



CHAPTER IV

RESEARCH RESULTS

The results of cross-sectional descriptive research with self-administered questionnaire about factors affecting the practice of Universal Precautions in Bamrasnaradura Institute will be presented in following sequence:

4.1 Socio-demographic data

4.2 Descriptive data on knowledge, attitude, practices toward Universal Precautions and opinion about hospital's policy on Universal Precautions from healthcare workers

4.3 Relationship of knowledge and attitude that affect Universal Precautions practice in each group of healthcare workers

4.4 Comparison of knowledge, attitude, and practices of Universal Precautions among different groups of healthcare workers

4.5 Socio-demographic data and other factors that can affect the Universal Precautions practice

4.1 Socio-demographic data

The total number of respondents was 311 which included 20 doctors, 110 nurses and 181 other healthcare workers. Most doctors, dentists and other healthcare workers' ages were between 31-40 years, while most nurses' ages were between 41-50 years. Sixty percent of doctors were male while other two groups were predominantly female (95.5% and 85.1% respectively). Most of the respondents were married (75%, 57.3% and 55.8% respectively). Most of the respondents had less than 10 years work experience. Most doctors and nurses had bachelor degree or higher level of education, while other healthcare workers mostly had high school or lower

level of education. All doctors and nurses knew about Universal Precautions, while 13.8% of other healthcare workers did not know about Universal Precautions. All nurses have been through Universal Precautions training (Table 4.1).

Table 4.1 Distribution of frequencies and percentages of healthcare workers by socio-demographic data

Socio-demographic data		Group [n (%)]			Total (%)
		Doctor and dentist n=20(%)	Nurse n=110(%)	Other healthcare worker n=181(%)	
Age (years)	<30	4 (20.0)	20 (18.2)	64 (35.4)	88 (28.3)
	31-40	8 (40.0)	14 (12.7)	76 (42.0)	98 (31.5)
	41-50	6 (30.0)	56 (50.9)	33 (18.2)	95 (30.5)
	>50	2 (10.0)	20 (18.2)	8 (4.4)	30 (9.6)
Sex	Male	12 (60.0)	5 (4.5)	27 (14.9)	44 (14.1)
	Female	8 (40.0)	105 (95.5)	154 (85.1)	267 (85.9)
Marital status	Single	5 (25.0)	35 (31.8)	61 (33.7)	101 (32.5)
	Married	15 (75.0)	63 (57.3)	101 (55.8)	179 (57.6)
	Separated / widows / divorced	0 (0.0)	12 (10.9)	19 (10.5)	31 (10.0)

Table 4.1 Distribution of frequencies and percentages of healthcare workers by socio-demographic data (continued)

Socio-demographic data		Group [n (%)]			Total (%)
		Doctor and dentist n=20(%)	Nurse n=110(%)	Other healthcare worker n=181(%)	
Work experience (years)	<10	11 (55.0)	34 (30.9)	133 (73.5)	178 (57.2)
	11-20	6 (30.0)	24 (21.8)	27 (14.9)	57 (18.3)
	21-30	3 (15.0)	41 (37.3)	16 (8.8)	60 (19.3)
	>30	0 (0.0)	11 (10.0)	5 (2.8)	16 (5.1)
Education	High school or lower	0 (0.0)	0 (0.0)	124 (68.5)	124 (39.9)
	Diploma	0 (0.0)	29 (26.4)	29 (16.0)	58 (18.6)
	Nursing	0 (0.0)	76 (69.1)	2 (1.1)	78 (25.1)
	Medicine	11 (55.0)	0 (0.0)	1 (0.6)	12 (3.9)
	Other undergraduate	0 (0.0)	1 (0.9)	20 (11.0)	21 (6.8)
	Graduate	9 (45.0)	4 (3.6)	5 (2.8)	18 (5.8)

Table 4.1 Distribution of frequencies and percentages of healthcare workers by socio-demographic data (continued)

Socio-demographic data		Group [n (%)]			Total (%)
		Doctor and dentist n=20(%)	Nurse n=110(%)	Other healthcare worker n=181(%)	
Position	Administration and policy planning	0 (0.0)	1 (0.9)	0 (0.0)	1 (0.3)
	Doctor	17 (85.0)	0 (0.0)	0 (0.0)	17 (5.5)
	Nurse	0 (0.0)	105 (95.5)	0 (0.0)	105 (33.8)
	Other healthcare worker	2 (10.0)	0 (0.0)	175 (96.7)	177 (56.9)
	More than one position	1 (5.0)	4 (3.6)	6 (3.3)	11 (3.5)
Experience of using UPs	Yes	20 (100.0)	110 (100.0)	156 (86.2)	286 (92.0)
	No	0 (0.0)	0 (0.0)	25 (13.8)	25 (8.0)
Have been Trained about UPs	Yes	7 (35.0)	110 (100.0)	148 (81.8)	265 (85.2)
	No	13 (65.0)	0 (0.0)	33 (18.2)	46 (14.8)

