

## Factors Associated With Needlestick/Sharps Injuries among Healthcare Workers In A Part Of North Central Nigeria

Egwuda, Livinus,<sup>2</sup> Igbudu, Terhemem Joseph,<sup>1</sup> Itodo, Cornelius Elachi,  
<sup>4</sup> Etukumana, Etiobong Akpan.

<sup>1,2</sup> Department of Family Medicine, Benue State University Teaching Hospital, Makurdi, Nigeria.

<sup>3</sup> Department of Surgery, Benue State University Teaching Hospital, Makurdi, Nigeria.

<sup>4</sup> Department of Family medicine, University of Uyo Teaching Hospital, Uyo, AkwaIbom State.

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### Abstract:

**Background:** Needlestick/ sharps injuries have continued to threaten the health and well-being of medical workers across the globe. It is believed to be one of the most common occupational health hazards in medical practice. Health experts have reported that about 20 blood borne pathogens can be transmitted through needlestick/sharps injuries.

**Aim:** The aim of this study was to investigate the factors that are associated with needlestick/sharps injuries (NSSI) among healthcare workers (HCWs).

**Materials and Methods:** This was a cross-sectional descriptive study that was carried out at the Benue State University Teaching hospital, Makurdi. Self-administered, structured and validated questionnaires were admitted to 215 subjects using a simple random sampling technique. Collated data were analyzed using Statistical Package for Social Sciences for Windows version 18.0 (SPSS, Inc., Chicago, Illinois).

**Results:** A total of 215 healthcare workers participated in the study. These were aged 18-71 years with the mean age of  $33.1 \pm 8.3$ . Statistically significant variables that were associated with needlestick/sharps injuries were healthcare workers' age ( $X^2 = 17.114$ ,  $df = 8$ ,  $p = 0.027$ ), being married ( $X^2 = 4.531$ ,  $df = 2$ ,  $p = 0.064$ ), having tertiary education ( $X^2 = 8.287$ ,  $df = 3$ ,  $p = 0.004$ ), being staff nurses ( $X^2 = 13.764$ ,  $df = 3$ ,  $p = 0.003$ ), safety boxes availability ( $X^2 = 3.936$ ,  $df = 1$ ,  $p = 0.034$ ), and monthly income ( $X^2 = 9.591$ ,  $df = 2$ ,  $p = 0.008$ ). However, healthcare workers' sex ( $X^2 = 0.187$ ,  $df = 1$ ,  $p = 0.666$ ), job satisfaction ( $X^2 = 0.170$ ,  $df = 1$ ,  $p = 0.396$ ), place of work ( $X^2 = 2.473$ ,  $df = 5$ ,  $p = 0.781$ ), recapping of needle ( $X^2 = 0.008$ ,  $df = 1$ ,  $p = 0.520$ ), and use of personal protective equipment ( $X^2 = 0.573$ ,  $df = 1$ ,  $p = 0.271$ ) were not statistically significant.

**Conclusion:** The factors identified in this study to be associated with needlestick/sharps injuries among healthcare workers in the North Central Region of Nigeria were age, being married, tertiary education attainment, being a staff nurse, safety boxes availability and monthly income. These factors should be considered when conducting needlestick/sharps injuries intervention programs.

**Keywords:** Factors associated, needlestick/sharps, Injuries, Healthcare Workers, North Central, Nigeria.

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### I. Introduction

Needlestick/sharps injuries have continued to threaten the health and well-being of medical workers across the globe. It is believed to be one of the most common occupational health hazards in medical practice.<sup>1</sup> The major risk associated with needlestick/sharps injuries is the transmission of infections. Health expert have reported that about 20 blood borne pathogens can be transmitted through needlestick/sharps injuries.<sup>2</sup> Among these, hepatitis and HIV viruses are believed to be the most serious. The risks of transmission of infection from an infected patient to healthcare workers following a needlestick/sharps injuries have been documented. It is 3-10% for hepatitis B, 3% for hepatitis C, and 0.3% for HIV.<sup>3</sup> Currently there are no known cure for these infections, and worst still the infected healthcare workers can transmit the infections to healthy individuals. This has posed a major challenge to the healthcare providers especially the Family Medicine Physicians who provides a comprehensive, coordinated and continuing care to the victims of needlestick/sharps injuries.

