



RESEARCH ARTICLE

KAP STUDY REGARDING NEEDLE STICK INJURIES AMONG NURSING COLLEGE STUDENTS –A CROSS SECTIONAL STUDY

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ABSTRACT

**Introduction:** Needle sticks and sharp injuries (NSSI) are identified as one of the occupational hazards in health care workers. NSSI increase risk of spread of diseases like HIV, hepatitis B, hepatitis C. Sharp injuries are a major source of HCV infection among health care workers (HCWS), accounting for 40% of HCV infections. Certain groups of individuals are at greater risk than others because of their nature of work. Numerous studies have found nurses to be the commonest group of health care workers in experiencing needle stick injuries due to their limited clinical experience. The purpose of this study is to know their knowledge and practices regarding needle stick injuries.

**Methods:** A cross-sectional study was carried out in a nursing college in Guntur city in August 2016. Study population constituting II,III, final year students. Self administered pre-tested questionnaire was used for data collection. Data was analyzed using SPSS version 20.

**Results:** The study population constitutes of 70 males and 268 female students form a nursing college in Guntur city. Mean age of the population was 20.5 years. Vaccination of which only 57.8% in final year, 56.5% in III year and 56.6% in II year had carried out Anti HBs antibody check up. Knowledge about disease transmitted by NSIs was satisfactory. Though 56% had suffered Needle stick injury (NSIs), 88.7% HCWs know about universal precaution guidelines.

**Conclusion:** Nurses are at high risk of needle stick injuries from syringes and equipment relative to the other health care workers. There is an urgent need for strengthening skills, developing newer competencies and broadening our knowledge in occupational health and safety.

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INTRODUCTION

Needle stick sharp injuries are commonly occurring occupational hazard among health care personnel's. The blood borne diseases such as HIV, HBV and HCV etc are most common diseases that are spread through these injuries. The study concerning exposures to blood and body fluids in health care workers found that an average 93.7 per 1000 health care employees were exposed annually (Goob et al., 1999). Universal precautions are the infection control techniques that are recommended following the AIDS outbreak in the 1980s. Essentially it means that every patient is treated as if they are infected and therefore precautions are taken to minimize risk. All sharps should be handled with extreme care as they should never be passed directly from one person to another, and their

use should be kept to a minimum (Guide lines for HIV/AIDS Intervention in emergency settings). The risk factors involved in needle stick injuries have been extensively studied by. Aiken, Klocinski and Sloane (1998) suggested that many of the needle stick injuries occur during recapping. A study done by (Osborn et al., 1999) showed that incidence of needle sticks among medical students concluded that workload and education of safe practice should be taken into consideration. The American nurses association (ANA) estimated that of the numerous needle stick injuries only about 1,000 health care workers actually contract an infection. Besides exposure to bloodborne pathogens, the nurse is also at risk for about twenty other infections that can be transmitted through a needle stick, including tuberculosis, syphilis and malaria pathogens. Primary prevention includes engineered safety devices, no recapping of needles, and educational programming. Secondary interventions for nursing students include peer and instructor evaluation of performance, “check-offs” of various nursing skills and continuing assessment of incidence of needle sticks.

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Tertiary intervention would be post exposure prophylaxis following a needle stick injury. The world health organization’s estimated that approximately 3 million cases of needle stick injuries (NSIS) in health care workers (HCW) each year, with 90% of these occurring in developing countries (WHO 2003). Student’s nurses are thought to be at high risk of NSI due to poor technique, inexperience and poor use of precautions. (Offili and Soglesan, 2003) Hence an attempt was made to know their knowledge and practices regarding needle stick injuries.

**MATERIALS AND METHODS**

The present study was carried out among the nursing college students of Guntur city. The study group constitutes of final, third and second year nursing students. The study was carried out over two months from July to August 2016. Subjects were fully informed about the design and purpose of the study and a written informed consent was obtained. Clearance of study protocol was obtained from the institutional ethics committee before the start of the study. The study was conducted with the help of an anonymous, self reporting questionnaire. Case definition of NSI in the present study included injuries caused by sharps such as hypodermic needles, blood collection needles, cannulas, suture needles, winged needle sets and needles used to connect parts of the delivery. The questionnaire constituted of general information such as gender, age, year of education, recall of self experienced needle stick injuries and their reasons along with measures they followed immediately after injury.

Questions regarding knowledge of safe disposal of used ones and awareness assessment questions regarding universal precaution guidelines of sharp management. An attempt made to know whether they underwent training regarding sharp management. Information of Vaccination against hepatitis B and C was collected. The content validity was tested by test-retest method. The participants completed questionnaire was handed back to the researchers on the same day that they were delivered. A knowledge assessment of needle stick injuries, protocols and prevalence of NSIS among students was done. The data was analyzed using Statistical package of social sciences (SPSS) version 20. The P value was set at 0.05 for significant level.

