PREVALENCE OF NEEDLESTICK INJURIES AND UTILISATION OF POST EXPOSURE PROPHYLAXIS AMONG RESIDENT DOCTORS IN A TERTIARY HOSPITAL IN PORT HARCOURT NIGERIA – A CROSS-SECTIONAL ANALYTICAL STUDY.

Irene O. Obuzor*[1] and Nneka Gabriel-Job[2]
[1]World Bank Centre of Excellence in Public Health and Toxicological Research, Port Harcourt, Nigeria, [2]University of Port Harcourt, Port Harcourt, Nigeria
***Corresponding author:** Irene O. Obuzor
Email: drobuzor@gmail.com

ABSTRACT
Background: *Needlestick injuries (NSIs) are percutaneous injuries sustained during delivery of medical care. They are occupational hazards faced by health workers and are a source of transmission of bloodborne pathogens.*

Aim*: This study was aimed at determining the prevalence of NSIs, utilisation of post-exposure prophylaxis and assessing the association between sociodemographic and occupational factors, knowledge and attitude towards NSIs among the resident doctors in the University of Port Harcourt Teaching Hospital in Port Harcourt, Nigeria.*

Methods: *Descriptive cross-sectional analytical study design was conducted using a self-administered questionnaire.*

Results: *The study found a 53.8% prevalence of NSIs among resident doctors. Annual prevalence was 50.9%. The prevalence was significantly higher among senior residents (65.1%) than among junior residents (45.9%) (p=0.006), among residents in Paediatrics (75.6%) than among other departments, lowest prevalence Psychiatry (0%) (p<0.001), and among residents who had worked for three years or more in the hospital (65.7%) than in those who had worked for less than 3 years (44.8%) (p<0.001). The most frequently reported factors that predisposed to needlestick injuries were excess workload (77.9%), insufficient consumables (72.6%), long working hours (70.2%) and lack of personal protective equipment (69.7%). 77.4% of residents had negative attitudes of recapping needles, 66.1% had negative attitudes of not reporting NSIs to authority. Only 8.9% of the residents utilised post-exposure prophylactic services after injury. In 51.8% of cases, the needle had been used on a patient prior to the injury. In 25.9% of these cases, the injury involved a high-risk patient (HIV, Hepatitis B or C infected). This study found a risk of transmission of HIV following a needlestick injury to be 0.48%. It found that attitude towards NSIs was significantly associated with the respondents' job category, department, years of practice and average number of calls taken per month. There was however no significant relationship between*

these factors and knowledge about NSIs.

Conclusion: *Needlestick injuries are common among resident doctors. A large number of these injuries go unreported. The attitude toward preventive measures and use of post-exposure prophylactic services is sub-optimal necessitating a need for more attention to be drawn to occupational health and safety in the region.*

Keywords: *Needlestick Injuries, Resident Doctors, Healthcare Workers, Postexposure Prophylaxis, Nigeria.*

INTRODUCTION

It has been shown that among 35 million health care workers, 2 million experience percutaneous exposure to infectious diseases each year, and 39%, 37.6% and 4.4% of HCV, HBV and HIV cases among health care workers in the world, respectively, are due to needlestick injuries.[1] The occupational risk associated with exposure to needlestick injuries affects the quality of care provided by the health care worker, due to the fear, anxiety, and emotional trauma associated with such injuries.[2] It has been found that about 40-70% of the cases of needlestick injuries in developing countries remain unreported.[3]

Due to the likelihood of poor documentation of events, it is important to ascertain for a fact, the true rates of occurrence of needlestick injuries and the typical response of health practitioners to these injuries so that the need for interventions will be identified. Resident doctors comprise the major population of the doctor workforce in big tertiary hospitals like ours.

This study was therefore aimed at determining the prevalence of NSIs, utilisation of post-exposure prophylaxis and assessing the relationship between sociodemographic, occupational factors, knowledge, attitude towards NSIs and the occurrence of these injuries among the residents in a Tertiary hospital in Port Harcourt, Nigeria.

