---	---
I&D	1	---	---	1	---	1	---	---
IM injection	9	---	---	2	---	7	4	8
IV access	9	---	---	7	---	4	1	4
IV medication	1	---	---	1	---	---	---	---
Wound irrigation	1	---	---	1	---	1	---	---
NG tube insertion	3	---	---	3	---	2	---	---
Physical examination	1	---	---	1	---	1	---	---
Reduction of paraphimosis	1	---	---	1	---	1	Needle stick	---
Removing blood stained garment	1	---	---	1	---	1	---	---
Suturing	8	---	---	8	---	8	1	6
Thoracostomy tube insertion	1	---	1	1	---	1	---	---
Urinary catheterization	8	1	---	8	1	6	1	---

HWB – hand-washing before, HWA – hand-washing after, I&D – incision and drainage, IV – intravascular, NG – nasogastric, IM – intramuscular, --- not done, not used or not applicable

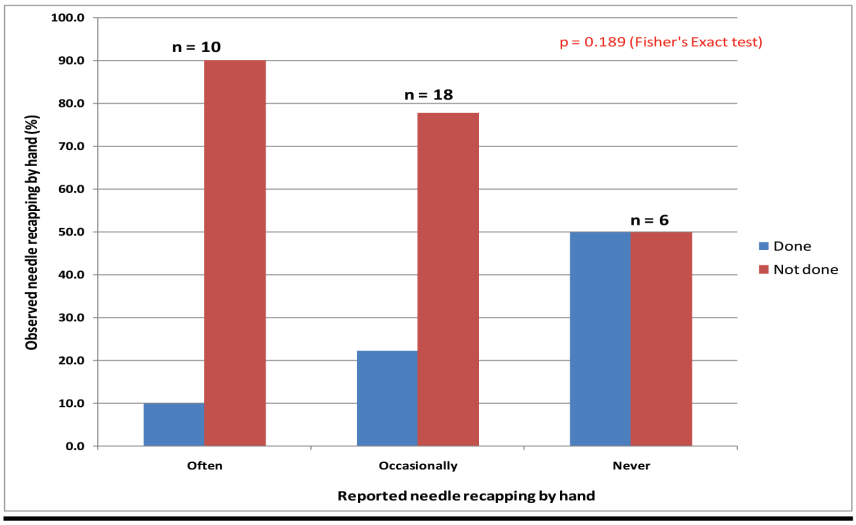

Fig. 5: Percentage of times that needle recapping by hand was observed (first set of observations) compared with reported practices.

hands before a procedure. Of those who reported that they occasionally washed their hands prior to a procedure, none of them was observed washing their hands before a procedure (Fig. 6).

Figure 7 shows a comparison between the observed and reported hand-washing practices after a procedure. Of the participants who reported always washing their hands after a procedure, less than 80% were observed performing hand-washing after a procedure. Of those participants who reported often washing their hands after a procedure, over 30% did not perform hand-washing after a procedure when observed. Of the 52 participants that were observed initially, 18 persons were observed a second time. The results are shown in Table 4.

In the second set of observations, gloves were again the most commonly used protective gear and face mask the least commonly used. Gloves were consistently used except when doing venepuncture or performing intravenous (IV) access insertion.

For those persons who reported performing hand-washing before a procedure, none was observed performing hand-washing before a procedure for either the first or the second set of observations. Of the participants who reported always performing hand-washing after a procedure, 87%