**RESULTS**

A total of 338 questionnaires were delivered to the nursing students during mandatory class attendance. The average age of the respondents was 20.3 years. Among the respondents in Table 2 females constitute 268(79.3%), males constitute 70(20.7%). Year wise respondents in table 1 were final year 64(18.9%) third year 168 (49.7%) and second year 106(31.3%). Among the respondents total number that experienced NSIS were 52(81.2%) final years, 66(62.3%) III years, 66(62.3%) II years. The majority answered that commonest site of injury was finger among those 33(51.6%) were final years, 41(38.7%) were III years, 52(31.0%) were II years. Reasons for injury majority agreed that careless attitude, among those mentioned 27(42.2%) final years, 42(39.6%) III years, 88(52.4%) II years.

**Table 1. Nursing students distribution according to year wise**

	4 <sup>TH</sup> YEAR		3 <sup>RD</sup> YEAR		2 <sup>ND</sup> YEAR		P-VALUE
	64	%	106	%	168	%	
Have you experienced nsis							
Yes	52	81.2	66	62.3	93	55.4	0.009*
No	12	14.8	40	37.7	75	44.6	
If yes number of times experiences							
Once	20	31.2	22	20.8	32	19	
Twice	09	14	08	7.5	11	6.5	
More than twice	07	11	18	17	30	17.9	0.022*
Dont remember	16	25	18	17	20	12	
Site of injury							
finger	33	51.6	41	38.7	52	31.0	
Hand	08	12.5	07	6.6	09	5.4	0.231
Both 1 and 2	11	17.1	15	14.2	31	18.4	
Dont remember	0	0	03	2.8	01	0.6	
What are the most common reasons for nsi							
Stress	06	9.4	05	4.7	07	4.2	
Being over burdened	13	20.3	13	12.3	13	7.7	
Careless attitude	27	42.2	42	39.6	88	52.4	0.089
Lack of experience	18	28.1	46	43.4	60	35.7	
What measures will you take for immediate management of nsis							
Wash the injured area with soap and running water							
Allow injury to bleed	10	15.6	62	58.5	52	31.0	
Clean the area with spirit swab	07	10.9	07	6.6	26	15.5	0.000*
Applying available bandage	36	56.3	30	28.3	78	46.4	
	11	17.2	07	6.6	12	7.1	
Common occurrence of nsi is while							
Giving injection	17	26.6	28	26.4	40	23.8	
Drawing blood samples	07	10.9	10	9.4	26	15.5	
Suturing	04	6.3	04	3.8	05	3.0	0.817
Recapping needle	23	35.9	41	38.7	48	28.6	
Bending/breaking needles by hand	12	18.8	20	18.9	48	28.6	
Assisting in theater	01	1.6	03	2.8	01	0.6	
Do you recap needle after injection							
Yes	49	76.6	97	91.5	139	82.7	0.128
No	15	23.4	09	8.5	29	17.3	
If yes which method do you follow							
Use one hand to recap needle	47	73.4	71	67	98	58.3	0.082
Use both hands to recap needle	17	26.6	35	33	70	41.7	

Continue.....

Method of disposing syringe							
Leave it on the working tray	03	4.7	05	4.7	05	3.0	
Place the syringe in sharp disposal container	26	40.6	39	36.8	37	22.0	
Throw the syringe in garbage	11	17.2	06	5.7	24	14.3	0.031*
Use of needle destroyer	21	32.8	40	37.7	73	43.5	
Safe hospital management	03	4.7	16	15.1	29	17.3	
Do you know universal precaution guidelines							
Yes	33	51.6	94	88.7	121	72.0	
No	31	48.4	11	11.3	47	28.0	0.000*
Diseases transmitted by nsis							
Hiv/aids	23	36.0	24	22.6	33	19.6	
Hepatitis b	07	10.9	11	10.4	20	11.9	
Hepatitis c	03	4.7	01	0.9	04	2.4	0.238
All the above	28	43.7	64	60.4	111	66.1	
None	03	4.7	06	5.7	0		
Have you taken vaccine against hepatitis b							
Yes	37	57.8	60	56.6	95	56.5	0.934
No	27	42.2	46	43.4	73	43.5	
Have you received sharp management training							
Yes	22	34.4	32	30.2	60	35.7	0.321
No	42	65.6	74	69.8	108	64.3	

