Original Article

Hepatitis B & C Among Nurses

Needle Stick Injuries: Knowledge, Attitude, Practices (KAP) and Frequency of Hepatitis B & C among Nursing Students in Karachi

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ABSTRACT

Objective: The objectives were to determine the Knowledge, Attitude, Practices regarding needle stick injuries (NSI) and frequency of Hepatitis B & C among nursing students at two tertiary care hospitals of Karachi.

Study Design: Cross-sectional study**.**

Place and Duration of Study: This study was conducted at the Department of Medicine, DMC, JPMC and Hilton Pharma, Karachi from January 2014 to June 2014.

Materials and Methods: This study was carried out on NSI exposed 214 nursing students from 1st year to 4th year, visiting their respective hospitals and engaging in clinical activities. A hundred of those students who reported needle stick injuries randomly selected and screened for Hepatitis B surface antigen (HbsAg) and anti-HCV in sera.

Results: Approximately thirty four percent (34%) of the students reported to have NSI one time. Out of the 214 students only 143 (66·8%) of the students were aware of the Universal Precaution Guidelines while 71 (33·2%) were unaware of it. After getting NSI only 18·2% reported it to the infection control team while 81.8% failed to report it. Of the 100 students randomly selected for screening, four tested positive for HbsAg and two tested positive for Anti-HCV.

Conclusion: Allowing nursing students to practice without prior knowledge of their immune status poses a major risk of acquiring hazardous infections. Prior to practice, students should be ingrained with the universal precaution guidelines and screened for blood borne infections that should be followed up every year.

Key Words: Hepatitis C, Needle stick injuries, Hepatitis B, Nursing student

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INTRODUCTION

One of the major concerns of hospital administrations is the transmission of blood borne infections to the health care workers (HCWs) through needle stick injuries (NSI). Of these infections, the most challenging and with fatal consequences are Hepatitis B, C and HIV but the risk of HIV transmission appears to be low (0.3%).[1]

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In Pakistan, there are an estimated 7-9 million carriers of hepatitis B virus with a carrier rate of 3-5%. The percentage of hepatitis B virus infection in the general population is 4.3% ± 1.64%, in healthy blood donors 3.93% ± 1.58%, healthcare persons 3.25% ± 1.20%, and in users of injectable drugs is 14.95% ± 10.54%.[2] Percentage prevalence of HCV was 4.95% ± 0.53% in the general adult population, 1.72% ± 0.24% in the pediatric population and 3.64% ± 0.31% in a young population which applied for military recruitment. Very high 57% ± 17.7% prevalence was observed in injecting drug users and 48.67% ± 1.75% in a multi transfused population.[3]

The risk of HBV or HCV infecting a healthcare worker is higher in percutaneous than in mucosal-cutaneous exposure. According to the data provided by the World Health Organization (WHO), there are approximately 36 million healthcare workers worldwide, of whom around 3 million per year receive an injury with a sharp instrument, thus resulting in 2000000 subjects contaminated with HBV and 1000000 with HCV.[4]

Globally, it is estimated that out of the total of 35 million HCWs worldwide, 3 million experience NSIs every year; [5]of these, nurses are at the greatest risk, with up to 50% of all NSIs being sustained by this group. [6] Considering such prevalence and penetrance in the general population, the exposure of the unsuspecting nursing students is immense. Being

amateurs in their clinical skills, with little experience but extreme enthusiasm the rate of acquiring these infections is quite high. After keeping all factors under consideration the primary objective was to assess the knowledge, attitude and practices regarding NSI among nursing students. The secondary objective was to determine the frequency of Hepatitis B & C among nursing students with NSI.

MATERIALS AND METHODS

This cross sectional study was carried out among nursing students of This study was conducted at the Department of Medicine, DMC, JPMC and Hilton Pharma, Karachi**,** from January 2014 to June 2014. Raosoft calculator was used to calculate the sample size assuming frequency of NSI among nurses 20.4%, margin of error 5%, and confidence level 95%. The minimum recommended sample size was 247.[16] Three hundred and fourteen nursing students in the two institutes were approached to take part in the study, of which 214 nursing students from 1st year to 4th year were recruited on atleast once exposed to NSI. We obtained responses regarding their practices with the help of a pretested questionnaire.[12] A total of 33 questionnaires were not included in the final analysis due to incomplete information. The areas covered in the questionnaire to judge the knowledge, attitude and practices of students were their level of training; instruments involved in injury; amount of bleeding; frequency of NSI in their total clinical experience; initial measure taken to stop the bleeding; reporting to infection control team; knowledge about universal precaution guidelines; reason for getting injury and mode of injury; and finally their vaccination history and immune status.