Globally, 35 million people constitute the healthcare workforce, and this represents the 12% of the working population.<sup>4</sup> The morbidity and mortality of healthcare workers related to the occupational exposures has an impact on the workforce, and as a result on access to good health care.<sup>5</sup> For instance, a global shortage of nurses has emerged due in part to exposures to deadly infectious agents.<sup>5</sup> The burden of this could be appreciated by the high prevalence of needlestick/sharps injuries reported across the globe. Experts have reported that about 2 million healthcare workers incur needlestick/sharps injuries per year.<sup>5</sup> In Africa, Eastern Mediterranean, and Asian population, World Health Organization has reported an average of four needlestick/sharps injuries per worker per year.<sup>6</sup> In Vietnam, 38% of physicians and 66% of nurses reported sustaining a sharp stick injury in the previous nine months.<sup>7</sup> Furthermore, in South Africa, 91% of junior doctors reported sustaining needle-stick

injury in the previous 12 months and 55% of these injuries came from source patients who were HIV-positive.<sup>8</sup> These trend is not different from what is obtainable in Nigeria.<sup>9,10,11</sup>

These abysmally high prevalence of needlestick/sharps injuries prompted some critical stake-holders in occupational and environmental health to go in search of factors that are associated with needlestick/sharps injuries with a view of coming up with measures to addressing this challenge. This effort is being rewarded as some factors are now being linked to needlestick/sharps injuries. These factors include lack of access to sharp containers, recapping of needle after use, lack of personal protective equipment, overuse of injections, educational level, place of work and monthly income.<sup>3,5,13</sup>

In North Central Region of Nigeria, there is a gap in knowledge on factors associated with needlestick/sharps injuries among healthcare workers. The present study will attempt to address this gap and lay the foundation for future research in this field. The current study set out to investigate the factors that are associated with needlestick/sharps injuries among healthcare workers in a part of North Central Nigeria.

## **II. Materials And Methods**

The study area of this study is Makurdi. Makurdi, the state capital of Benue State is located in North Central, Nigeria. It lies between latitude 7.73<sup>0</sup> and 8.32<sup>0</sup>. It has a population of about 300,377 people (NPC 2006).<sup>12</sup> It was conducted in Benue State University Teaching Hospital, which is a 300-bed hospital located in Makurdi. It was commissioned in March 2012 and commenced clinical activities in May 2012. The hospital has 15 clinical departments with over three hundred healthcare workers. It currently serves a population of over four million people in the North Central Region of Nigeria.

The present study was a cross-sectional study designed to investigate the prevalence of needlestick/sharps injuries among healthcare workers in Benue State University Teaching Hospital, Makurdi, Nigeria. The study was carried out between January and March 2014. The healthcare workers were recruited on work days using a well-structured self-administered questionnaire after a signed consent had been obtained from them. The instrument (questionnaire) was validated through a pretest conducted on 10 healthcare workers. A total of 245 questionnaires were administered through simple random sampling technique. Out of this number, 215 were completely filled, 11 were incompletely filled and 17 were non response. The non-response and incompletely filled questionnaires were excluded from the study.

The inclusion criteria for the participants include being a healthcare worker at Benue State University Teaching hospital and consenting to participate in the study.

Approval for the study was obtained from the Research and Ethical Committee of Benue State University Teaching Hospital, Makurdi.

Collated data were analyzed using Statistical Package for Social Sciences for Windows version 18.0 (SPSS, Inc., Chicago, Illinois).

## **III. Results**

A total of 215 healthcare workers were recruited for the study. These were aged 18-71years with the mean age of 33.1±8.3. The majority of the participants were within the age group 30-34years. Few of the participants were aged 60 years and above. TABLE 1: Shows the age distribution of the healthcare workers.

The socio-demographic profile of participants showed that the majority of the participants were females 125(58.1%), while the males were 90(41.9%). The married participants were the majority 134(62.3%), while others (widowed, separated, divorced) accounted for only 4 (1.9%). Almost all the participants 212(98.6%) were Christians, while Muslims were 2(0.9%). On the educational attainment of participants, those without formal education were the least 2(0.9%), while those with tertiary education were the majority 171(79.5%), primary education accounted for 4(1.9%), and those that attended secondary schools 38(17.7%). The monthly income of the majority of HCWs 131(60.9%) was between 20,000 to 200,000 naira, 58(27.0%) had <20,000 naira while only 26(12.1%) had >200,000 naira. Table 2: Shows the socio-demographic characteristics of healthcare workers.