Table 2. Nursing students distribution according to gender wise

	Male 70 (20.7%)		Female 268(79.3%)	P-VALUE	
Have you experienced nsis					
Yes	38	54.3%	173	64.6%	0.076
No	32	45.7%	95	35.4%	
If yes number of times experiences					
Once	12	17.1%	63	23.5%	
Twice	5	7.1%	23	8.6%	0.386
More than twice	9	12.9%	47	17.5%	
Dont remember	44	62.8%	135	50.4%	
Site of injury					
finger	33	47.1%	162	60.4%	
Hand	6	8.6%	20	7.5%	0.242
Both 1 and 2	30	42.9%	83	31.0%	
Dont remember	1	1.4%	3	1.1%	
What are the most common reasons for nsi					
Stress	2	2.9%	16	60.0%	
Being over burdened	10	14.3%	29	10.8%	0.612
Careless attitude	34	48.6%	123	45.9%	
Lack of experience	24	34.3%	100	37.3%	
What measures will you take for immediate management of nsis					
Wash the injured area with soap and running water	27	38.6%	97	36.2%	
Allow injury to bleed	8	11.4%	32	11.9%	0.948
Clean the area with spirit swab	28	40.0%	116	43.3%	
Applying available bandage	7	10.0%	23	8.6%	
Common occurrence of nsi is while					
Giving injection	15	21.4%	70	26.1%	
Drawing blood samples	9	12.9%	34	12.7%	
Suturing	2	2.9%	11	4.1%	0.312
Recapping needle	22	31.4%	90	33.6%	
Bending/breaking needles by hand	19	27.1%	61	22.8%	
Assisting in theater	3	4.3%	2	0.7%	
Do you recap needle after injection					
Yes	48	68.6%	237	88.4%	0.000
No	22	31.4%	31	11.6%	
If yes which method do you follow					
Use one hand to recap needle	39	55.7%	177	66.0%	0.109
Use both hands to recap needle	31	44.3%	91	34.0%	
Method of disposing syringe					
Leave it on the working tray	5	7.1%	8	30.1%	
Place the syringe in sharp disposal container	26	37.1%	76	28.4%	0.247
Throw the syringe in garbage	9	12.9%	32	11.9%	
Use of needle destroyer	24	34.3%	110	41.0%	
Safe hospital management	6	8.6%	41	15.3%	
Do you know universal precaution guidelines					
Yes	47	67.1%	202	75.0%	0.113
No	23	32.8%	68	25.0%	
Diseases transmitted by nsis					
Hiv/aids	18	25.7%	62	23.1%	
Hepatitis b	9	12.9%	29	10.8%	
Hepatitis c	3	4.3%	5	1.9%	0.765
All the above	38	54.3%	165	61.6%	
None	2	2.9%	6	2.2%	
Have you taken vaccine against hepatitis b					
Yes	39	55.7%	153	57.1%	0.470
No	31	44.3%	115	42.9%	
Have you received sharp management training					
Yes	31	44.3%	83	31.0%	0.101
No	31	55.7%	184	68.7%	

Regarding measures they followed, most of III<sup>rd</sup> years (58.5%) responded as they wash the injured area with soap and running water, among final years (56.3%) and IInd years (46.4%) of them responded as clean the area with spirit swab. Common occurrence of Needle stick injuries was found among most of the students. (33.1%) responded that while recapping needle, followed by giving injections (26.14%). As showed in table 1 final year students 35.9% responded NSIS were while recapping needles, among III<sup>rd</sup> year students 38.7% responded NSIS were while recapping needles and among IInd year students 28.6% said that while recapping needles and equally while bending/ breaking needles by hand. Regarding response to the recapping of the needle after injection 91.5% responded that they recap after use. Method to be followed while recapping most of them answered that use one hand to recap needle constituting 67%. Rest of the 33% were answered as they use both hands to recap needles. This was found as statistically significant with p value 0.082. Question regarding method of disposing syringe they responded as followed, use of needle destroyer (37.7%), place the syringe in sharp disposal container (36.8%). Table 2 among males (54.3%) and females (64.6%) experienced needle stick injuries during their day to day activities which was statistically significant. Among males (67.1%) and females (75.0%) were aware regarding universal precaution guide lines. Regarding disease transmitted by NSIS (54.3%) males and (61.6%) females were expressed as HIV/AIDS, HBV, HCV all three will be transmitted. Among males (55.7%) and females (57.1%) were vaccinated against hepatitis B. Regarding sharp management training males only (44.3%) and females only (31.0%) were received.