METHODOLOGY

Study Design and Population

This was a descriptive cross-sectional analytical study which took place between July and September 2017 at the University of Port Harcourt Teaching Hospital. The minimum sample size was derived from the prevalence from a similar study.[4] The study respondents were 210 resident doctors at various levels of training. Considering that the number of residents differed significantly in each department, to obtain a representative sample, the number of resident doctors from each of the departments to be recruited for the study was obtained by calculating the percentage of total resident doctor population for each department. This percentage was used to determine the number of participants to be recruited from each department. A simple random sampling technique was employed using a table of random numbers to pick the actual participants from the sample frame of the resident doctors working in the hospital. Informed consent was obtained. Confidentiality was maintained. Participation was voluntary. Ethical approval

was obtained from the University of Port Harcourt Ethics committee (UPH/CEREMAD/REC/04).

Survey Instrument

A structured self-administered questionnaire consisting of 30 closed-ended questions was pre-tested among a group of 20 residents over a two-week period for face validity, content validity and feasibility of the study. The Cronbach's alpha value (internal validity) of the questionnaire was assessed to be 0.84. Following the feedback, the final questionnaire was designed which enquired about their socio-demographic characteristics, the number of needlestick injuries ever experienced and in the last one year, possible contributory factors to the injury, whether the needle had been used on the patient prior to the injury, whether it involved a high-risk patient (patient with HIV, Hepatitis B or C infection), whether the injury was reported, reasons for not reporting, actions taken immediately following the injury, whether post-exposure prophylaxis (PEP) was commenced, how long after the injury PEP was commenced and for how long it was taken. The hepatitis B vaccination status of the participants and whether they were aware of the existence of a written protocol for needlestick injuries in their department was also ascertained. The respondents were asked about whether or not they had attended training on infection prevention beyond medical school.

Statistical Analysis

Summary measures were computed and displayed using tables and charts. The summary statistic for continuous variables such as respondent's age was reported as mean and standard deviation, while those of categorical variables such as sex, marital status, job category, were reported as frequencies and percentages. Differences in proportions were assessed with Chi-square test or fisher's exact test, where applicable. Overall knowledge and attitude scores were computed. Correctly answered questions on knowledge or attitude questions in the questionnaire were given a score of 1 while wrongly answered questions were given a score of zero. Overall knowledge score was computed by summing up all correct answers to the knowledge questions in the questionnaire and dividing by the total number of questions on knowledge and then expressed in percentage by multiplying by 100. Taking above average as being a score of 75%, respondents with scores 75% and above were categorised as having good knowledge, while scores below 75% were categorised as having poor knowledge. A similar approach was adopted for overall attitude score. The Chi-square test of independence was used to identify statistically significant variables. The level of significance was set at a probability level of 0.05 at 95% confidence interval. All analyses were performed with SPSS version 22.

RESULTS

Respondents

210 resident doctors were invited to participate in the study, 208 Questionnaires were retrieved (response rate of 99%). 101 were females (48.6%), most of the respondents were >30 years old (79.3%), only 2 respondents (1%) were <25 years. Most 151 (72.6%) were married, 1

respondent (0.5%) was separated and 56 (26.9%) reported being single. 82 (39.4%) of the respondents reported having 1-2 or no child while 1% had >4children.122 (58.7%) were junior residents while 86 (41.3%) were senior residents. The most frequently occurring average number of call duties taken each month was 5-10 (54.4%). 10 (4.9%) respondents noted that they took >/= 16 calls a month. 125 (60.1%) had been in the program for </=3 years while 83 (39.9%) had been in the program for >/=3years.

Out of the 208 respondents analysed, 112 (53.8%) reported that they had had a needlestick injury at work, and 57 (50.9%) among 112, reported that they had had a needlestick injury in the last one year. More than half (57.9%) had 1 injury and 3 individuals (5.3%) had had ≥4 injuries in the last one year (see Fig. 1).