The majority of the HCWs 84(39.1%) worked in the ward, 49(22.8%) worked in the clinics, 26(12.1%) worked in the theatre, 20(9.3%) worked in the laboratory, while 15(7.0%) worked in other units of the hospital.

Figure 1: Shows the distribution of place of work of the HCWs

Ninety nine (46.0%) indicated having needle-stick injury at least once in their career. Figure 2: Shows the distribution of NSSIs among HCWs.

Majority of HCWs 151(70.2%) were not using PPE during work/procedures, while 64(28.8%) used it. Majority 172 (80.0%) indicated having safety boxes in their place of work, while 43(20.0%) did not have. About half of the HCWs 112(52.1%) had working guideline in their place of work, while 103(47.9%) did not have. Less than half 90(41.9%) indicated having protocol for reporting NSSIs in their place of work, while the majority did not have. About half of the HCWs 106(49.3%) indicated that their colleagues in the place of work recap needles after use, while 109(50.7%) indicate otherwise. Majority of the HCWs 131(80.9%) did not recap

needles after use, while 84(39.1%) did recap needles after use. Table 3: Shows the distribution of other variables in the study.

HCWs that were in the age group 30-34 years were more likely to sustain needle-stick and sharp injury when compared to HCWs in the other age groups ( $X^2 = 17.114$ ,  $df = 8$ ,  $p = 0.027$ ). The HCWs that were married were more likely to sustain NSSIs when compared to the singles and others ( $X^2 = 4.531$ ,  $df = 2$ ,  $p = 0.064$ ). Similarly, HCWs that have tertiary education were more susceptible to NSSIs when compared to those with other levels of education ( $X^2 = 8.287$ ,  $df = 3$ ,  $p = 0.004$ ). The staff nurses were more likely to sustain NSSIs when compared to other category of HCWs ( $X^2 = 13.764$ ,  $df = 3$ ,  $p = 0.003$ ). Furthermore, the HCWs that had access to safety boxes were more likely to sustain NSSIs when compared with those that did not have ( $X^2 = 3.936$ ,  $df = 1$ ,  $p = 0.034$ ). The HCWs that their monthly salary was between 20,000 to 200,000 naira were more susceptible to NSSIs when compared with those that earn more or less ( $X^2 = 9.591$ ,  $df = 2$ ,  $p = 0.008$ ). However, HCWs sex ( $X^2 = 0.187$ ,  $df = 1$ ,  $p = 0.666$ ), the level of job satisfaction ( $X^2 = 0.170$ ,  $df = 1$ ,  $p = 0.396$ ), place of work ( $X^2 = 2.473$ ,  $df = 5$ ,  $p = 0.781$ ), recapping of needle ( $X^2 = 0.008$ ,  $df = 1$ ,  $p = 0.520$ ), and use of PPE ( $X^2 = 0.573$ ,  $df = 1$ ,  $p = 0.271$ ) were not statistically significant. Table 4: Shows the association of some variables in the study with needlestick/sharps injuries.

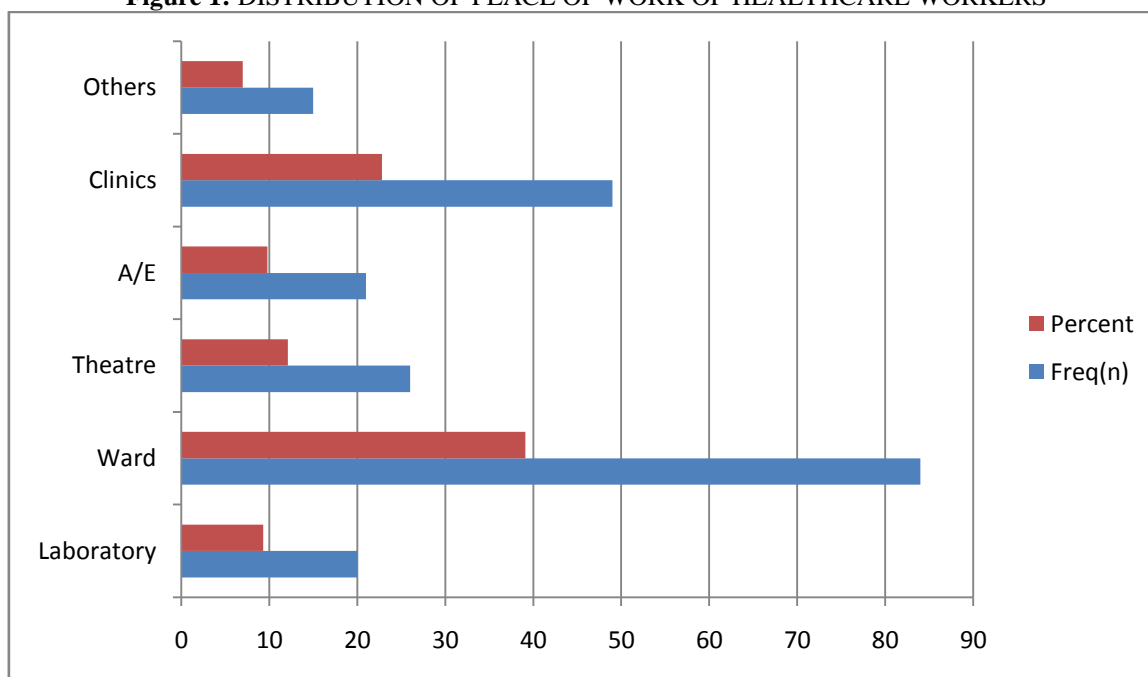
**Table 1: AGE DISTRIBUTION OF HEALTHCARE WORKERS**

Age group (years)	Frequency (n)	Percent (%)
<25	16	7.4
25-29	67	31.2
30-34	56	26.0
36-39	33	15.3
40-44	21	9.8
45-49	14	6.5
50-54	4	1.9
55-59	2	0.9
60 and above	2	0.9
Total	215	100

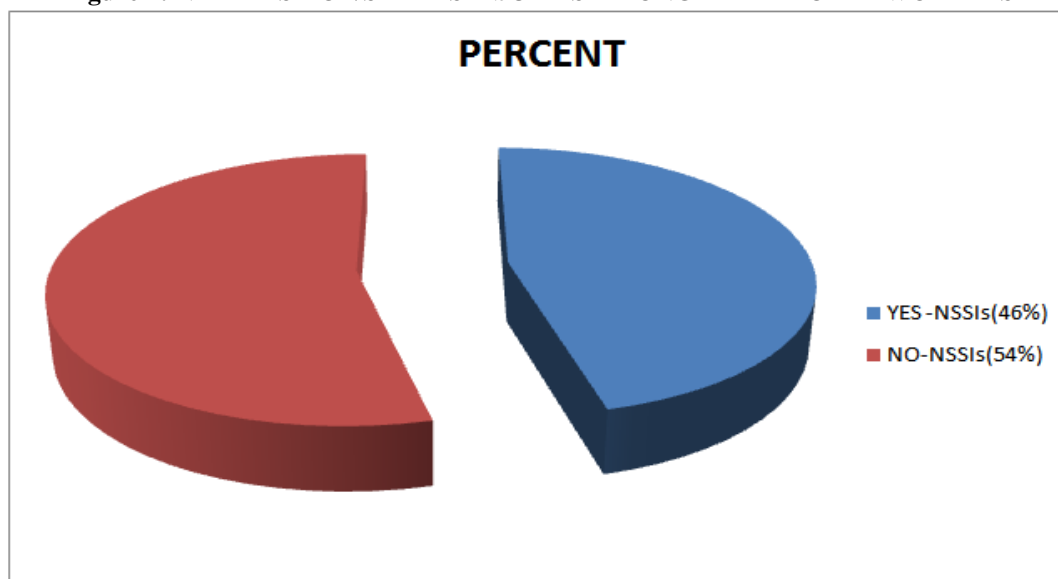
**Table 2: SOCIO-DEMOGRAPHIC DISTRIBUTION OF HEALTHCARE WORKERS**

Variables	Frequency (n)	Percent (%)
Sex		
Male	90	41.9
Female	125	98.1
Total	215	100
Marital Status		
Married	134	62.3
Single	77	35.8
Others	4	1.9
Total	215	100
Religion		
Christianity	212	98.6
Islam	2	0.9
Total	215	100
Education		
No formal	2	0.9
Primary	4	1.9
Secondary	38	17.7
Tertiary	171	79.5
Total	215	100
Monthly income		
<20,000 naira	58	27.0
20K-200,000	131	60.9
>200,000	26	12.1
Total	215	100