A hundred students were selected randomly for the screening of Hepatitis B surface antigen (HBsAg) and Antibody to Hepatitis C virus (Anti-HCV) in their sera. All participants were informed about the aims and objectives of the study and their consent was obtained to fill the questionnaire and blood samples. Participants data was kept confidential and positive results on hepatitis B & C were informed to participants and as well as to concerned authorities.

One hundred randomly selected samples were screened for HBsAg and anti-HCV. For screening, 5cc blood samples were collected and centrifuged at 6000 rpm for 5 minutes. The serum was separated and was transferred into disposable Eppendorf. Vitros Electrochemical Immunoassay (ECI) technology and kits were used under the supervision of well experienced technicians provided by the company. The sensitivity and specificity of the test for the detection of HBsAg is 99.99% and 98% respectively. [8] Similarly for the detection of anti-HCV in sera, sensitivity of this technique was 100% while specificity for the test was 99.99%.[9] Data was entered into Microsoft Excel and exported to SPSS version 20.0 for analysis. All categorical variables were expressed in frequency and percentages.

RESULTS

The frequency of students regarding year of education, 11 (5.1%) belonged to 1st year, 101 (47.2%) students belonged to 2nd year, 64 (30%) from 3rd year, and 38 (18%) from 4th year of nursing school. Thirty six (16.8%) students were male and 178 (83.2%) were females. the mean age of the students was 21.17 +/- 2.56 years.

Majority of the students experienced NSI at least once during their clinical encounters. However, many of the 3rd year (33.3%) and most of 4th year (56.2%) students suffered the injury twice. Thirty percent (30%) of the total students reported to have had NSI more than twice. When asked about the cause of injury, 130 (61%) said that the practice of recapping syringes and 26 (12.1%) said bent needles were to blame. The remaining 58 (27.1%) mentioned that handling other sharp objects caused them the injury. In answer to the question regarding what made them prone to acquiring NSI, 123 (58.2%) said immense workload, 34.1% and 28.9% of which were in 3rd year and 4th year of education, and 43 (20.4%) admitted that their own negligence led to this unfortunate event. Little experience was the reason for 41 (19.4%) students, majority (80.4%) of them were in 2nd year of nursing school.

Regarding their attitude, it was noted that 54% students pressed the wound to bleed further as a remedy, while 23.3% washed the wound site. Following NSI only 18.2% reported the incident to the Infection control team while the remaining 82% chose to remain silent. Precautionary measures like double gloving were taken by 127 (60%) students while 87 (41%) showed carelessness in this regard. After going through the results of this study it was surprising to learn that only143 (67%) students were aware of Universal Precaution Guidelines and 71 (33.2%) were unaware.

Regarding their practices, it was noted that one hundred and forty one (66%) students had completed their Hepatitis B vaccination course before enrolling into the nursing school, whereas as much as 65 (30.3%) were unvaccinated. Eight (3.7%) students still had doses remaining. Only 20 (9.3%) got tested for Anti HBsAg titers prior to clinical exposure while the remaining 194 (90.7%), whether vaccinated or unvaccinated, did not get tested. Blood samples from randomly selected students were collected and screened for the presence of HbsAg and Anti HCV. A positive result for HbsAg was reported for 4 students out of the 100, all of which failed to provide any evidence of past vaccination. Anti HCV was reported positive for 2 students out of the 100, both of which were vaccinated against Hepatitis B virus.

Table No.I: Knowledge, Attitude and Practices of Nursing Students Regarding NSI (n=214)

Questions	N (%)
What is the frequency of NSI?(n=194)	
One time	65(33.5)
Two times	71(36.5)
> 2 times	58(30)
How you got a NSI? (n=213)	
Recapping	130(61)
Bending needle	25(12)
Others	58(27)
How do you think you got NSI? (n=210)	
Workload	123(58)
Little experience	41(19)
Negligence	43(21)
Confidence	4(2)
Do you know universal precaution guidelines? (n=214)	
Yes	143(67)
Hepatitis B vaccination done? (n=214)	
Yes	141(66)
No	65(30)
In progress	8(4)
Anti HBs antibody after vaccination? (n=214)	
Checked	20(9)
Unchecked	194(91)
Have you reported the incidence to infection control team? (n=214)	
Yes	39(18)
What did you do with injury site after getting NSI? (n=214)	
Washed	56(26)
Pressed it to bleed	111(52)
Washed, pressed it to bleed	41(19)
Did nothing	6(3)