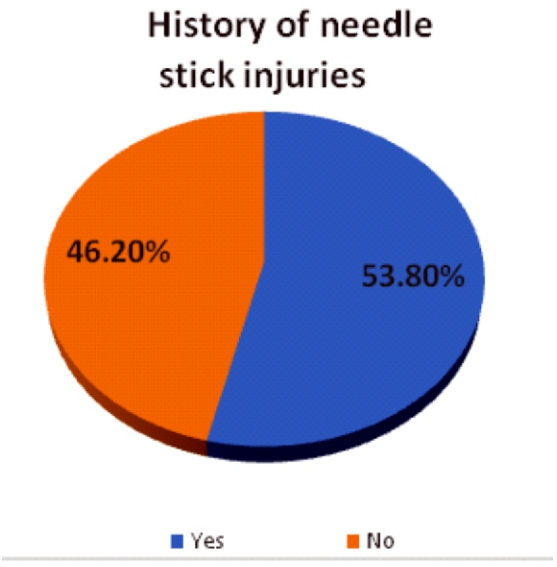

Figure 1: Prevalence of needlestick injuries

A higher percentage of senior residents (65.1%) had a needlestick injury compared to junior residents (45.9%) ($\chi2=7.494$; $p=0.006$). It was also found to be significantly higher among residents in the Department of Paediatrics (75.6%), Obstetrics and Gynaecology (72.7%) and Surgery (63.9%) compared to residents in other departments, least three being Psychiatry (0%), Radiology (12.5%) and Community Medicine (16.7%) ($\chi2=33.526$; $p<0.001$). Residents who had spent more than 3 years in the residency program reported a significantly higher prevalence of needlestick injury than those who had been in the program for three years or less (67.5% and 44.8%, respectively; $\chi2=10.315$; $p<0.001$). No significant difference was found in the prevalence of needlestick injury across the respondent's age, gender and marital status, and whether the respondents took calls or not (Table 1).

Among the respondents, 156 (75.0%) had received some vaccination against hepatitis B, but only 15 (9.6%) had completed the vaccination schedule by taking a booster dose 10 years after the third dose. When asked for the reason why they had not taken the booster dose, 119 (83.7%) reported that it was not yet time for the booster dose, 11 (7.8%) reported that they were not aware that they were to take a booster dose, and 12 (8.5%) reported that they did not remember to take the booster dose when it was due.

The overall knowledge score revealed that 190 (91.3%) of the respondents had good knowledge about NSIs. Socio-demographic and occupational factors of respondents was compared with their knowledge of NSIs,

none of the variables assessed showed any statistically significant relationship with the overall knowledge score (p>0.05) (Table 2).

About 161 (77.4%) of the respondents recapped needles after use, 48 (29.8%) of whom recapped with two hands. Among the respondents who had suffered a needlestick injury, 82 (73.2%) took actions against the injury. 55.4% washed the injured part with soap and water, 46.4% washed with iodine, alcohol solution or bleach, 31.3% squeezed the injured part to extract blood, 20.5% went for HIV screening, 8.9% took post-exposure prophylaxis, 8.9% applied pressure to stop bleeding, 3.6% took tetanus anti-toxoid and 5.4% undertook other non-specific actions. Only about one-third (33.9%) of the respondents who had needlestick injury reported the incident to the appropriate authority, however, about 65.8% of them reported within 10 minutes of the occurrence of injury as opposed to 2.6% who reported the injury after 72 hours of occurrence. Only 14.3% received medical care following the injury. 10.1% of the respondents affirmed that there was a written protocol for handling NSI in their departments. Overall attitude score revealed that 114 (54.8%) of the respondents had a positive attitude towards NSIs (Table 3).

The relationship between respondents' sociodemographic and occupational factors was compared with their attitude towards needlestick injuries, and it was found that attitude towards NSIs was significantly associated with the respondents' job category, department, duration in department and average number of calls taken per month. Among the junior residents, 48 (39.3%) had a negative attitude towards NSIs and 74 (60.7%) had positive attitude towards NSIs, while among the senior residents, 46 (53.5%) had negative attitude and 40 (46.5%) had positive attitude, and this difference was statistically significant (p=0.044). Also, the attitude of respondents towards NSIs was significantly more positive among those who had spent three years or less in the department than among those who had spent over three years in the department (60.8% against 45.8% respectively; p=0.033). It was also found that those who took fewer monthly calls had a better attitude towards NSIs than those who took more monthly calls (p=0.030), and respondents who never had NSIs in the past had a better attitude than the counter group in the past (p<0.001). Gender, age, or whether the respondent took calls or not showed no significant relationship with attitude towards NSIs (Table 4).