**Figure 1: DISTRIBUTION OF PLACE OF WORK OF HEALTHCARE WORKERS**



**Figure 2: NEEDLESTICK/SHARPS INJURIES AMONG HEALTHCARE WORKERS**



**Table 3: DISTRIBUTION OF OTHER VARIABLES IN THE STUDY**

Variables	Frequency (n)	Percent (%)
PPE use		
Yes	151	70.2
No	64	29.8
Total	215	100
Safety box availability		
Yes	172	80.0
No	43	20.0
Total	215	100
Working Guideline Availability		
Yes	112	52.1
No	103	47.9
Total	215	100

Protocol For reporting injury Availability		
Yes		
No	90	41.9
Total	125	58.1
	215	100
Recapping of needle by colleagues		
Yes		
No	106	49.3
Total	109	50.7
	215	100
Recapping of needle by respondents		
Yes		
No	84	39.1
Total	131	80.9
	215	100

**Table 4: THE ASSOCIATION OF VARIABLES IN THE STUDY WITH NEEDLSTICK/SHARPS INJURIES AMONG HEALTHCARE WORKERS.**

Variables	Needle-stick and sharp injury		Total n(%)	X <sup>2</sup>	df	P value
	YES n(%)	NO n(%)				
<b>Age group(years)</b>						
<25						
25-29	3(1.4)	13(6.0)	16(7.4)			
30-34	25(11.6)	42(19.5)	67(31.2)			
35-39	28(13.0)	28(13.0)	56(26.0)			
40-44	21(9.8)	12(5.6)	33(15.3)			
45-49	11(5.1)	10(4.7)	21(9.8)			
50-54	6(2.8)	8(3.7)	14(6.5)	17.114	8	0.027
55-59	1(0.5)	3(1.4)	4(1.9)			
60 and above	2(0.9)	0(0)	2(0.9)			
	2(0.9)	0(0)	0(0.9)			
<b>Sex:</b>						
Males						
Females	43(20.0)	47(21.9)	90(41.9)	0.187	1	0.666
	56(26.0)	69(32.1)	125(58.1)			
<b>Marital status:</b>						
Married						
Single	69(32.1)	65(30.2)	134(62.3)			
Others	28(13.0)	49(22.8)	77(35.8)	4.531	2	0.064
	2(0.9)	2(0.9)	4(1.9)			
<b>Education</b>						
No formal						
Primary	1(0.5)	1(0.5)	2(0.9)			
Secondary	1(0.5)	3(1.4)	4(1.9)			
Tertiary	10(4.7)	28(13.0)	38(17.7)			
	87(40.5)	84(39.1)	171(79.5)	8.287	3	0.004
<b>Job category:</b>						
Cleaners						
Nurses	14(6.5)	35(16.3)	49(22.8)			
Lab Scientist	52(24.2)	50(23.3)	102(47.4)			
Doctors	2(0.9)	9(4.2)	11(5.7)	13.764	3	0.003
	31(14.4)	22(10.2)	53(24.7)			
Safety availability: box						
Yes						
No	85(39.5)	87(40.5)	172(80.0)	3.936	1	0.034
	14(6.5)	29(13.5)	43(20.0)			

**Table 4: THE ASSOCIATION OF VARIABLES IN THE STUDY WITH NEEDLSTICK/SHARPS INJURIES AMONG HEALTHCARE WORKERS.**

Variable	Needle-stick and sharp injury		Total n (%)	X <sup>2</sup>	df	P-value
	YES n(%)	NO n(%)				
Monthly income						
<20,000	18(8.4)	40(18.6)	58(27.0)	9.591	2	0.008
20K-200,000	64(29.8)	67(31.2)	131(60.9)			
>200,000	17(7.9)	9(4.2)	26(26)			
<b>Job satisfaction:</b>						
Satisfied	70(32.6)	79(36.7)	149(69.3)	0.170	1	0.396
Unsatisfied	29(13.5)	37(17.2)	66(30.7)			
<b>Place of work:</b>						
Laboratory	7(3.3)	13(6.0)	20(9.3)	2.473	5	0.781
Ward	40(18.6)	44(20.5)	84(39.1)			
Theatre	13(6.0)	13(6.0)	26(12.1)			
A/E	8(3.7)	13(6.0)	21(9.8)			
Clinics	25(11.6)	24(11.2)	49(22.8)			
Others	6(2.8)	9(4.2)	15(7.0)			
<b>Needle recapping:</b>						
Yes				0.008	1	0.520
No	39(18.1)	45(20.9)	84(39.1)			
<b>PPE use:</b>						
Yes				0.573	1	0.271
No	67(31.2)	84(39.1)	151(70.3)			
	32(14.9)	32(14.9)	64(29.8)			

