International Journal of Community Medicine and Public Health
Piyumanthi RAP et al. Int J Community Med Public Health. 2020 Nov;7(11):4227-4232
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20204718

Original Research Article

Are the future nurses geared to protect themselves from blood borne viruses? A descriptive cross-sectional study from Sri Lanka

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Received: 13 August 2020
Revised: 04 October 2020
Accepted: 05 October 2020

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ABSTRACT

Background: Nurses have a high risk of being exposed to blood borne viruses (BBV) during their day to day practices and knowledge on transmission is important. The objective was to describe the knowledge in a selected Nursing Training School in Western Province, Sri Lanka and their associated factors of transmission of BBV, among nursing students in a selected Nursing Training School in Western Province and their associated factors in Sri Lanka.
Methods: A descriptive cross-sectional study was carried out among 209 nursing students from a nursing school in Sri Lanka. Data collection was done using a self-administered questionnaire. Data was analysed using SPSS software version 15.0. Statistical significance was tested at $p<0.05$.
Results: Majority (57%) had poor knowledge on transmission of BBV. Most gave correct answers for transmission of HIV and Hepatitis B virus 91%, 64% (HBV) by needle stick injury (82%, 87%), through blood transfusion (90%, 80%), mother to child at birth (90%, 64%), through organ and for transmission of HBV via tattooing/piercing, 58% gave correct answers transplant (80%, 66%), direct contact with blood (75%, 62%), through unprotected sexual intercourse (93%, 50%) and tattooing/ piercing (48%, 58%). Many had poor knowledge on transmission of HIV and HBV via sharing household equipment (50%, 84%), by kissing/hugging (57%, 75%), through mosquito bites (76%, 86%), by swimming in pools (80%, 87%), by eating contaminated food (81%, 88%) and through exposure to saliva/tears/stools and urine (89%, 92%). There was a statistically significant association between knowledge on transmission of BBV with higher academic year and older age ($p<0.05$).
Conclusions: BBV transmission needs further emphasis on the curriculum for future nurses to deliver to their utmost capabilities in the future.

Keywords: Blood borne virus, Knowledge, Nursing students, Transmission

INTRODUCTION

Health care workers (HCW) during their course of work and during their clinical training are at a risk of being exposed to blood borne virus infections, mainly Hepatitis B virus (HBV) and Human Immuno-Virus (HIV). Therefore, it is preliminary that those who work related to health care have a good knowledge on methods of

transmission of blood borne virus (BBV) to safeguard themselves as well as patients against this occupational hazard. HBV infection is a potentially life-threatening liver infection that can cause both acute and chronic disease. The hepatitis B virus can survive outside the body for about 7 days during which the virus can still cause infection if it enters the body of a person who is not previously immunized. HBV is about 50-100 times more infectious than HIV and despite having a safe and effective vaccine for HBV, the spread across the globe is continuing.[1]

HIV is a retrovirus that targets and weakens human immune system. As the virus destroys and impairs the functions of CD4 lymphocytes, the infected individuals 33 million gradually become immune deficient. HIV continues to be a main global public health issue claiming more than 32 million lives so far.[2] Although Sri Lanka continues to be a low prevalence country for HIV, the numbers of HIV positive patients is slowly rising over the years.[3] A report from UK published in 2014 stated that there were 4830 reported cases of occupational exposure to BBV and 42% of exposures happened to nurses and health care assistants.[4]

Therefore, it is of paramount importance that the nursing students have adequate knowledge on transmission of BBV in order to prevent any occupational exposure.

METHODS

Study design, participants and procedures

A descriptive cross-sectional study was carried out among nursing students in Nursing Training School, Western Province who have completed more than 6 months in their training were included in the study. Those who were absent on the day of data collection were excluded. At 95% significance level, assuming 74.0% knowledge, attitudes and practices regarding blood borne occupational exposure among reproductive health staff in Tianjin, China and adding a 5% nonresponse rate, the final sample size was 312. Data was collected in March 2018 using a pretested self-administered questionnaire after obtaining informed written consent before data collection.[5]

Data analysis

SPSS (statistical package for social sciences) version 15 was used to enter data and for analysis. Descriptive statistics was used for summarizing and presenting data. The association between knowledge and associated factors was analysed using the Chi square test and $p<0.05$ were taken as a significant level. There were total of 32 knowledge questions to assess the level of knowledge on transmission of BBV. To calculate the knowledge, each correct statement was given "1" mark and "0" mark for incorrect and don't know responses. Accordingly, the mean mark for knowledge on BBV transmission was 22.71±7.5 SD. Those who had marks ≥22.71 was categorized as "good knowledge" and those who had marks less than 22.71 was categorized as "poor knowledge".