Only 8.9% of respondents utilised PEP after sustaining needlestick injuries (Fig 2). Among those who did, most (81.8%) utilised it for 28 days while 18.2% did not complete the recommended duration of intake.

Table 1: Relationship between socio-demographic and occupational factors and occurrence of NSIs

	Ever had needlestick injury (n=208)				
	Yes (%) n=112	No (%) n=96	χ2	Df	p-value
Age					
<25 years	2 (100.0)	0 (0.0)	2.385	2	0.260#
25-30 years	19 (46.3)	22 (53.7)			
>30 years	91 (55.2)	74 (44.8)			
Gender					
Male	54 (50.5)	53 (49.5)	1.012	1	0.314
Female	58 (57.4)	43 (42.6)			
Marital status					
Single	24 (42.9)	32 (57.1)	3.724	1	0.054
Married/Divorced	88 (57.9)	64 (42.1)			
Job category					
Registrar	56 (45.9)	66 (54.1)	7.494	1	**0.006***
Senior registrar	56 (65.1)	30 (34.9)			
Department					
Pathology	7 (43.8)	9 (56.3)	33.526	12	**0.001*#**
Internal medicine	8 (36.4)	14 (63.6)			
Radiology	1 (12.5)	7 (87.5)			
Community medicine	2 (16.7)	10 (83.3)			
Paediatrics	31 (75.6)	10 (24.4)			
Anaesthesiology	12 (54.5)	10 (45.5)			
Surgery	23 (63.9)	13 (36.1)			
Microbiology	2 (28.6)	5 (71.4)			
Family medicine	6 (54.5)	5 (45.3)			
Obstetrics & gynecology	16 (72.7)	6 (27.3)			
Ophthalmology	2 (40.0)	3 (60.0)			
Ear, nose & throat	2 (66.7)	1 (33.3)			
Psychiatry	0 (0.0)	3 (100.0)			
Duration in department					
- -	56 (44.8)	69 (55.2)	10.315	1	**0.001***
>3 years	56 (67.5)	27 (32.5)			
Take calls					
Yes	111 (54.4)	93 (45.6)	-	1	0.337#
No	1 (25.0)	3 (75.0)			
The average number of calls taken per month (n=204)					
<5	29 (43.3)	38 (56.7)	7.960	4	0.093
5-10	63 (56.8)	48 (43.2)			
11-15	11 (68.8)	5 (31.3)			
16-20	6 (75.0)	2 (25.0)			
>20	2 (100.0)	0 (0.0)			

*=Statistically Significant; #=Fisher's Exact Test used

Table 2: Relationship between sociodemographic and occupational factors with knowledge about NSIs