## DISCUSSION

The present study addresses of certain aspects of needle stick injuries. It was found that 62.42% of nursing students had experienced NSIs at some point in their careers. In that commonest site of injury reported were finger (47.1%) males, (60.4%) females. India authentic data on NSIS are scarce. It is known that around 3-6 billion injections are given per year, of which 2/3<sup>rd</sup> injections are unsafe (62.9%) and the use of glass syringes is constantly associated with higher degree of unsafety. (Kermode and Muani, 2006) In the study done by Sumathi Muralidhar *et al.* on needle stick injuries among HCWS showed nurses were most prone to NSIS, with hundred percent of them having experience it in the preceding one year. (Sumathi Muralidhar *et al.*, 2010) There are other studies had also shown high occurrence of NSI among nurses. (Nili *et al.*, 2006; Nagao *et al.*, 2007; Smith and Leggat, 2005; Alamgir *et al.*, 2008) In the present study regarding knowledge of disease transmission by unsafe injection practices were as follows HIV was (22.60%), Hepatitis B was (10.4%), Hepatitis C was (0.9%), All three were transmitted by (60.4%), none were transmitted by (5.7%). This was little bit varied from the study done by the Kiran Pamarthi, Appala Naidu S, Madhavi.S in their study knowledge of disease transmitted by unsafe injection practices, majority (97%) were aware that HIV is transmitted. Around 44.5% stated that both HIV, HBV were most commonly transmitted diseases, while 2.7% students felt that no disease are transmitted by unsafe injection practices. (Kiran Pamarthi *et al.*, 2014) Similar studies done by Pandil NB, Choudary SK in their study in Gujarat, stated that 94% of service providers were well known that HBV is transmitted by NSIS. (Pandit and Choudary, 2008) Another study done by Kotwal *et al* in New Delhi found that knowledge regarding

disease transmission was 77.5% for HIV, 52.5% for HBV and 50% for HCV. (Kotwal *et al.*, 2004) Universal precautions are an approach to infection control to treat all human blood and certain human body fluids as if they were known to be infections for HIV, HBV and other blood-born pathogens. These include standard precautions such as hand washing, using appropriate personal protective equipment such as gloves, gowns and masks whenever touching or exposure to patient's body fluids is anticipated. (Zungn *et al.*, 2008) It is estimated that the risk of contracting Hepatitis B infection due to a needle prick injury is 100 times higher than that of contracting HIV. In this study 99% students responded that immediate measures must be taken following needle stick injuries. This was similar to the study done by Kiran Pamarthi, Appala Naidu.S, Madhavi S. in their study they found that 92% students responded that immediate measures must be taken following NSIS. (Kiran Pamarthi *et al.*, 2014) The present study showed that the respondents who receive vaccination against HBV were among males 55.7% and among females 57.1%. Vaccination of which only 57.8% in final year, 56.5% in III<sup>rd</sup> year and 56.6% in II<sup>nd</sup> years had carried out Anti HBs antibody check up. Which was similar to the study done by Paul B *et al* in their study they found that 52.5% subjects were protected by Hepatitis B vaccination. (Paul *et al.*, 2011) And another study done by Jayanth ST *et al* in their study on needle stick injuries stated 66.8% had received three doses of vaccine and a booster with in 5 years. (Jayanth *et al.*, 2009) In this study the sharp management training received among male respondents were 44.3% and among female respondents were 31.0%. According to one study by Exposure prevention information net work (EPI net) in 1999, out of 5000 percutaneous injuries due to sharps, 62% involved hollow bore needles. This association can have an impact on transmission of pathogens, as hollow bore needles are associated with higher fluid content and pathogen load, with a higher risk of disease transmission. (International health care workers safety center, 1999; Nili *et al.*, 2006)

## Conclusion

Procedures rated as high risk were considered to be most likely associated with the occurrence of NSIS. Appropriate guidelines, adequate knowledge and the enforcement of compliance with standard precautionary measures could reduce the incidence of NSIS among nursing students. The immunisation against Hepatitis B of nursing students undergoing training is also essential. The problem of unsafe injection practices at the college level should be addressed by organizing regular symposium, workshop and continuation of medical educations (CMES). Practice is as important as training and periodic monitoring of the activity is needed. The finding of this study are consistent with existing literature reporting that nursing students indeed experience needle sticks but are not likely to report them. It is only through accurate reporting that true incidences can be identified and changes made in practice and reporting technique to report these students and ensure their safety in the clinical practice setting. All nursing colleges should make safety-engineered equipment. Education regarding the use of protective and safety equipment and reporting of needle stick injuries should be promoted on a regular basis. Legislation may be needed to required safety measures for nursing college students. Transmission-based precautions such as airborne precautions, droplet precautions, and contact precautions to interrupt transmission of pathogen in hospitals.

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