#### IV. Discussion

Even though the prevalence of needlestick/sharps injury is well documented, only few reports have attempted to identify the factors that are associated with needlestick/sharps injuries in North Central Region of Nigeria. Identifying these factors has become relevant because it is thought to enable intervention programs to be directed appropriately. In the present study, some factors have been linked to NSSIs in our environment. The study noted that the HCWs that were in age group 30 to 34 years were more susceptible to NSSIs. Clinical experience has shown that this finding is similar to what is obtainable in practice. The HCWs in the age bracket 30-34 years are very vibrant in our environment, as they work very hard to master the job and at the same time to impress their superior. In the process they are expected to make mistakes and sustain NSSIs. The current study also discovered a link between NSSIs and the HCWs marital status. Those that were married were more likely to sustain NSSIs. In our environment, marriage carries a lot of responsibilities with it, especially now that Nigeria is facing challenges in all ramifications. These challenges could lead to body fatigue. If this happens during the working hours, it could result in NSSIs. In addition, the present study revealed that HCWs with higher education were more susceptible to NSSIs. This finding is acceptable in our environment going by the fact that these set of HCWs are the skilled workforce and are deeply involved in service delivery, training of the other HCWs and taking risk to research into new areas. These expose them more to NSSIs.

On the category of the HCWs that were most affected by NSSIs, this study found that, the staff nurses were most susceptible. This finding is in tandem with what was reported in the previous studies.<sup>15,16, 17</sup> The reason adduce for this is that the staff nurses are often involved in medication administration. It is important to note that most of the patients referred to BSUTH often require injections, and the nurses are deeply involved in this procedure. The current study also observed that the availability of safety boxes in the HCWs environment did not assist in reducing the prevalence of needlestick/sharps injury among the subjects. This finding is in conflict with what has been reported by some authors<sup>4,5,6</sup>. However, some experts have argued that the availability of safety boxes in HCWs working environment should not translate to low incidence of NSSIs. The reason advanced for this is that the HCWs may decide not to use the facility and indiscriminately dispose the used needles; or the HCWs may not have adequate training on how to use the facility.<sup>18,19</sup> In a study conducted in Donimical Republic, for example, sharps were observed to be improperly disposed in a regular waste container. Another finding from the present study was that NSSIs were more pronounced among HCWs whose monthly income was between 20,000 and 200,000 naira. This is similar to what Lulieet. al., found in North-West Ethiopia.<sup>12</sup> These people appear to be in the middle class and may be putting extra commitment to their duty with the hope of being promoted to the high class. They may sustain NSSIs in the process. Job satisfaction by health care workers has been identified as one of the factors that are associated with needlestick/sharp injury. In a study in FelegeHiwot Referral Hospital, Ethiopia, it was stated that the healthcare workers who were satisfied on their job were nearly three times more at risk to encounter sharp injury than those who were not satisfied on their job.<sup>12</sup> However, the current study found no strong association between job satisfaction and

NSSIs. Further study is advocated in this direction. Furthermore, Research finding has shown that those who worked in waste handling unit were four times more likely to sustain needlestick/sharps injuries than those who worked in emergency unit.<sup>12</sup> Even though the present study showed that more of the HCWs in the wards were susceptible to NSSIs, the association was found to be very weak. Research interest should be focused in this field for more understanding. Needle recapping is common practice among health care workers in many parts of the world. Previous reports have linked needle recapping with NSSIs.<sup>20,21,22</sup> These reports did not agree with the present study. The reason for the present finding is unclear. However, it is a known fact that the HCWs in Benue State University Teaching Hospital (where this study was carried out) had the history of having worked for many years. It is not clear whether this could have helped in preventing NSSIs among them during needle recapping. This observation further goes for the use of personal protective equipment and needlestick/sharps injuries, where no strong association was found. Further research work is advised in these directions especially in the North Central Region of Nigeria.

### **Limitations of the study**

This is a hospital based study; therefore the true prevalence of the NSSIs in our environment may not be accurately achieved. Some of the HCWs declined consent to participate in the study, and those that consented to the study were unwilling to return the filled questionnaires.

### **V. Conclusion**

The factors identified in this study to be associated with needlestick/sharpsinjuries in a North Central Region of Nigeria were age, being married, tertiary education, staff nurses, safety boxes availability and monthly income. These factors should be considered when conducting needlestick/sharps injuries intervention programs.

### **Acknowledgement**

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