	Overall Knowledge score (n=208)				
	Poor (%) n=18	Good (%) n=190	χ2	Df	p-value
Age					
<25 years	0 (0.0)	2 (100.0)	1.337	2	0.486#
25-30 years	5 (12.2)	36 (87.8)			
>30 years	13 (7.9)	152 (92.7)			
Gender					
Male	11 (10.3)	96 (89.7)	0.737	1	0.390
Female	7 (8.7)	94 (93.1)			
Marital status					
Single	12 (7.9)	140 (92.1)	-	1	0.580#
Married/Divorced	6 (10.7)	50 (89.3)			
Job category					
Registrar	11 (9.0)	111 (91.0)	0.049	1	0.825
Senior registrar	7 (8.1)	79 (91.9)			
Department					
Pathology	2 (12.5)	14 (87.5)	11.777	12	0.284#
Internal medicine	4 (18.2)	18 (81.8)			
Radiology	0 (0.0)	8 (100.0)			
Community medicine	1 (8.3)	11 (91.7)			
Paediatrics	3 (7.3)	38 (92.7)			
Anaesthesiology	2 (9.1)	20 (90.9)			
Surgery	2 (5.6)	34 (94.4)			
Microbiology	0 (0.0)	7 (100.0)			
Family medicine	0 (0.0)	11 (100.0)			
Obstetrics & gynecology	2 (9.1)	20 (90.9)			
Ophthalmology	0 (0.0)	5 (100.0)			
Ear, nose & throat	2 (66.7)	1 (33.3)			
Psychiatry	0 (0.0)	3 (100.0)			
Duration in department					
⩽3years	8 (6.4)	117 (93.6)	2.013	1	0.156
>3 years	10 (12.0)	73 (88.0)			
Take calls					
Yes	17 (8.3)	187 (91.7)	-	1	0.306#
No	1 (25.0)	3 (75.0)			
The average number of calls taken per month					
<5	6 (9.0)	61 (91.0)	1.052	3	0.846#
5-10	9 (8.1)	102 (91.9)			
11-15	2 (12.5)	14 (87.5)			
⩾16	0 (0.0)	10 (100.0)			
Ever had NSI					
Yes	11 (9.8)	101 (90.2)	0.418	1	0.518
No	7 (7.3)	89 (92.7)			

*=Statistically Significant; #=Fisher's Exact Test

Table 3: Attitude towards needlestick injury

Variable	Frequency	Percent
Recapped needle (n=208)		
Yes	161	77.4
No	47	22.6
Method needle is recapped (n=161)		
With one hand	113	70.2
With two hands	48	29.8
Took action after needlestick injury (n=112)		
Yes	82	73.2
No	30	26.8
Action taken after needlestick injury (Multiple responses)		
Washed with soap and water	62	55.4
Washed with iodine, alcohol solution or bleach	52	46.4
Squeezed to extract blood	35	31.3
Got tested for HIV	23	20.5
Took post-exposure prophylaxis	10	8.9
Applied pressure to stop bleeding	10	8.9
Took tetanus anti-toxoid	4	3.6
Others	6	5.4
Reported injury to superior		
Yes	38	33.9
No	74	66.1
Time injury was reported to superior (n=38)		
Within 10 minutes	25	65.8
Within 12 hours	6	15.8
Within 24 hours	3	7.9
Within 72 hours	3	7.9
After 72 hours	1	2.6
Received medical care after the injury		
Yes	16	14.3
No	96	85.7
Medical care received (n=16; Multiple response)		
Pre-test counseling	3	18.8
Post-test counseling	1	6.3
PEP administration and follow-up	9	56.3
Overall attitude score		
Positive attitude	114	54.8
Negative attitude	94	45.2

Table 4: Relationship between sociodemographic and occupational factors with the attitude towards NSIs

	The overall attitude towards NSIs(n=208)				
	Negative (%) n=94	**Positive (%) n=114**	**χ2**	**Df**	**p-value**
Age					
<25 years	1 (50.0)	1 (50.0)	0.310	2	1.000#
25-30 years	18 (43.9)	23 (56.2)			
>30 years	75 (45.5)	90 (54.5)			
Gender					
Male	45 (42.1)	62 (57.9)	0.875	1	0.350
Female	49 (48.5)	52 (51.5)			
Marital status					
Single	74 (48.7)	78 (51.3)	2.779	1	0.095
Married/Divorced	20 (35.7)	36 (64.3)			
Job category					
Registrar	48 (39.3)	74 (60.7)	4.074	1	**0.044***
Senior registrar	46 (53.5)	40 (46.5)			
Department					
Pathology	5 (31.3)	11 (68.8)	31.332	12	**<0.001*#**
Internal medicine	8 (36.4)	14 (63.6)			
Radiology	0 (0.0)	8 (100.0)			
Community medicine	2 (16.7)	10 (83.3)			
Paediatrics	26 (63.4)	15 (36.6)			
Anaesthesiology	12 (54.5)	10 (45.5)			
Surgery	18 (50.0)	18 (50.0)			
Microbiology	0 (0.0)	7 (100.0)			
Family medicine	5 (45.5)	6 (54.6)			
Obstetrics &Gynaecology	14 (63.6)	8 (36.4)			
Ophthalmology	2 (40.0)	3 (60.0)			
Ear, nose & throat	2 (66.7)	1 (33.3)			
Psychiatry	0 (0.0)	3 (100.0)			
Duration in department					
⩽3 years	49(39.2)	76(60.8)	4.541	1	0.033*
>3 years	45(54.2)	38(45.8)			
Take calls					
Yes	93 (45.6)	111 (54.4)	-	1	0.628
No	1 (25.0)	3 (75.0)			
The average number of calls taken per month					
<5	23 (34.3)	44 (65.7)	8.922	3	**0.030***
5-10	55 (49.5)	56 (50.5)			
11-15	7 (43.8)	9 (56.3)			
⩾16	8 (80.0)	2 (20.0)			
Ever had NSI					
Yes	94 (83.9)	18 (16.1)	147.008	1	**<0.001***
No	0 (0.0)	96 (100.0)			