DISCUSSION

The multi-centered study which was carried out in two nursing institutes associated with tertiary care hospitals of Karachi, suggested the thirty four percent (34%) of the students reported to have NSI one time, Kessler CS et al reported a prevalence of 22.6% among health care workers in United States.[10]Other regional studies suggested a mixed pattern where one study reported a higher incidence of NSI with a rate of 74%, while other studies showed a lowering trend i.e. 53.5%, 45%, 38.4%, 26.1%, 24.4%, and 20.4%. [6,11,12,13,14,15,16]

Majority of students failed to report the NSI to the infection control team in our study (81.8%) in concordance with other studies that have shown high failure rates of 55%, 21% and 47%.[10, 11, 15]This shows lack of formal training and emphasis on incident reporting and careless attitude of students regarding NSI across the board. We did not explore the most common reasons for underreporting but other studies revealed "unused needles" being the source of injury, belief that most exposures are insignificant, and "being too busy" as the most common reasons for not reporting.[10,17]

Notably in our study recapping of syringes (60.7%) was identified as a major risk factor for NSI as compared to other studies that suggested rates of 35%, 32% and 11% which indicates inadequate knowledge of protocols and precaution guidelines at a stage of basic training for young nurses.[11, 14, 18] Bent needles (12.1%) were identified as a second major risk factor for NSI. In junior students of 1st and 2nd year little experience was identified as the major risk factor for NSI. In a similar study in Tehran the subjects were seen to be more likely to develop blood borne infections during their internship period.[6] Majority of senior students in our study reported that high workload (75.5%) lead to the incidents of NSI. Other studies in Health care workers (HCWs) also supported a higher rate of NSI with increased work load and tiredness.[14, 19] The frequency of NSI showed a higher trend amongst middle year students with 51.5% of total injuries reported by 2nd year students and 26.3% by 3rd year. This is primarily because of increasing workload but insufficient amount of training in middle years whereas 1st year students (5.7%) and final year students (16.5%) had a lesser incidence of NSI due to very little clinical exposure and significant experience respectively.

In our study, 66.8% of the students reported that they had knowledge of Universal precaution guidelines (UPG), which corresponds with findings by Chan et al (2002) and Van der ber et al (2012). [20, 21]There is however a lot of scope for improvement, as no less than 100% awareness is desirable. These studies also showed no significant correlation between having knowledge of and adherence to UPG.[22]This may have contributed to the high rate of NSI in our study.

Strikingly, in our study, a sizeable proportion of students (30.3%) were not vaccinated for Hepatitis B which is significantly higher than that in other studies which have shown a better trend in vaccination.[16, 22, 23] With regard to screening, prevention and treatment of blood borne infections, this shows a clear lapse in policy making and implementation on part of Nursing school administrations.

In our study, 4% of the subjects had positive HBsAg while 2% tested positive for Anti-HCV. This may represent current infection or carrier status. However the positive results shown may not be entirely due to NSI and the students may have acquired it prior to their admission in nursing school, or been carriers since birth, following vertical transmission. Moreover, our study could only reveal point prevalence of Hepatitis B and Hepatitis C in the study population, but could not determine the frequency of past incidences of infection that may have taken their natural course and resolved following NSI. Therefore, there is a need to conduct

larger scale studies targeted at determining period prevalence of blood borne infections among nursing student populations while they are in training.

During preclinical years, nursing school training should place more emphasis on tending to universal precaution guidelines, so that the students are well-versed with all safety protocols by the time of their first few clinical encounters, when the likelihood of NSI was reported highest. This should be combined with adequate clinical supervision. A protocol should be worked out and implemented, that in the event of an incident, mandates students to report sharps injury to infection control department in a prompt manner, take the right post-exposure measures and initiate necessary prophylaxis against infections.

CONCLUSION

Allowing nursing students to practice without prior knowledge of their immune status poses a major risk of acquiring hazardous infections. Prior to practice, students should be ingrained with the universal precaution guidelines and screened for blood borne infections that should be followed up every year.

Conflict of Interest: The study has no conflict of interest to declare by any author.

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