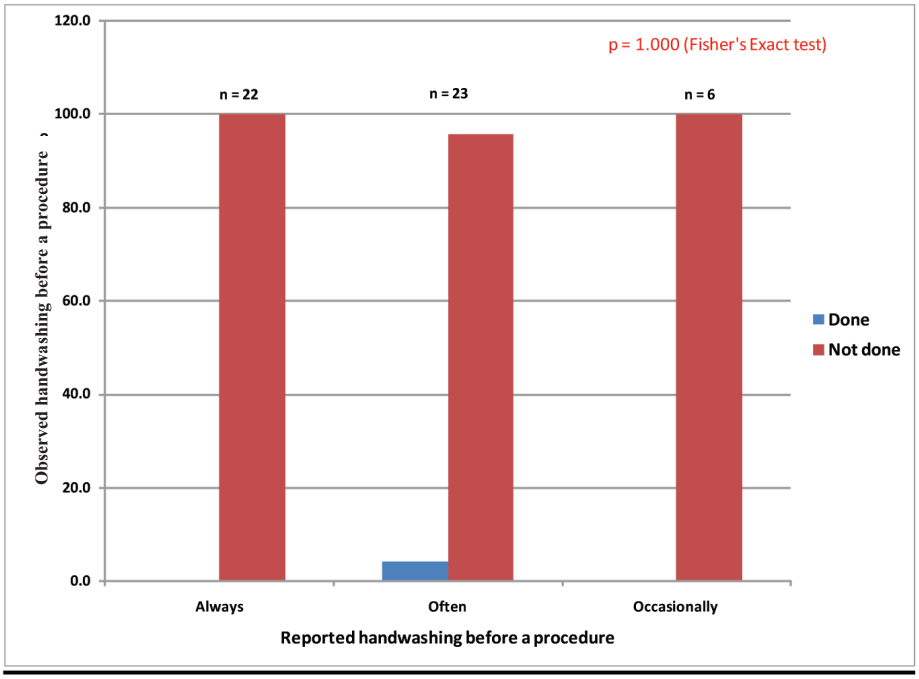

Fig. 6: Comparison of observed (first observation) with reported hand-washing before a procedure.

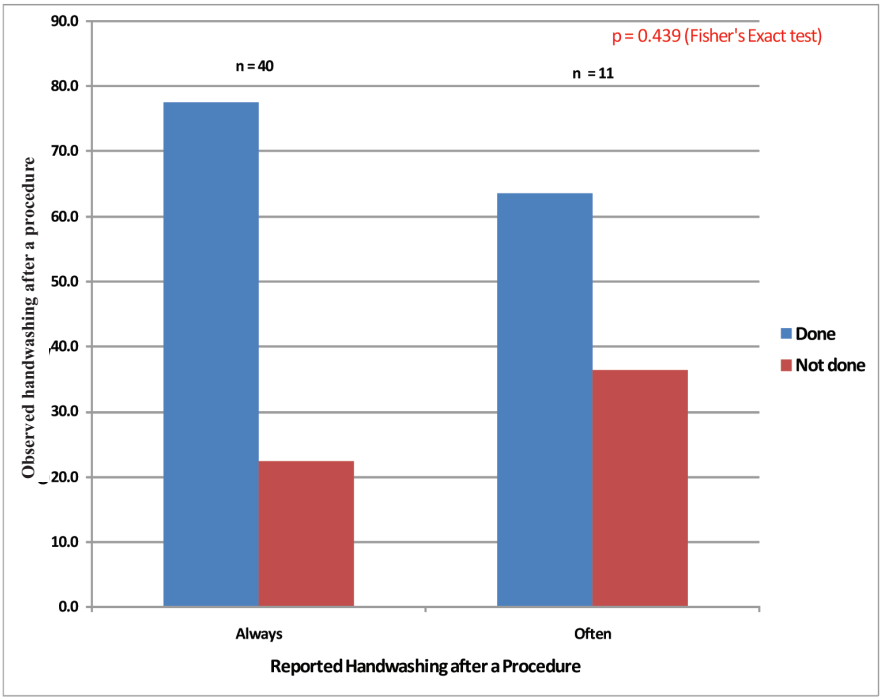

Fig. 7: Comparison of observed (first observation) with reported hand-washing after a procedure.

Table 4: Use of protective gears and practices of participants during procedures (second set of observations)

Procedure	# of times observed	Mask	Gown	Gloves	HWB	HWA	Needle recapped by hand	Immediate disposal of sharps
IV access	3	---	---	2	---	3	---	2
IV medication	1	---	---	1	---	---	1	---
Log rolling multiple trauma patient	2	1	---	2	---	2	2	---
Preparing body for morgue	1	---	1	1	---	1	1	---
Undressing patient	1	1	1	1	---	1	---	---
Thoracostomy tube insertion	3	---	2	3	---	3	---	2
Urinary catheterization	5	---	---	5	---	4	3	2
Venepuncture	2	---	---	1	---	2	---	1

IV – intravenous, HWB – hand-washing before, HWA – hand-washing after, --- not done, not used or not applicable

were observed doing so. Hand-washing practices after a procedure was therefore almost consistent (under 80% for the first observation and over 80% for the second observation) for the two set of observations.

DISCUSSION

Emergency room healthcare providers are at an increased risk of exposure to blood-borne pathogens due to the nature of the emergent procedures that are necessary. Because of this, compliance with universal precautions is required to reduce the likelihood of exposure to blood-borne pathogens. In this study performed at the UHWI emergency room, knowledge levels, availability of protective gears, practices and perceptions were assessed. Most of the participants were knowledgeable about which body fluids universal precautions were to be applied; however, less was known of the body fluids to which these precautions did not apply. According to the CDC guidelines for universal precautions (updated in 1996), universal precautions should apply to blood, semen, vaginal secretions, cerebrospinal, synovial, pleural, peritoneal, pericardial and amniotic fluids. They do not apply to faeces, nasal secretion, sputum, sweat, tears, urine, vomitus or saliva (1). All of the participants correctly thought universal precautions applied to blood, however, most incorrectly thought universal precautions applied to urine and faeces. Among the personal protective gears, gloves were the most commonly available. However, only 56.5% of the participants reported always wearing gloves while doing a procedure. The CDC recommends the use of gloves during patient contact that requires handling of blood, body fluids, mucous membranes and non-intact skin (1). In light of this, the reported glove use among the participants is inadequate. The observed glove use was also less than the required standards. For example, during the study, glove use was not observed when performing bedside glucometer measurement which involves the handling of blood. Additionally, glove use was observed in less than 80% of IV access insertions, which involve the handling of blood. It should be noted that whereas glove use may decrease the likelihood of contaminations of hands, they are unable to prevent penetrating injuries from sharps (1).

Goggles were never available for use, although the CDC guidelines recommend the use of protective eyewear to decrease the incidence of contamination of the mucous membrane of the eyes (1).

The use of personal protective gears could have been affected by availability. For example, in the case of gown use, less than half always using this protective gear and only 24% reported that gowns were always available. Gowns were observed being used during thoracostomy tube insertion, while cleaning abrasions, undressing a patient and body preparation for the morgue but not used during any other procedure. The majority of participants never wore eye shields (66.7%) and again, availability could have been a determining factor as 62% reported that eye shields were never available.

Needle recapping by hand is still being practised by the emergency room staff. Fifty per cent of the participants who denied this practice were actually observed recapping needles by hand. During the study, a needle stick injury was observed while a participant was recapping a needle by hand. This highlights the risk involved when needles are being recapped by hand.

During the first set of observations, sharps were immediately disposed of less than 50% of the times during IV access insertion, whereas sharps were disposed of immediately over 80% of the times when intramuscular injections were done. This observation could be an indication that sharp containers need to be in closer proximity to where IV accesses are being sited so that the staff can place them immediately in the sharp containers after use.

All healthcare providers should be familiar with the recommendations of the CDC guidelines on universal precautions. Healthcare providers should also apply these recommendations. The results of this study indicate that adherence to universal precautions among healthcare providers in the emergency room at UHWI is lacking and, in at least one instance, exposure to body fluid as a result of not applying universal precautions was observed. In order to improve compliance rates, educational programmes such as regular teaching sessions and reminders in the form of posters could be used. Knowledge of universal precautions

does not guarantee compliance; however, constant reminders may alter the practices of the staff. Staff members may be more inclined to comply when they are constantly reminded of the benefits of compliance and the risks of non-compliance.

Limitations of this study are the small sample size, which made it impossible to evaluate compliance of different subgroups. Also, some of the participants who had given consent for the study and had completed questionnaires were unavoidably moved to a different department in the hospital before they were observed. Additionally, an attempt was made to observe participants twice during the study to decrease the likelihood of bias. This attempt was made but because some of these participants were already moved to a different department they could not have been observed twice. Therefore, most of the study participants were only observed once. Surveys that have been done reveal that self-reported adherence was higher than adherence reported in observational studies (3). This could be a limitation as the present study was observational.

CONCLUSION

The emergency room is a high-risk area for exposure to body fluids due to the nature of the injuries presenting and the interventions that may be required. Because of this, compliance with universal precautions is necessary to reduce the likelihood of exposure to body fluids. The compliance with universal precautions among staff in the emergency room at UHWI was assessed and found to be lacking. The emergency room staff needs increased sensitization to the standards of universal precaution in order to protect both patients and healthcare providers.

REFERENCES

1. Centers for Disease Control and Prevention. Guidelines for prevention of human immunodeficiency virus and hepatitis B virus to health-care and public-safety workers. MMWR 1989; **38 (Suppl 6):** 111−55.
2. Pruss-Ustun A, Rapiti E, Hutin Y. Estimation of the global burden of disease attributable to contaminated sharps injuries among health-care workers. Am J Ind Med 2005; **48:** 482−90.
3. Siegel JD, Rhinehart E, Jackson M, Chiarello L; the Healthcare Infection Control Practices Advisory Committee. 2007 guideline for isolation precautions: preventing transmission of infectious agents in healthcare settings. Atlanta, GA: CDC; 2007. Available from: http://www.cdc.gov/hicpac/pdf/isolation/isolation2007.pdf
4. Rosen HR. Acquisition of hepatitis C by a conjunctival splash. Am J Infect Control 1997; **25:** 242−7.
5. Beltrami EM, Kozak A, Williams IT, Saekhou AM, Kalish ML, Nainan OV et al. Transmission of HIV and hepatitis C virus from a nursing home patient to a healthcare worker. Am J Infect Control 2003; **31:** 168−75.
6. Avitzur Y, Amir J. Herpetic whitlow infection in a general pediatrician – an occupational hazard. Infection 2002; **30:** 234−6.
7. Boyce JM, Pittet D. Guideline for hand hygiene in health-care settings. Recommendations of the Healthcare Infection Control Practices Advisory Committee and the HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force. MMWR Recomm Rep 2002; **51:** 1– 45, quiz CE1-4.
8. Madan AK, Raafat A, Hunt JP, Rentz D, Wahle MJ, Flint LM. Barrier precautions in trauma: is knowledge enough? J Trauma 2002; **52:** 540–3.
9. Madan AK, Rentz DE, Wahle MJ, Flint LM. Noncompliance of health-care workers with universal precautions during trauma resuscitations. South Med J 2001; **94:** 277−80.
10. Figueroa JP, Carpenter H, Hospedales CJ. A survey of hepatitis B among health workers in Jamaica. West Indian Med J 1994; **43:** 2−6.
11. Smith H. The knowledge, attitudes and practices of nursing personnel with regards to caring for HIV/AIDS patients at selected hospitals in Kingston and St Andrew [Abstract ii, Research Paper]. Kingston: The University of the West Indies; 1996.
12. Foster TM, Lee MG, McGaw CD, Frankson MA. Knowledge and practice of occupational infection control among healthcare workers in Jamaica. West Indian Med J 2010; **59:** 147–52.