*=Statistically Significant; #=Fisher's Exact Test used

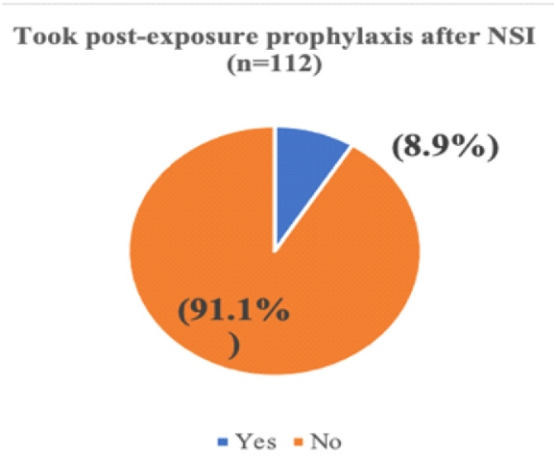

Figure 2: Utilization of Post-Exposure Prophylaxis

When respondents were assessed for the factors that contribute to needlestick injuries in their health facility, 77.9% attributed it to excess workload, 72.6% attributed it to insufficient consumables causing them to indulge in suboptimal practices, 70.2% attributed it to long working hours, 69.7% attributed it to lack of personal protective equipment (PPE), and 13.0% attributed it to other factors including poor knowledge about universal precautions, carelessness, impatience, etc. It was also noted that 30.4% of respondents incurred NSI as a result of sudden movement of the patient, 19.6% incurred it when attempting to bend or break the needle, 16.1% incurred it when recapping, 14.3% got injured accidentally by the needle held by a colleague, 12.5% got injured when opening the needle cap, 12.5% got the injury when trying to cap the needle, 10.7% got injured during a blood draw from a patient, 9.8% incurred the injury during injection of medication, 9.8% thought they incurred the injury as a result of lack of concentration, 7.1% were injured by improperly disposed needle, 5.4% thought they were injured due to a lack of experience, and another 5.4% due to inadequate disposal of equipment, while 2.7% were injured by needle protruding from disposal box.

Among the respondents who reported to have been injured by needles, 58 (51.8%) reported that the needle with which they were injured had previously been used on a patient, and 15 (25.9%) reported that the patient whom the needle was previously used on was infected with infectious agents such as HIV, HBV or HCV. 1 respondent (0.48%) reported being infected with HIV following a needlestick injury obtained in the course of training.

DISCUSSION

The prevalence of NSIs among resident doctors in this study was high. This finding was similar to that observed among health workers in Benin and Asaba, Nigeria[4,5], lower than that found in Minna, North-central Nigeria[6], but higher than that found in Ethiopia[7]. While some studies reported a high prevalence of NSIs with values greater than 65% [8-12], others reported a low prevalence of the injuries with values around 30%.[7,13] These studies were conducted among the general population of health care workers, however, this present study was conducted specifically among resident doctors. The level of awareness about NSIs and infectious disease transmission was found to be high among the residents which is not unexpected.