Ethical considerations

Ethical approval was obtained from Ethics Review Committee, Faculty of Medical Sciences, University of Sri Jayewardenepura, Sri Lanka. Prior permission was obtained from the nursing training school. Informed written consent was taken after giving al information about the study and its importance. Confidentiality and anonymity were assured. They had the right to withdraw from the study anytime or not participate in the study.

RESULTS

Out of 295, there were 209 nursing students and the rest were public health midwife students. In the study population 93.7% of the nursing students were females and majority were less than 23 years in age (mean age was 23.24 years, SD=1.52). The sample included first year, second year and third year students in approximately equal numbers. Majority of them (94%) had studied in Biology stream while others have studied in Physical science stream for Advanced level (A/L) examination. As shown in Figure 1, overall good knowledge was 50.2%. Proportion of good knowledge on post exposure prophylaxis (PEP) and prevention was 68% and 60% respectively. However, the proportion of good knowledge for transmission was 43%. Hence, we decided to focus more on the transmission of BBV.

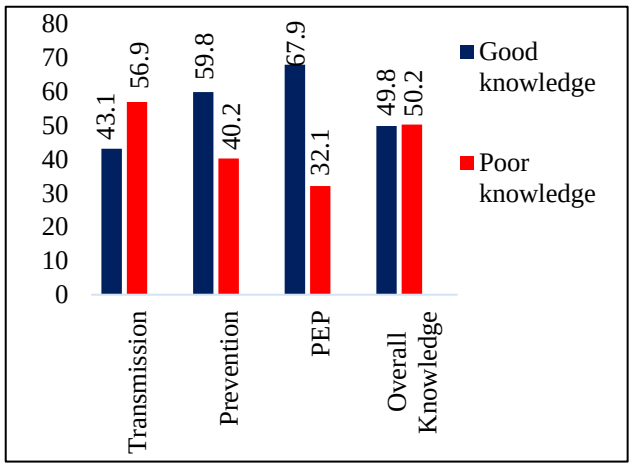

Figure 1: Proportion of knowledge on transmission, prevention, post exposure prophylaxis and overall knowledge on blood borne viruses among nursing students.

As shown in Table 1, nursing students older than 23 years had better knowledge on transmission of BBV than younger students and this was statistically significant ($p<0.05$). With the advancement of academic year, an increase in the level of knowledge was noted and it was

statistically significant (p<0.05). The nursing students who had received formal education on transmission of BBV had better knowledge than students who had not received formal education and this observed difference was statistically significant (p<0.05). However, there was no significant association between knowledge on transmission of BBV and the A/L subject stream or the gender of the study population.

Table 1: Association between Socio-demographic data and knowledge regarding transmission of BBV among nursing students

Socio demographic data	Good knowledge		Poor knowledge		Total	
	No.	%	No.	%	N (%)	Significance
Age (years)						
≤23	52	32.6	90	63.4	142 (100)	p=0.006
23	38	56.7	29	43.3	67 (100)	
Gender						
Male	4	30.8	9	69.2	13 (100)	Fishers Exact Test=0.402
Female	86	43.9	110	56.1	196 (100)	
Academic year						
1st year	11	16.4	56	83.6	67 (100)	p=0.000
2nd year	31	44.3	39	55.7	70 (100)	
3rd year	48	66.7	24	33.3	72 (100)	
A/L stream						
Bio Science	82	41.6	115	58.4	197 (100)	p=0.089
Physical science	8	66.7	4	33.3	12 (100)	
Received education						
Taught	90	45.9	106	54.1	196(100)	Fishers Exact Test = 0.001
Not taught	0	0	13	100	13 (100)	

Table 2: Frequency distribution of knowledge among the study population on transmission methods of HIV and HBV.

Method of transmission	HIV				HBV			
	Correct response about HIV		Incorrect Response		Correct Response		Incorrect Response	
	No.	%	No.	%	No.	%	No.	%
By Needle stick injury	171	81.8	38	18.2	182	87.1	27	12.9
Through Blood transfusion	187	89.5	22	10.5	165	78.9	44	21.1
By sharing household equipment/ personal hygiene equipment	105	50.2	104	49.8	34	16.3	175	83.7
Mother to child at birth	190	90.9	19	9.1	133	63.6	76	36.4
Through organ transplant	167	79.9	42	20.1	137	65.6	72	34.4
By direct contact with blood	157	75.1	52	24.9	129	61.7	80	38.3
Through unprotected sexual intercourse	195	93.3	14	6.7	105	50.2	104	49.8
Through Breast feeding	130	62.2	79	37.8	48	23	161	77
By kissing/ hugging	91	43.5	118	56.5	53	25.4	156	74.6
By tattooing/ piercing	163	48	46	22	122	58.4	87	41.6
Through Mosquitoes bites	51	24.4	158	75.6	30	14.4	179	85.6
Swimming in pools	41	19.6	168	80.4	27	12.9	182	87.1
Shaking hands	169	80.9	40	19.1	102	48.8	107	51.2
Eating with affected people	139	66.5	70	33.5	81	38.8	128	61.2
Eating contaminated food	40	19.1	169	80.9	26	12.4	183	87.6
Exposure to saliva/ tears/stools/ urine	23	11	186	89	17	8.1	192	91.9

Table 2 shows the knowledge of the study population with regards to different methods of transmission of BBV, considering HBV and HIV. Most of nursing students respectively gave correct answers for transmission of HIV and Hepatitis B virus (HBV) by needle stick injury (82%, 87%), through blood transfusion (90%, 79%), from mother to child at birth (90%, 64%), through organ transplant (80%, 66%), by direct contact with blood (75%, 62%), through unprotected sexual intercourse (93%, 50%) and by tattooing/ piercing (48%, 58%).

Surprisingly, more than 50% of nursing students had poor knowledge on transmission of HIV and HBV via sharing household equipment (50%, 84%), by kissing/hugging (57%, 75%), through mosquito bites (76%, 86%), by swimming in pools (80%, 87%), by eating contaminated food (81%, 88%) and through exposure to saliva/tears/stools and urine (89%, 92%) respectively.

DISCUSSION

Health care workers, especially nurses have a high risk of exposure to blood borne infections, mainly Hepatitis B, Hepatitis C, and HIV. Our study was conducted among nursing students at a selected nurses training school in Sri Lanka. Majority of students were aged less than 23 years (67.9%) and were females (93.7%). These results are relatively similar to a study carried out in Italy among 339 nursing students in which 64.3% were aged less than 22 years and 74.6% were females.[6] This pattern may be due to the young school leavers entering the para-medical field as nursing students and the nursing field being predominated by females.

This pattern may be due to the young school leavers entering the para medical field as nursing students and the nursing field being predominated by females. Our findings showed that there was statistically significant difference between the academic year of the study population and their knowledge on transmission of BBV ($p<0.05$). The percentage of students with good knowledge increased respectively through the academic years as 29.9% in first year, 50% in second year and 68.1% in the third year. A study among nursing students in Kathmandu, Nepal by Paudel et al showed similar results.7 The results indicated that there was an increase in good preventive practices of HBV with increasing academic year (27.6% in the first year 38.4% in the third year).

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Our findings showed that there was statistically significant difference between the age of the study population and the knowledge on transmission of BBV ($p<0. 05$). However, the association between the gender of the study population and the knowledge was not significant ($p>0.05$). In relation to this, a study on occupational exposure to blood borne pathogens in Nigerian dental schools demonstrated that there was no significant association between both sex and age with knowledge regarding transmission of BBV.[8] Contrary to the general belief, there was no significant association between the knowledge on BBV and the A/L subject stream being Bioscience or Physical Science ($p>0.05$).

The knowledge of the study population on various methods of transmission of BBV was assessed with regards to HBV and HIV. Majority of the nursing students gave correct responses with regards to commonly known methods of transmission of BBV such as by needle stick injury, through blood transfusion, from mother to child at birth, through organ transplant, by direct contact with blood. Similarly, in a Serbian study almost all medical students and 89% of HCWs also identified blood as the most significant biological material of transmission of HIV.[9]

However, only half of the study population was aware that HBV is transmitted through unprotected sexual intercourse but 93% were aware that HIV is transmitted through this method. This is a better level of knowledge when compared with a study involving nurses of Serbia, where only 64.9% of the total study population identified sperm/vaginal secretions as a HIV transmission biological fluid.[10] Our study population being nursing students when compared with the study of concern which involves doctors, dentists, nurses and laboratory technicians as their study population may have led to this difference.

Only 48% and 58% of the respondents identified that HIV and HBV respectively are transmitted through tattooing/ piercing. This level of knowledge is not satisfactory when considering the study population being nursing students. A study conducted among health care workers in rural India revealed similar results where 26% of respondents were not aware tattooing as a means of transmitting HIV.[11]

It was evident in our study that 89% and 92% of the nursing students had poor knowledge on transmission of HIV and HBV respectively through exposure to saliva/tears/stools and urine. Similarly, in a study conducted in Serbia involving 230 health care workers, majority of the nurses incorrectly stated that HIV is spread through saliva, tears with only 37.4% giving correct answers. In the same study, only a minority of the nurses gave correct answers regarding transmission of HIV through urine (43.6%) and faeces (45.4%).[10] Similarly, among nurses and doctors in rural India 37.7% gave correct answers when considering saliva as a means of transmitting HIV and 61.4% and 68.9% when

considering urine and stools respectively.[11] When considering Nigeria, more than one fourth of health care workers believed that HIV could be transmitted by saliva, faeces, urine.[12]

Majority of the study population had considered that HIV and HBV is transmitted by sharing household equipment (50%, 84%), by eating contaminated food (81%, 88%) and by kissing/hugging (57%, 75%). In contrast in an Indian study 88.4% gave correct answers when questioned on sharing plates, cups and spoons as a method of transmission of HIV.[11] But, the study population of the above-mentioned study being doctors and other HCWs, and ours being nursing students, this level of knowledge shown by both the groups is not satisfactory at all.

Surprisingly among nursing students, 76% and 86% had also stated that HIV and HBV respectively, are transmitted by mosquito bites, and 80% and 87% stated that HIV and HBV respectively are transmitted by swimming in pools. According to a research brief on knowledge of rural nursing students about HIV/AIDS, it was shown that common misconceptions about means on transmission of HIV still exist, and rural nursing students believed HIV can be transmitted through contact with mosquitoes.[13] These findings were similar to the findings of a review of literature which showed that although the knowledge of nurses have improved over the years, their attitudes and fears have not changed proportionately to the knowledge, as the study population believed mosquitoes were carriers of HIV virus.[14] This is supported by the fact that only 70.6% of the respondents giving correct answers on mosquitoes spreading HIV in a study among doctors, nurses and other health care workers in India.[11]

A statistically significant difference was observed between transmission of BBV and whether the study population has received a formal education on the topic or not ($p<0.05$), where all the students who had not received such education showed poor knowledge. However, among those who have received a formal education on transmission of BBV, majority showed poor knowledge during the study. Similarly, a study on Cameroonian nursing students also showed improved HIV related knowledge after training programmes and the scores decreased on re-evaluation after two months.[15]

Therefore, it can be assumed that this observed decrease in knowledge level even after receiving education on the topic may be due to the time gap between the period of teaching and the timing of the study. However, the poor level of knowledge on transmission of BBV cannot be justified on this fact because this is key knowledge that every health care worker needs to be thorough with. In a South African study including nurses, nursing students and midwives it was suggested that improving education on HIV as an essential step in improving HIV related care.[16] This is a valuable suggestion that needs serious consideration as majority of this study of concern were nursing students.

This study showed a detailed insight into the common beliefs and misconceptions regarding the knowledge on transmission of BBV. It was evident that these sections need to be emphasized at nursing education programmes thus minimizing occupational hazards to themselves.

There were few limitations in our study. The study was carried out only in one nurse training school and therefore the results cannot be generalized to the whole country. Although the calculated sample size was 312, there were only 209 nursing students in this school and the rest were public health midwives.

CONCLUSION

In conclusion, although this study was conducted only in one nursing training school, the results showed that health care workers have inadequate knowledge pertaining to BBV transmission. The of importance of educating health care workers on BBV with emphasis on transmission was evident from this study.

Thus, the implications of this study can be used in uplifting the standards of nursing education, nursing services, administration and this also provides grounds for further research, so that the future nurses would be vigilant in protecting themselves from BBV while providing utmost care to the patients.

ACKNOWLEDGEMENTS

Authors would like to thank the Director, National Institute of Health Sciences, Administration staff and students at the Nursing Training School, National Institute of Health Sciences, Kalutara, Western Province, Sri Lanka for granting permission to carry out the research and for their cooperation.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Piyumanthi RAP, Isuruni NAY, Abeyrathne GNU, Rupasinghe SR, Silva LND, Kottahachchi J, et al. Are the future nurses geared to protect themselves from blood borne viruses? A descriptive cross-sectional study from Sri Lanka. Int J Community Med Public Health 2020;7:4227-32.