Table 4.1 Distribution of frequencies and percentages of healthcare workers by socio-demographic data (continued)

Socio-demographic data		Group [n (%)]			Total (%)
		Doctor and dentist n=20(%)	Nurse n=110(%)	Other healthcare worker n=181(%)	
Place of work	ER	0 (0.0)	3 (2.7)	1 (0.6)	4 (1.3)
	OPD	1 (5.0)	14 (12.7)	17 (9.4)	32 (10.3)
	IPD	0 (0.0)	45 (40.9)	51 (28.2)	96 (30.9)
	OR	0 (0.0)	9 (8.2)	10 (5.5)	19 (6.1)
	LAB	0 (0.0)	0 (0.0)	46 (25.4)	46 (14.8)
	Other place	2 (10.0)	11 (10.0)	23 (12.7)	36 (11.6)
	More than one place	17 (85.0)	28 (25.5)	33 (18.2)	78 (25.1)

The following table showed detailed information about sample's age and work experience. Nurses' group had the highest mean age. The mean age of nurses was 42.40 years old. The oldest was 59 and the youngest was 22. The mean age of doctors and dentists was 39.25 years old. The oldest was 59 and the youngest was 25. And for last group, the mean age of other healthcare workers was 34.79 years old. The oldest was 59 and the youngest was 20. Nurses also had the highest mean of work experience which was 18.20 years. Doctors, dentists and other healthcare workers had mean of work experience about 10 years (Table 4.2).

Table 4.2 Descriptive data about age and work experience in each group of respondents

Groups of respondents		Mean	SD	Max	Min
1.Doctor and dentist	Age	39.25	9.01	59	25
	Work experience	10.80	10.80	24	1
2.Nurse	age	42.40	9.15	59	22
	Work experience	18.20	10.17	38	1
3.Other healthcare worker	age	34.79	8.38	59	20
	Work experience	9.62	7.8	35	1

4.2 Knowledge, attitudes, practices toward Universal Precautions and opinions about hospital's Universal Precautions policy in healthcare workers

4.2.1 Knowledge regarding UPs:

Most of healthcare workers had moderate to high level of knowledge. As shown in Table 4.3, 105 persons (33.8%) of the samples had moderate level of knowledge, and 189 persons (60.8%) had high level of knowledge. Most respondents from doctor-dentist and nurse groups had high level of knowledge compared to other healthcare worker group (65% and 77.3% compared to 50.3%). Most respondents had high level of knowledge; there were only 17 samples which were accounted only 5.5% of healthcare workers who had low knowledge level.

Table 4.3 Distribution of frequencies and percentages of healthcare workers' knowledge level by groups of respondents

Groups of respondents	Level of knowledge [n (%)]		
	High	Moderate	Low
Doctor and dentist (n=20)	13 (65.0)	7 (35.0)	0 (0.0)
Nurse (n=110)	85 (77.3)	25 (22.7)	0 (0.0)
Other healthcare worker (n=181)	91 (50.3)	73 (40.3)	17 (9.4)
Total(n=311)	189 (60.8)	105 (33.8)	17 (5.5)

The questions asked about knowledge about Universal Precautions were divided into 3 parts: definition and principle of Universal Precautions, application of Universal Precautions, and knowledge about HIV. Detail for each question was shown in Table 4.4. There were two categories that healthcare workers lacked knowledge about Universal Precautions. First, most healthcare workers lacked knowledge about Universal Precautions principles, as showed in question no.3. (Which one is not a principle of self-protection against occupationally acquired infections?), the number of healthcare workers who answered this question correctly was only 167 people (53.7%).

Second, there was a problem in selecting appropriate protective barriers. As showed in question no.6 (When you are using gloves, what should you do?), only 3 people (1%) answer this question correctly. Question no.9 (When drawing patients' blood, which protective barrier is appropriate and most cost-effective), number of healthcare workers who answered the question correctly was 54 people (17.4%). Question no.10 (Which one of follows activities is not useful in preventing occupationally acquired infections?) number of healthcare workers who answered the question correctly was 182 people (58.5%).

Table 4.4 Distribution of frequencies and percentages of correct and incorrect answers among healthcare workers by knowledge items

Items of UPs Knowledge	HCWs that answered the question correctly [n (%)]	HCWs that answered the question incorrectly [n (%)]
1. Definition of UPs.	286 (86.2)	43 (13.8)
2. Usefulness of UPs.	193 (62.1)	118 (37.9)
3. Principles of UPs.	167 (53.7)	144 (46.3)
4. Route of transmission.	292 (93.9)	19 (6.1)
5. Use of protective equipment in ER.	294 (94.5)	17 (5.5)
6. How to use gloves.	3 (1.0)	308 (99.0)
7. Infectious source for HIV.	300 (96.5)	11 (3.5)
8. HIV window period.	273 (87.8)	38 (12.2)
9. Use of protective barrier when for taking patients' blood.	54 (17.4)	257 (82.6)
10. Use of protective equipment in general.	182 (58.5)	129 (41.5)

4.2.2 Attitudes toward UPs:

Likert's scale technique (5 scales) was applied in measuring attitude. There were 20 questions in this part. The first 6 questions were about healthcare workers' beliefs in Universal Precautions. The next 6 questions were about healthcare workers' feelings toward Universal Precautions practice. And the last 7 questions were about their intention to practice Universal Precautions.

After the mean attitude score for each healthcare worker had been calculated, the mean attitude score of 2.5 and 3.5 were used as cut points. Healthcare workers were divided into three groups. It was shown that most doctors, dentists and nurses had positive attitudes toward Universal Precautions compared to other healthcare workers (95%, 95.5% compare to 84.5%). All of the respondents had neutral to positive attitudes toward Universal Precautions. None of the respondents had negative attitudes toward Universal Precautions (Table 4.5).

Table 4.5 Distribution of frequencies and percentages of healthcare workers' attitude level by groups of respondents

Group of respondents	Attitude level [n (%)]		
	Positive	Neutral	Negative
Doctor and dentist (n=20)	19 (95.0)	1 (5.0)	0 (0.0)
Nurse (n=110)	105 (95.5)	5 (4.5)	0 (0.0)
Other healthcare worker (n=181)	153 (84.5)	28 (15.5)	0 (0.0)
Total(n=311)	277 (89.1)	34 (10.9)	0 (0.0)

In attitude scale, there were both positive and negative statements for the respondents to express their opinion in term of agreement level. The negative statements were marked with asterisk (*) in front of the statements. Score for negative statement were reversed before interpretation. Although most of the respondents had neutral to positive attitudes toward Universal precautions, there were some important negative attitudes found in questions no. *3 (You will contract diseases if you are in close contact with ill patients, even though you follow the protective guidelines.) with mean score 2.91. Question number *4 (You are afraid to take care of AIDS patients because you believe that you can be infected to the disease.) had mean score of 2.67. Question number *6(Using protective equipment, you still need to know patients' blood anti-HIV status because you do not feel safe.) had mean score of 2.54. It was indicated that healthcare workers did not believe that Universal Precautions could protect them from HIV transmission. And for question 17 (You will not use any equipment for self protection if you know patients well, such as friends or relatives.) had mean score of 2.15. This indicated that they might neglect Universal Precautions practice when applied to their closed friends or relatives. Details for all questions were shown in Table 4.6.

Table 4.6 Distribution of frequencies, percentages and mean score of attitude toward Universal Precautions of healthcare workers by items

Items(n=311)	Frequency [n (%)]					Mean
	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	
1. UPs are effective.	6(1.9)	1(0.3)	12(3.9)	124(39.9)	168(54)	4.44
*2. UPs are not necessary.	250(80.4)	47(15.1)	2(0.6)	9(2.9)	3(1.0)	1.29
*3. You cannot protect yourself, even if you use UPs.	89(28.6)	154(49.5)	21(6.8)	45(14.5)	2(0.6)	2.09
*4. You are afraid to care HIV patients.	73(23.5)	122(39.2)	71(22.8)	31(10.0)	14(4.5)	2.33
*5. UPs is not important for you.	103(33.1)	134(43.1)	8(2.6)	60(19.3)	6(1.9)	2.14
*6. You need to know patients' blood HIV before providing cares.	78(25.1)	125(40.2)	18(5.8)	71(22.8)	19(6.1)	2.45
7. Universal Precautions are good concepts.	11(3.5)	4(1.3)	8(2.6)	119(38.3)	169(54.3)	4.39
*8. You were bored to follow protective guidelines.	136(43.7)	128(41.2)	31(10.0)	10(3.2)	6(1.9)	1.78
*9. Protective barriers will decrease your working ability.	130(41.8)	129(41.5)	33(10.6)	17(5.5)	2(0.6)	1.82

* Negative question: need reversal before interpretation.

Table 4.6 Distribution of frequencies, percentages and mean score of attitude toward Universal Precautions of healthcare workers by items (continued)

Items(n=311)	Frequency [n (%)]					Mean
	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	
*10. Protective principles can protect you from infectious diseases.	51(16.4)	118(37.9)	37(11.9)	88(28.3)	17(5.5)	2.68
11. Prevention of infectious diseases is better than treatment.	26(8.4)	6(1.9)	4(1.3)	72(23.2)	203(65.3)	4.35
*12. You feel safe to care patients without UPs.	110(35.4)	164(52.7)	19(6.1)	17(5.5)	1(0.3)	1.83
13. You will use gloves when you will do operation.	30(9.6)	39(12.5)	4(1.3)	119(38.3)	119(38.3)	3.83
14. You will wash your hand before and after intervention.	5(1.6)	5(1.6)	1(0.3)	116(37.3)	184(59.2)	4.51
*15. You will omit barriers equipments if you are in hurry.	146(46.9)	105(33.8)	10(3.2)	31(10.0)	19(6.1)	1.95
16. You will use single hand technique for re-cap needles.	55(17.7)	32(10.3)	11(3.5)	110(35.4)	103(33.1)	3.56

* Negative question: need reversal before interpretation

Table 4.6 Distribution of frequencies, percentages and mean score of attitude toward Universal Precautions of healthcare workers by items (continued)

Items(n=311)	Frequency [n (%)]					Mean
	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	
17. You won't use any equipment for self protection if you know the patients well.	97(31.2)	136(43.7)	25(8.0)	40(12.9)	13(4.2)	2.15
18. You will ask for protective barriers even if they are in shortage.	5(1.6)	14(4.5)	8(2.6)	143(46.0)	141(45.3)	4.29
19. You can work well even when you wear protective barriers.	11(3.5)	13(4.2)	16(5.1)	153(49.2)	118(37.9)	4.14
20. You will use protective barriers even though with healthy patients	28(9.0)	40(12.9)	31(10.0)	118(37.9)	94(30.2)	3.68

* Negative question: need reversal before interpretation.

4.2.3 Practices of UPs:

There were 20 questions asked about healthcare workers' frequency of Universal Precautions practices. Each question had 5 rating scale from less frequent to more frequent. From methodology, using 60% and 80% of their practices frequency or mean score of 3.0 and 4.0 from practical part as cut points, healthcare workers were divided into three groups. It was shown that most doctors, dentists and nurses had high practice level group compared to other healthcare workers (70%, 73.6% compare to 65.2%). Sixty-eight point five percent of all healthcare workers had high level of practice for Universal Precautions but 31.5% of them still had low to moderate level of practice for Universal Precautions (Table 4.7).

Table 4.7 Distribution of frequencies and percentages of healthcare workers' practice level by groups of respondents

Groups of respondents	Practice level [n (%)]		
	High	Moderate	Low
Doctor and dentist (n=20)	14 (70.0)	5 (25.0)	1 (5.0)
Nurse (n=110)	81 (73.6)	29 (26.4)	0 (0.0)
Other healthcare worker (n=181)	118 (65.2)	58 (32.0)	5 (2.8)
Total(n=311)	213 (68.5)	92 (29.6)	6 (1.9)

There were both positive and negative statements in practice questions. The negative statements were marked with asterisk (*) in front of the statements. Score for negative statement were reversed before interpretation. There were some situations that healthcare workers would neglect Universal Precautions practices, as shown in

table 4.8. These situations were when they practiced with their closed friends or relatives, according to the result in question no *7 (Omit barriers precaution for some known patients such as your relatives.), and when they were in emergency situations as shown in questions no. *5 (When you are in hurry such as in emergency situation, sometimes you will have direct contact with patients' secretion without the proper use of self-protection's equipments.)(Mean score= 1.83 and 1.89 respectively). Details for each practical activity were shown in Table 4.8.

Table 4.8 Distribution of frequencies, percentages and mean scores of Universal Precautions practice in healthcare workers

Activity(n=311)	Frequency [n (%)]					Mean
	Never	Seldom	Sometimes	Often	Very often	
1. Washing hands and skin surfaces immediately if contaminated.	0(0)	1(0.3)	16(5.1)	132(42.4)	162(52.1)	4.46
2. Check your hands, if there are pre-existing wounds.	5(1.6)	20(6.4)	70(22.5)	136(43.7)	80(25.7)	3.86
3. Wear gloves before drawing patients' blood.	11(3.5)	3(1.0)	21(6.8)	109(35.0)	167(53.7)	4.34
4. Re-cap needles after used with single hand technique.	57(18.3)	16(5.1)	53(17.0)	83(26.7)	102(32.8)	3.50
*5. In emergency situation, sometimes you omit using UPs.	191(61.4)	38(12.2)	45(14.5)	18(5.8)	19(6.1)	1.83

*Negative question: need reversal before interpretation

Table 4.8 Distribution of frequencies, percentages and mean scores of Universal Precautions practice in healthcare workers (continued)

Activity(n=311)	Frequency [n (%)]					Mean
	Never	Seldom	Sometimes	Often	Very often	
6. When touching patients' wound, you always wear gloves.	8(2.6)	10(3.2)	24(7.7)	111(35.7)	158(50.8)	4.29
*7. Omit barriers precaution for some known patients.	167(53.7)	53(17.0)	56(18.0)	28(9.0)	7(2.3)	1.89
8. Wear boots and gown if you have to be in major operation.	38(12.2)	19(6.1)	35(11.3)	105(33.8)	114(36.7)	3.77
9. Wear gloves when you collect specimens.	2(0.6)	1(0.3)	14(4.5)	75(24.1)	219(70.4)	4.63
10. Wear gloves when you wash medical instruments.	14(4.5)	3(1.0)	18(5.8)	91(29.3)	185(59.5)	4.38
11. Place sharp instruments in puncture resistance container.	7(2.3)	1(0.3)	4(1.3)	77(24.8)	222(71.4)	4.63
12. Place contaminated gauzes or disposable waste in separated garbage.	0(0)	1(0.3)	3(1.0)	64(20.6)	243(78.1)	4.77
13. Wear eyewear or face shields for procedures.	26(8.4)	9(2.9)	30(9.6)	100(32.2)	146(46.9)	4.06

*Negative question: need reversal before interpretation

Table 4.8 Distribution of frequencies, percentages and mean scores of Universal

Precautions practice in healthcare workers (continued)

Activity(n=311)	Frequency [n (%)]					Mean
	Never	Seldom	Sometimes	Often	Very often	
14. Check for resuscitation or protection barriers equipment.	1(0.3)	3(1.0)	12(3.9)	131(42.1)	164(52.7)	4.46
15. Hand over sharp instruments with no touch technique.	16(5.1)	12(3.9)	15(4.8)	107(34.4)	161(51.8)	4.24
16. Immediate change dressing when contaminated.	5(1.6)	2(0.6)	8(2.6)	98(31.5)	198(63.7)	4.55
17. Refrain from direct patients care when have exudative lesion or weeping.	66(21.2)	41(13.2)	65(20.9)	84(27.0)	55(17.7)	3.07
18. Immediate change dressing when contaminated.	20(6.4)	30(9.6)	47(15.1)	114(36.7)	100(32.2)	3.78
19. Squeeze blood out and wash your hands immediately when punctured.	17(5.5)	4(1.3)	6(1.9)	98(31.5)	186(59.8)	4.39
20. Practice and keep training for self-protection.	9(2.9)	12(3.9)	50(16.1)	122(39.2)	118(37.9)	4.05

*Negative question: need reversal before interpretation

4.2.4 Opinions toward Hospital's environment and UPs policy:

There were eight questions in this part which conveyed healthcare workers' opinions toward hospital's environment and UPs policy. Using mean score of 4.0 from questionnaire as cut point, It was shown that most of doctors, dentists, nurses and other healthcare workers disagreed with hospital's policy on Universal Precautions and did not think that hospital environment were supportive for Universal Precautions practice (90%, 74.5%, and 84%)(Table 4.9).

Table 4.9 Distribution of frequencies and percentages of healthcare workers' opinions toward hospital's environment and UPs policy by groups of respondents

Groups of respondents	Opinions toward hospital's environment and UPs policy [n (%)]	
	Agree	Disagree
Doctor and dentist (n=20)	2 (10.0)	18 (90.0)
Nurse (n=110)	28 (25.5)	82 (74.5)
Other healthcare worker (n=181)	29 (16.0)	152 (84.0)
Total (n=311)	59 (19.0)	252 (81.0)

Most of the respondents felt good that the hospital has some policies to protect them from occupationally acquired infection, as showed in question no.3 (Your hospital has good policy about occupationally acquired infections.) with mean score of 4.24. However, they were still unsatisfied with the policy, as shown in question no.*4 (You feel unsatisfied about hospital's policy to protect you from occupationally acquired infections.) with reversed mean score of 2.33. They thought that hospital did not provide enough equipment for Universal Precautions practices, as shown in

question no.*7 (You feel that hospital do not have enough equipment for you to prevent you from occupationally acquired infections.) with reversed mean score 2.58. Details for their opinion were shown in Table 4.10.

Table 4.10 Distribution of frequencies, percentages and mean scores of healthcare workers' opinion toward hospital's environment and UPs policy

Question (n=311)	Frequency [n (%)]					Mean
	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	
1. Hospital provides adequate protective barriers.	3(1.0)	13(4.2)	12(3.9)	153(49.2)	130(41.8)	4.27
2. Hospital has supported your training.	0(0)	8(2.6)	18(5.8)	161(51.8)	124(39.9)	4.29
3. Your hospital has good policy for UPs.	1(0.3)	9(2.9)	20(6.4)	164(52.7)	117(37.6)	4.24
*4. You feel unsatisfied about hospital's UPs policy.	51(16.4)	107(34.4)	58(18.6)	83(26.7)	12(3.9)	2.67
5. Hospital working's environment makes you feel safe.	12(3.9)	25(8.0)	40(12.9)	164(52.7)	70(22.5)	3.82
6. Commander always tries to improve your awareness on UPs.	13(4.2)	33(10.6)	31(10.0)	143(46.0)	91(29.3)	3.86
*7. You feel that hospital has not enough protective equipment.	85(27.3)	102(32.8)	45(14.5)	65(20.9)	14(4.5)	2.42
*8. Hospital need to improve UPs guideline.	24(7.7)	38(12.2)	65(20.9)	135(43.4)	49(15.8)	3.47

*Negative question: need reversal before interpretation

4.3 Relationship of knowledge and attitudes that affect Universal Precautions practices in each group of healthcare workers

4.3.1 Doctor and dentist group:

There were 9 persons with high level of knowledge and high UPs practice, and 5 persons with moderate level of knowledge and high UPs practice. The rest were in moderate level of practice. There were no doctors and dentists in low level of knowledge group. There was no statistically significant difference in Universal Precautions practice between those who had high level of knowledge and those who had moderate level of knowledge ($p - \text{value}^* = 0.664$).

There was only one doctor who had neutral attitude toward Universal Precautions. For statistical comparison, there was no statistical significant difference in Universal Precautions practice between positive attitude and neutral attitude group of doctors and dentists ($p\text{-value}^* = 0.15$). This might be because of the number of respondents who had neutral attitude were too low for comparison (Table 4.11.).

Table 4.11 Relationship of knowledge and attitudes that affect Universal Precautions practice in the group of doctors and dentists

Doctor and Dentist		Practice level [n (%)]		Total (%)	p – value*
		High	Moderate and Low		
Knowledge level	High	9 (69.2)	4 (30.8)	13 (100.0)	0.664
	Moderate	5 (71.4)	2 (28.6)	7 (100.0)	
Attitude level	Positive	14 (73.7)	5 (26.3)	19 100.0	0.15
	Neutral	0 (0.0)	1 (100.0)	1 100.0	
Total		14 (70.0)	6 (30.0)	20 100.0	

* Fisher's Exact Test was used because of low expected value (<5) more than 20% of cells that was not appropriated for Chi-square test.

4.3.2 Nurse group:

All respondents in this group had moderate to high level of knowledge and practice. There were 60 nurses who had high level of knowledge and high UPs practice level. In comparison, there was no statistical significant difference in Universal Precautions practice between those who had high level of knowledge and those who had moderate level of knowledge (p-value = 0.090).

All respondents in this group had neutral to positive attitude toward UPs and no negative attitude toward UPs. There were 80 nurses who had positive attitude toward UPs with high UPs practice and 25 nurses who had positive attitude and moderate UPs practice. When compared, there was no statistical significant difference in Universal Precautions practice between positive attitude and neutral attitude group

of nurses ($p - \text{value}^* = 0.017$). This might be because of the number of respondents who have neutral attitude were very low (Table 4.12).

Table 4.12 Relationship of knowledge and attitudes that affect Universal Precautions practice in the group of nurses

Nurse		Practice level		Total (%)	Chi Square	df	p - value
		High	Moderate				
Knowledge level	High	60 (70.6)	25 (29.4)	85 (100.0)	1.790	1	0.090
	Moderate	21 (84.0)	4 (16.0)	25 (100.0)			
Attitude level	Positive	80 (76.2)	25 (23.8)	105 (100.0)			0.017*
	Neutral	1 (20.0)	4 (80.0)	5 (100.0)			
Total		81 (73.6)	29 (26.4)	110 (100.0)			

* Fisher's Exact Test was used because of low expected value (<5) more than 20% of cells that was not appropriated for Chi-square test.

4.3.3 Other healthcare worker group:

In the high of level knowledge group, there were 54.9% of workers with high level of UPs practice, 40% of workers with moderate level of UPs practice and 1 % of workers with low level of UPs practice. In the moderate level of knowledge group, there were 75.3% of workers with high level of UPs practice, 21.9% of workers with moderate level of UPs practice and 2.7% of workers with low level of UPs practice. In the low level of knowledge group, there were 76.5% of workers with high level of UPs practice, 11.8% of workers with moderate level of UPs practice and 11.8% of workers with low level of UPs practice. There was a statistically significant difference

in Universal Precautions practice between who had high level of knowledge and who had low to moderate level of knowledge (p-value <0.01).

There was no negative attitude toward UPs in the group of other healthcare workers. There was a statistically significant difference in Universal Precautions practice between positive attitude and neutral attitude group in other healthcare worker group (p-value <0.01) (table 4.13).

Table 4.13 Relationship of knowledge and attitudes that affect Universal Precautions practice in the group of other healthcare workers

Other healthcare worker		Practice level			Total (%)	Chi Square	df	p-value*
		[n (%)]						
		High	Mod.	Low				
Knowledge level	High	50 (54.9)	40 (44.0)	1 (1.1)	91 (100.0)	8.478	2	<0.01
	Mod	55 (75.3)	16 (21.9)	2 (2.7)	90 (100.0)			
	Low	13 (76.5)	2 (11.8)	2 (11.8)	17 (100)			
Attitude level	Positive	106 (69.3)	45 (29.4)	2 (1.3)	153 (100.0)	7.283	1	<0.01
	Neutral	12 (42.9)	13 (46.4)	3 (10.7)	28 (100.0)			
Total		118 (65.2)	58 (32.0)	5 (2.8)	181 (100.0)			

* p-value was calculated after combining numbers of workers in low and moderate level of group because of low expected value (<5) more than 20% of cells that was not appropriated for Chi-square test.

4.4 Comparison of knowledge, attitudes and practices among different groups of healthcare workers

For statistical calculation purpose (Table 4.17-4.19), The numbers of workers with moderate and low level of knowledge, workers with neutral and negative attitude, and workers with moderate and low level of practice were combined together. The reason was that some groups had less than 5 people, which would not be appropriated for chi-square test. There were no statistically significant differences in knowledge and attitude toward Universal Precautions practice among different groups of healthcare workers. They all had the same level of Universal Precautions practice.

Table 4.14 showed that there were differences in knowledge among different groups of healthcare workers with statistical significance (p -value < 0.001).

Table 4.14 Comparison of knowledge among different groups of healthcare workers

Group	Knowledge about UPs (%)		Total (%)	Chi Square	df	p - value
	High	Moderate and Low				
Doctor and dentist	65.0	35.0	20 (100.0)	21.007	2	<0.01
Nurse	77.3	22.7	110 (100.0)			
Other healthcare worker	50.3	49.7	181 (100.0)			
Total	60.8	39.2	311 (100.0)			

Table 4.15 showed that there were differences in attitude toward Universal Precautions among different groups of healthcare workers with statistical significance (p-value < 0.001).

Table 4.15 Comparison of attitudes among different groups of healthcare workers

Group	Attitude toward UPs (%)		Total (%)	Chi Square	df	p - value
	Positive	Neutral and negative				
Doctor and dentist	95.0	5.0	20 (100.0)	9.158	2	<0.01
Nurse	95.5	4.5	110 (100.0)			
Other healthcare worker	84.5	15.5	181 (100.0)			
Total	89.1	10.9	311 (100.0)			

Table 4.16 showed that there was no statistically significant difference in Universal Precautions practice among different group of healthcare workers (p-value = 0.158).

Table 4.16 Comparison of Universal Precautions practice among different groups of healthcare workers

Group	Practice of UPs (%)		Total (%)	Chi Square	df	p - value
	High	Moderate and low				
Doctor and dentist	70.0	30.0	20 (100.0)	2.283	2	0.158
Nurse	73.6	26.4	110 (100.0)			
Other healthcare worker	65.2	34.8	181 (100.0)			
Total	68.5	31.5	331 (100.0)			

4.5 Socio-demographic data and other factors that can affect the Universal

Precautions practice

The following factors had affected on Universal Precautions practice among healthcare workers: age, level of education, work experiences, workplace, Universal Precautions experience, Universal Precautions training, level of knowledge, attitude toward UPs and hospital policy of healthcare workers with p-value below 0.01(all factors).

While all the factors mentioned earlier do affected Universal Precautions practice, sex, marital status, and work position of healthcare workers did not affect Universal Precautions practice among healthcare workers with a p-value of 0.088, 0.330, and 0.068 respectively. p-values were calculated, after combining numbers of workers in low with moderate level of practice group because of low expected value (<5) more than 20% of cells that was not appropriated for Chi-square test (Table 4.17).

Table 4.17 Relationship of socio-demographic data and Universal Precautions practice of sample

socio-demographic data (n=311)	Practice level [n (%)]			Total (n)	Chi Square	df	p- value*	
	High	Mod.	Low					
Age (years)	<30	52 (59.1)	33 (37.5)	3 (3.4)	88	12.11	3	<0.01
	31-40	62 (63.3)	35 (35.7)	1 (1.0)	98			
	41-50	77 (81.1)	16 (16.8)	2 (2.1)	95			
	51-60	22 (73.3)	8 (26.7)	0 (0.0)	30			

Table 4.17 Relationship of socio-demographic data and Universal Precautions practice of sample (continued)

socio-demographic data (n=311)		Practice level [n (%)]			Total (n)	Chi Square	df	p- value*
		High	Mod.	Low				
years of work experiences (years)	<10	112 (62.9)	62 (34.8)	4 (2.2)	178	10.136	3	<0.01
	11-20	39 (68.4)	16 (28.1)	2 (3.5)	57			
	21-30	51 (85.0)	9 (15.0)	0 (0.0)	60			
	>31	11 (68.8)	5 (31.2)	0 (0.0)	16			
Level of education	High school or lower	71 (57.3)	49 (39.5)	4 (3.2)	124	15.603	5	<0.01
	Diploma	41 (70.7)	17 (29.3)	0 (0.0)	58			
	Nurse	59 (75.6)	19 (24.4)	0 (0.0)	78			
	Medicine	8 (66.7)	3 (25.0)	1 (8.3)	12			
	Other Undergraduate	18 (85.7)	2 (9.5)	1 (4.8)	21			
	Graduate	16 (88.9)	2 (11.1)	0 (0.0)	18			
UPs Experience	Yes	201 (70.3)	81 (28.3)	4 (1.4)	286	5.288	1	<0.01
	No	12 (48.0)	11 (44.0)	2 (8.0)	25			

Table 4.17 Relationship of socio-demographic data and Universal Precautions practice of sample (continued)

socio-demographic data (n=311)		Practice level [n (%)]			Total (n)	Chi Square	df	p- value*
		High	Mod.	Low				
UPs training	Yes	190 (71.7)	73 (27.5)	2 (0.8)	265	8.551	1	<0.01
	No	23 (50.0)	19 (41.3)	4 (8.7)	46			
Hospital's policy and environment	Agree	52 (88.1)	7 (11.9)	0 (0.0)	59	13.02	1	<0.01
	Disagree	161 (63.9)	85 (33.7)	6 (2.4)	252			
Place of work	ER+OPD	16 (44.4)	20 (55.6)	0 (0.0)	36	17.044	5	<0.01
	IPD	64 (66.7)	30 (31.3)	2 (2.1)	96			
	OR	16 (84.2)	3 (15.8)	0 (0.0)	19			
	LAB	38 (82.6)	5 (10.9)	3 (6.5)	46			
	Other places	27 (75.0)	9 (25.0)	0 (0.0)	36			
	More than one place	52 (66.7)	25 (32.1)	1 (1.3)	78			
	Married	124 (69.3)	50 (27.9)	5 (2.8)	179			
	Separated/Widow /Divorced	19 (61.3)	12 (38.7)	0 (0.0)	31			

Table 4.17 Relationship of socio-demographic data and Universal Precautions practice of sample (continued)

socio-demographic data (n=311)		Practice level [n (%)]			Total (n)	Chi Square	df	p - value*
		High	Mod.	Low				
Knowledge level	High	119 (63.0)	68 (36.0)	2 (1.1)	189	6.817	1	<0.01
	Moderate	81 (77.1)	22 (21.0)	2 (1.9)	122			
	Low	13 (76.5)	2 (11.8)	2 (11.8)	17			
Attitude level	Positive	200 (72.2)	74 (26.7)	3 (1.1)	277	16.189	1	<0.01
	Neutral	13 (38.2)	18 (52.9)	3 (8.8)	34			
Sex	Male	34 (77.3)	10 (22.7)	0 (0.0)	44	1.832	1	0.088
	Female	179 (67.0)	82 (30.7)	6 (1.9)	267			
Marital Status	Single	70 (69.3)	30 (29.7)	1 (1.0)	101	0.827	2	0.330
	Married	124 (69.3)	50 (27.9)	5 (2.8)	179			
	Separated/Widow /Divorced	19 (61.3)	12 (38.7)	0 (0.0)	31			
Working Position	Administration	0 (0.0)	1 (100.0)	0 (0.0)	1	7.005	4	0.068
	Doctor	11 (64.7)	5 (29.4)	1 (5.9)	17			
	Nurse	77 (73.3)	28 (26.7)	0 (0.0)	105			
	Other healthcare worker	115 (65.0)	57 (32.2)	5 (2.8)	177			
	More than one position	10 (90.9)	1 (9.1)	0 (0.0)	11			