Despite the high level of awareness about NSIs and transmission of blood-borne

pathogens, the attitude of residents towards NSIs was found to be generally poor. Needle recapping after use was identified as one of the major risk factors of NSIs among the residents, and this has been supported by various studies which have shown a direct relationship between NSIs and needle recapping.[7,11,14] In Ethiopia, it was observed that people who practiced needle recapping after use were three times more likely to sustain needlestick injuries than those who did not.[7] Despite their knowledge that the use of post-exposure prophylaxis after a sharps injury could reduce the incidence of infection with blood-borne pathogens, only very few of the resident doctors utilized the service. This was similar to the findings of Uzochukwu*et al* 2014 who found that 92.2% of their respondents were aware of the importance of post-exposure prophylaxis, but only 12.8% utilized it.[15] Some reasons given for this were that the post-exposure prophylactic drugs were not readily available or accessible to health workers in the facility, or that the doctors failed to utilize the service for fear of being stigmatized.[15,16] This present study, however, did not explore reasons for the failure of the majority of the respondents (91.1%) to utilize post-exposure prophylaxis.

Looking at the relationship between sociodemographic and occupational factors with knowledge about NSIs, this present study found no relationship between these parameters which is not unexpected as all the respondents were doctors with similar level of basic medical training. However, it was found that residents who had spent shorter years in training, as well as the junior resident category, had better attitudes towards prevention of occurrence of NSIs. This was an unexpected finding, considering that one would expect better attitudes derived from experience from those who had been in training for longer periods. This highlights a need for refresher courses in infection prevention. This finding was different from a study in Ethiopia which found no relationship between length of years of service and attitude towards prevention of NSIs.[11]

Respondents in Radiology, Psychiatry and Microbiology had higher positive attitudes towards prevention of NSIs than their counterparts in other departments. It is not clear why this was so. More studies may be needed to assess peculiarities in these individual department structure. However, having a higher number of call duties was clearly associated with poorer attitudes towards prevention of NSIs. This is expected as physician burnout is expected with an increased number of calls. For those who had had an NSI in the past, it was found that a strong association existed between having had an injury in the past and having a negative attitude towards prevention of NSI. This finding is similar to that of a study done in India which found that health workers took less precautionary measures when fatigued as more than half of the injuries occurred when the health worker was fatigued.[9]

In interpreting the results of this study, taking the limitations into consideration is important. Since the study was based on self-reported data in estimating the prevalence of

occupational NSI exposure, a common threat to the validity of self-report is information bias due to social desirability and recall bias.

CONCLUSION

Needlestick injuries are common among resident doctors however, a large number of these injuries go unreported. The level of awareness about NSIs and the risk of transmission of infection is high, but, the attitude toward preventive measures and use of post-exposure prophylactic services is poor. There is a need for the improvement of safety culture towards infection prevention by organizing in-service training, addressing problems of shortage of consumables and sharps disposal boxes as a lot of the resident doctors identified these as risk factors for the unsafe practices leading to injury. All health facilities should have a written sharps safety policy and a post-exposure protocol displayed at points of care. Resident doctors should be actively quizzed on these guidelines by their supervisors. In addition, adequate healthcare staffing and implementation of an appropriate number of calls per month are essential in reducing NSI risk as exhaustion was cited as one of the predisposing factors associated with the occurrence of NSIs. There is a need for the hospital infection control team to follow up on victims to encourage utilization and completion of post-exposure prophylaxis.

ACKNOWLEDGEMENTS

The authors wish to thank Douglas K.E and Alabere I.D of the University of Port Harcourt, Nigeria as well as the residents of the University of Port Harcourt Teaching Hospital for their support of this work.

FUNDING AND DISCLOSURES

This study was author funded. No potential conflict of interest is reported.

REFERENCES

1. WHO | Needlestick injuries [Internet]. Who.int. 2019 [cited 2 October 2019]. Available from: http://www.who.int/occupational_health/topics/needinjuries/en
2. Mbaisi E, Ng'ang'a Z, Wanzala P, Omolo J. Prevalence and factors associated with percutaneous injuries and splash exposures among health-care workers in a provincial hospital, Kenya, 2010. Pan Afr Med J. 2013;14:10 DOI: 10.11604/pamj.2013.14.10.1373
3. Qazi A, Siddiqui F, Faridi S, Nadeem U, Umer N, Mohsini Z et al. Comparison of awareness about precautions for needlestick injuries: a survey among health care workers at a tertiary care centre in Pakistan. Patient Saf Surg. 2016;10(1): 19 DOI: 10.1186/s13037-016-0108-7
4. Isara A, Oguzie K, Okpogoro O. Prevalence of needlestick injuries among healthcare workers in the Accident and Emergency Department of a Teaching Hospital in Nigeria.Ann Med Health Sci Res. 2015;5(6):392. DOI: 10.4103/2141-9248.177973
5. Isara A, Ofili A. Prevalence of occupational accidents/injuries among health care workers in a federal medical centre in Southern Nigeria. *West Afr J Med.* 2012;**31**:47-51.
6. Olaleye A, Ogundele O, Awokola B, Olatunya O, Olaleye O, Adeyanju T et al. Occupational exposure to HIV and use

of post-exposure prophylaxis in a general hospital in North Central, Nigeria. Int J OccupSaf Health. 2013;3(1):11-17. DOI: https://doi.org/10.3126/ijosh.v3i1.6635

7. Bekele T, Gebremariam A, Kaso M, Ahmed K. Factors Associated with Occupational Needlestick and Sharps Injuries among Hospital Healthcare Workers in Bale Zone, Southeast Ethiopia. PLoS One. 2015;10(10) DOI: https://doi.org/10.1371/journal.pone.0140382
8. Kermode M, Jolley D, Langkham B, Thomas M, Crofts N. Occupational exposure to blood and risk of bloodborne virus infection among health care workers in rural north Indian health care settings. *Am J Infect Control.* 2005;**33**:34-41.
9. Sharma R, Rasania S, Verma A, Singh S. Study of prevalence and response to needlestick injuries among health care workers in a tertiary care hospital in Delhi, India. *Indian J Community Med.* 2010;**35**:74.
10. Hanafi M, Mohamed A, Kassem M, Shawki M. Needlestick injuries among health care workers of the University of Alexandria hospitals. *East Mediterr Health J.* 2011;**17**:26-35.
11. Feleke B. Prevalence and Determinant Factors for Sharp Injuries among Addis Ababa Hospitals Health Professionals. *Science J of Pub Health.* 2013;**1**:189-193 DOI: 10.11648/j.sjph.20130105.11
12. Walle L, Abebe E, Tsegaye M, Franco H, Birhanu D, Azage M. Factors associated with needlestick and sharp injuries among healthcare workers in Felege Hiwot Referral Hospital, Bahir Dar, Northwest Ethiopia: a facility-based cross-sectional survey. *Int J of Infect Control.* 2013;**9**. DOI: 10.3396/IJIC.v9i4.030.13
13. Ali G, Abasalt B, Pegah L, Amin A. Risk Factors of Needlestick and Sharps Injuries among Healthcare Workers. *International J of Hospital Research.* 2013;**2**:31-38.
14. Vaz K, McGrowder D, Crawford T, Alexander-Lindo R, Irving R. Prevalence of injuries and reporting of accidents among health care workers at the University Hospital of the West Indies. *Int J Occup Med Environ Health.* 2010;**23**:133-43 DOI: 10.2478/v10001.010.0016.5
15. Uzochukwu B, Sibeudu F, Ughasoro M, Onwujekwe O. How do Primary Health Care Workers Perceive and Practice Post Exposure Prophylaxis for HIV in Enugu State?. *J AIDS Clin Res.* 2014;**5**. DOI:10.4172/2155-6113.1000381
16. Laporte A, Jourdan N, Bouvet E, Lamontagne F, Pillonel J, Desenclos J. Post-exposure prophylaxis after non-occupational HIV exposure: impact of recommendations on physicians' experiences and attitudes. *AIDS.* 2002;**16**:397-405. DOI: