

THE PREVALENCE OF NEEDLE STICK INJURY AMONG HEALTHCARE WORKERS AT JUBA TEACHING HOSPITAL

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Abstract

Needles and sharps injuries are major occupational health risk to healthcare workers around the globe. They are constantly and on daily basis exposed to infectious pathogens through contaminated needle and other sharps injuries. The aim of this study was to assess the prevalence and factors associated with needle stick and sharp injuries among healthcare workers in Juba Teaching Hospital. Facility based cross-sectional survey was conducted from Sep 2021, using questionnaire. All healthcare workers contacted in the study period were included. Data was analyzed using SPSS version 16.0. Binary logistic regression was used to identify factors associated with needle stick and sharp injuries. From the total 184 healthcare workers enrolled, nearly 2/3 were diploma holders, and Nurses by profession Three fourth of the injuries were due to needle stick. Those whose monthly income \geq 4.000SSP, was unsatisfied on their job, and worked in emergency unit were likely 21.4 more likely to get injured than their counterparts

respectively (Adjusted Odds ratio [AOR] =1.006, 95% Confidence Interval [CI] (95%). Those who worked in maternity unit were 80% less likely to get injured than those who worked in Emergency units (AOR= 0.20, 95% CI 0.05-0.78). The risk was higher among healthcare workers aged 25-29, 20-24 and 30-34 years 56, 49 and 42 persons, respectively. Safety box was absent in 0.162%.The risk was higher in those who work more than 40 hours (4.280%). Most of HCWs did not use PPE (1.006%).Eighty percent (2.893) of those who exposed to injury did not get care after injury. Suboptimal practices and behaviors that put them at risk to the injury were identified. The findings of this survey indicate the need for efficient training of nursing students that encourages prevention of sharp injuries; compliance with standard precautions; preclinical HBV testing, immunization and efficacy testing; reporting of injuries and follow-up with provision of PEP. Further research is needed to determine the incidence of the injury, and the type of disease they would acquire.

Conclusion: There is an urgent need to introduce health education training programs to all HCW especially to young doctors like interns before they enter their professional career of clinical practice and an urgent need to put prophylactic measures readily available for staffs

Keywords: Needles and sharps injuries, healthcare workers, Juba teaching hospital, personal protective equipment,

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Background

The National Institute for Occupational Safety and Health (NIOSH) USA defines a needle stick injury as injuries that are caused by objects such as hypodermic needles, blood collection needles, cannula and needles used to connect parts of IV delivery systems. Health Professionals who are exposed to needles in their clinical activities are at high risk of acquiring a needle stick which may lead to a serious or fatal infection with blood borne pathogens such as hepatitis B virus (HBV), hepatitis C virus (HCV) or human immunodeficiency virus (HIV). Approximately 3 million HCWs are exposed to blood borne viruses each year. Blood has been implicated as the source of the exposure in nearly all occupationally⁽¹⁾. Healthcare facilities (HCFs) can provide diagnostic, preventive, curative, and prognostic services for the community. However, while they are providing services. Particularly, there is a potential exposure among doctors, nurses, laboratory professionals, and biomedical waste management staff to blood-borne pathogen worldwide. Needle stick injuries (NSIs) are the most Common workplace-related health hazards among the HCWs where safety measures have not already been established. Needles Injuries mostly happen during needle recapping, operative procedures, blood sample collection, intravenous line administration, and poor waste disposal practices⁽²⁾. It is difficult to establish correct figures for the risk of exposure or the incidence of needle stick injuries. First of all it is difficult to observe an injury, either in oneself or in other persons. Glove perforations in surgeons are considered a reasonable proxy that can be measured objectively. Even though glove perforations can be objectively measured, it is still unclear what the relation is between glove perforations and needle stick injuries. It is estimated that half of all occupational needle stick injuries are not reported. Additionally, an unknown number of occupational needle stick injuries are reported by the affected employee, yet due to organizational failure, institutional record of the injury does not exist. This

makes it difficult to determine what the exact risk of exposure is for various medical occupations⁽³⁾. Most studies use databases of reported needle stick injuries to determine preventable causes. However this is different from establishing an exposure risk. Exposure to needles may expose the recipient to blood that contains pathogens which pose a potential risk. According to Hassan and Wahsheh (2009) found that the prevalence of sharp needles injuries among nurses in their last year was 81% in Sub-Saharan Africans Countries.

Nurses have a higher risk of exposure to NSI than other healthcare workers. The main cause of injury was needles injection (58.75%), whereas surgical dressing set was the least (8.5%). Khraisat et al (2015) found that factors associated with NSI were being a nurse, female, younger than 30 years, with more than two years' experience, working in a public hospital, working on a morning shift, holding a bachelor's degree, and working in an intensive care unit.

It's estimated that globally and in Africa around 44.5% and 41.7% of HCWs respectively sustain NSIs. However, more than 90% of NSIs occur in low- and middle-income countries (LMICs) with sub-Saharan Africa's prevalence ranging from 28.8% to 68%. Almost over 35 million people worldwide that make up the health care workforce, represents in all 12% of the working population. The main factors that increase the transmission risk of infections include deep wounds, visible blood on devices, hollow-bore blood- filled needles, the use of a device to access arteries or veins, and the high viral load status of patients. In developing countries where resources are lacking, the number of injuries is greater (3.7 injuries per person/year). WHO, reports in 2002 that of 35 million health-care workers, 2 million experience percutaneous exposure to infectious diseases each year. Around 37.6% of hepatitis B, 39% of hepatitis C and 4.4% of HIV/acquired immunodeficiency syndrome in healthcare workers around the world are due to NSIs⁽⁴⁾. The NSIs were shown not only to be a major risk of infection transmission to HCWs but in addition resulted in a minimum

of 6 months of stress to HCWs and their families while they waited to get the all clear. There is a high risk of exposure to pathogens among healthcare students while they become involved patient's investigation and treatment during their clinical training⁽⁵⁾. Despite the high occurrence of NSIs, numerous current studies along with it a novelty for a developing country. The aim of this study was to determine preventive methods are available in order to decrease the manifestation of this problem.

1:2 Statement of Problem

Needle stick injury is one the greatest risk faced the front line Health care worker, these exposures have often been considered as part of the job. Health Needle stick injury is one of the greatest risks faced the front line health care worker are an integral part of clinical services and have primary responsibility for a greater proportion of patients care in most health care worker setting. Health care worker are at high risk to occupational hazard and injuries in the course of day to day activities in the health working environment, responsibility and duties, health care worker are at risk to numerous occupational hazard. A few studies conducted 2016 in Sudan and Ethiopia reported high prevalence of the needle stick injury in both countries, among females. The majority of respondents between 20-35 age and participants has a Diploma, Degree and above with less or equal years' work experience. Currently there is no study conducted with respect to the estimation of NSIs prevalence in the South Sudan in general and in particular Juba Teaching Hospitals. Therefore this study aims to assess and estimate the prevalence of NSIs and associated factors among the health care worker in Juba Teaching Hospitals.

1:3 Scope of the Study

1.3.1. Content Scope:

The study is strictly investigating the prevalence of needle stick injury in Juba Teaching Hospitals. The study also aimed at factors contributing to Needle stick injury as well as examined the impact of needle stick injury.

1.3.2 Time Scope:

This research was restricted to the period of three months started from September 2021 – November 2021 and was guided by the event or study related to the topic in ten years back started from 2010 to 2021 the empirical analysis were limited to this period because of the problem of unreliability of data obtained from secondary sources.

1.3.3. Geographical Scope

The study was conducted mainly in Juba Teaching Hospital in South Sudan and the study was guided by variable, which was the prevalence of Needle stick injuries.

1.3.4 Justifications

The results of this study focus on the growing body of knowledge about the prevalence of needle stick injury in Juba Teaching Hospital. This could be used in the formulation of appropriate policy aims at addressing the factors contributing to the increase in needle stick injury. The identification of those factors to determine the prevalence of needle stick injury in Juba Teaching Hospital. The prevalence of needle stick injury and predisposing Factors and recommendations were made to reduce the high rate of needle stick injury.

1.3.5 Objectives of the Study

Main objective

To determine the Prevalence of needle stick injuries in Juba Teaching Hospital

Specific objectives

1. To estimate the Incidence of needle stick injuries in juba teaching hospital
2. To assess the occurrence of needle stick injuries in Juba Teaching Hospital
3. To know the Frequency of needle stick injuries in Juba Teaching Hospital

1.3.6 Research Questions

- 1- What is the prevalence of needles stick injuries among health workers in Juba Teaching Hospital?
- 2- What are the factors associated with needles stick injury
- 3- What is the most affected group among health care providers?

1.3.7 Public Health Significance of the Study:

Health care waste represent major public health issue; especially in the developing countries particularly south Sudan. Among health care waste categories, sharp waste is the most hazardous. Exposure to needle stick can lead to blood-borne pathogens, the study will determine prevalence of (NSIs) among HCWs and the factors exposed them to injures and suggest the ways to assess the current management of used needles and provide awareness about infectious diseases transmitted by such injury and the prophylaxis after exposure.

2. Research Design and Methodology

This research design adapted in this study is quantitative cross-sectional study design which is useful at estimating prevalence data but has a potential for response bias. The quantitative research is used for descriptive purposes, through this approach, we are able to describe the population characteristics as well as understand the impact of the variable of the study on each other.

2:1 Area of Study

The study was conducted at Juba Teaching Hospital.

2:2 Target Population

The data was from the population of health care worker including nurses, doctors, anesthetists, health offices, midwives, laboratory personnel, cleaners.

2.3 Sample and Sampling Procedures

A sample is a section of the population chosen to represent the whole population. The essence of sampling is to obtain data from a smaller particular sample which in turn increases efficiency by allowing generalizations to deduce about the population without necessarily having to examine every member. The sample size for this study was adopted from the formula of Kish and Leslie to calculate the number of study respondents in Juba Teaching Hospital.

$$n = \frac{Z^2 p q}{d^2}$$

Where:

n = is the sample size required

z = is the confidence interval at 95% ($z = 1.96$)

p = is the percentage of absenteeism among health workers in South Africa 18% ($p = 0.18$).

Research done by Vaida G (13)

$q = 1-p$ (is the percentage of attendance among health workers in South Africa 82%) ($q = 0.82$)

d = is the marginal errors at 5% ($d = 0.05$)

$$n = \frac{z^2 p (1-P)}{d^2} = \frac{(1.96)^2 (0.18) (1-0.18)}{(0.05)^2} = \frac{(1.96)^2 (0.18)(0.82)}{(0.05)^2} = \frac{0.567}{0.0025} = \frac{0.567}{0.003} = 189$$

Therefore, the sample size will be 189 respondents for this study to be conducted in Juba Teaching Hospital.

2.4 Description of the Research Instrument

Questionnaires The researchers have used a questionnaire as a tool in the process of data collection. The enabled us to obtain quantitative data. Using these research tools, the chances of bias is reduced

2.5 Data Collection Procedure

Data collection procedure is gathering specific information aimed at proving or refuting some facts. Thus, appropriate data about the prevalence of NSIs was collected by the researchers. The data was randomly collected from Juba Teaching Hospital making sure all departments are map equally. All the respective demographic data involving name, age, sex, educational level and department of work.

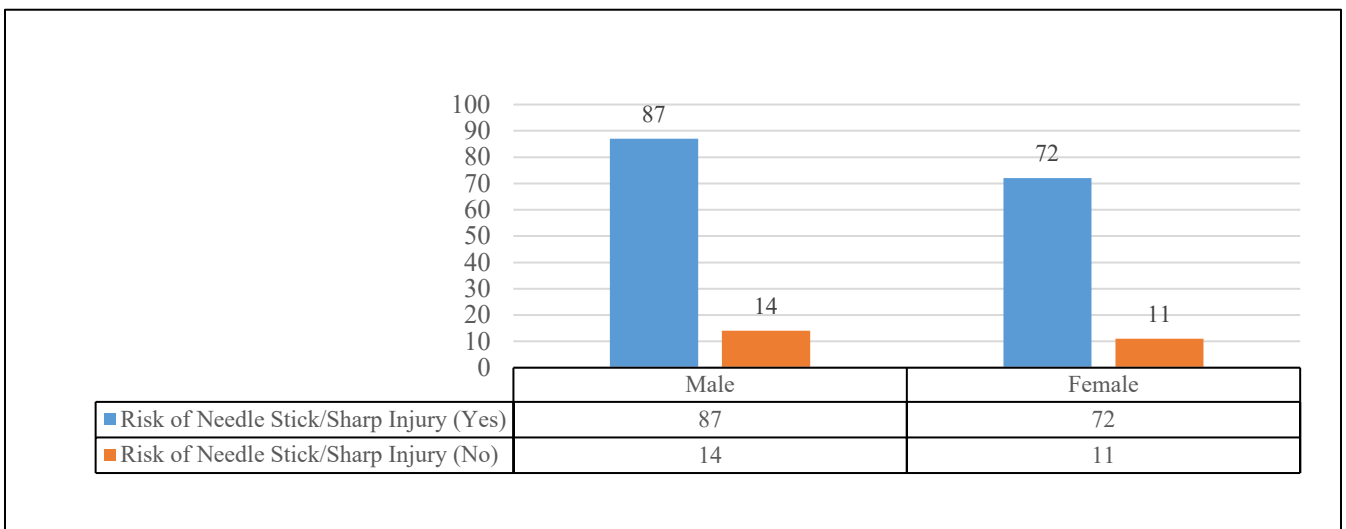
2.6 Data Analysis Procedure

Data was entered, and cleaned by using SPSS IBM Version 22. The data was analyzed and displayed as descriptive statistics. Categorical data were analysis and display as figures in form of bar charts. Associations were determined using ANOVA. Chi square was used to determine significance in which any value less than 0.05 was considered to be statistically significant.

3. Results:

3.1 Socio-demographic Characteristic by Risk of Needle Stick/Sharp Injury

Figure 3.1 Sex of Respondents by Risk of Needle Stick/Sharp Injury.



The results in figure 3.1 showed that the risk of needle stick/sharp injury was higher among male healthcare workers 87 persons than among female healthcare workers 72 persons.

Figure 3.2 Age of Respondents by Risk of Needle Stick/Sharp Injury.

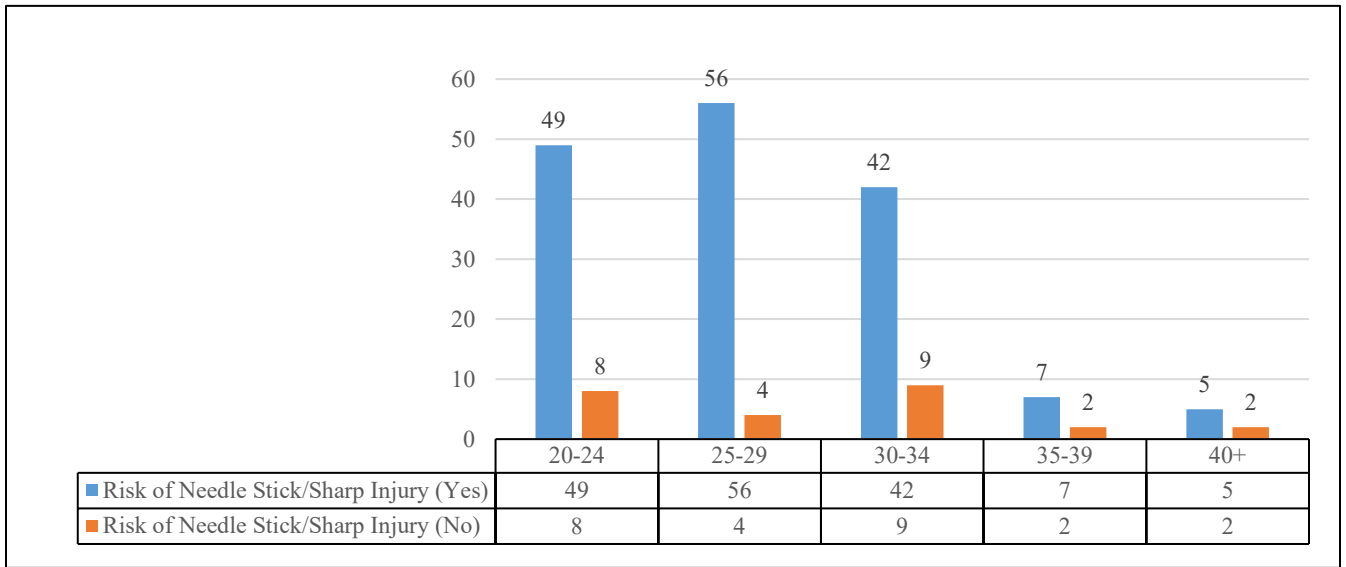
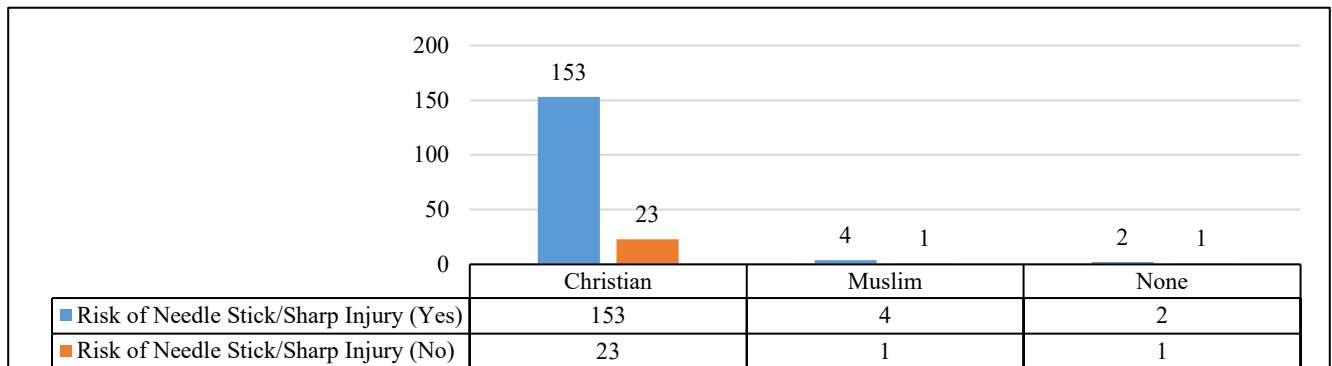


Figure 3.2 showed that the risk of needle stick/sharp injury was higher among healthcare workers aged 25-29, 20-24 and 30-34 years 56, 49 and 42 persons, respectively, while lower among healthcare workers aged 40+, 35-39 years 5 and 7 persons, respectively.

Figure 3.3 Religion of Respondents by Risk of Needle Stick/Sharp Injury.



The results in figure 3.3 showed that the risk of needle stick/sharp injury was higher among Christian healthcare workers 153 persons, while lower for Muslims and None religion healthcare workers 4 and 2 persons.

Figure 3.4 Education Statuses of Respondents by Risk of Needle Stick/Sharp Injury.

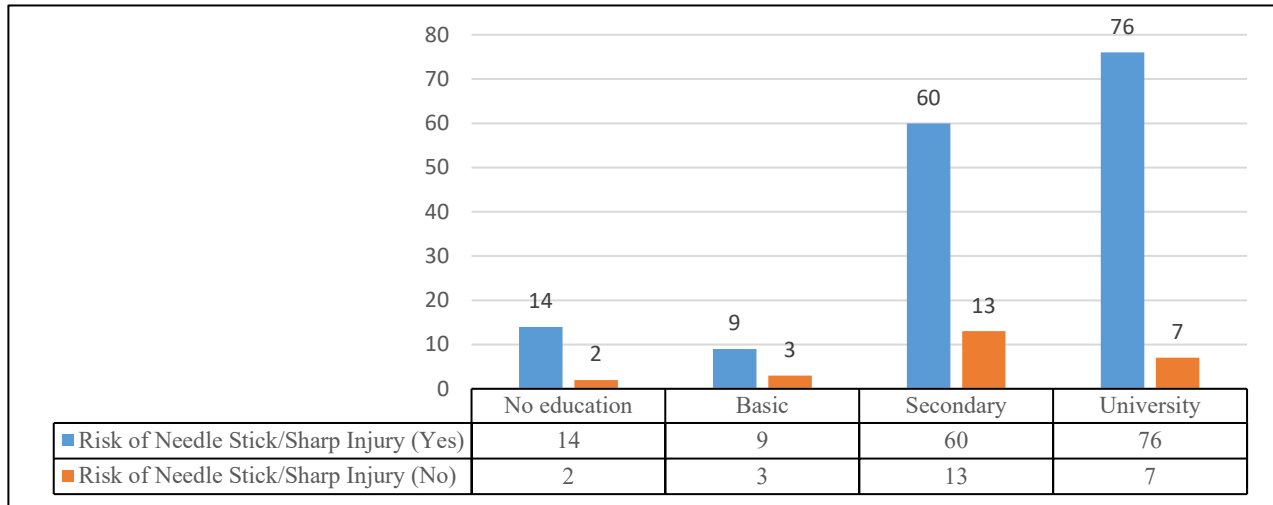


Figure 3.4 showed the differentials of risk of needle stick/sharp injury according to the study variables. The risk of needle stick/sharp injury was lower among healthcare workers with basic education 9 persons, followed by no education 14 persons, whilst higher among secondary and university 60 and 76 persons respectively.

Figure 3.5 Marital Status of Respondents by Risk of Needle Stick/Sharp Injury.

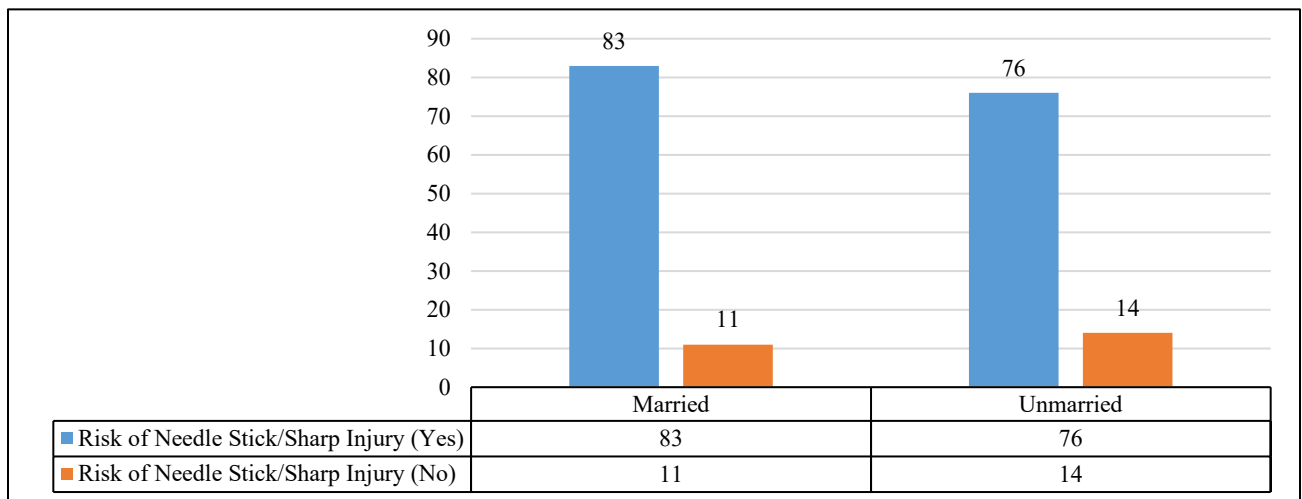


Table 3.1 Results of Logistic Regression for the Factors Associated with Risk of Needle Stick/Sharp Injury

Variables	B	Sig.	Exp(B)	95% C.I. for EXP(B)	
				Lower	Upper
Recap the needles after use	0.390	0.507	1.478	0.466	4.685
Safety box	0.650	0.606	1.915	0.162	22.631
Working guidelines	- 1.430	0.141	0.239	0.036	1.604
Training	- 1.144	0.134	0.319	0.071	1.423
Working hours	1.454	0.015	4.280	1.320	13.875
Job satisfaction	1.436	0.018	4.203	1.280	13.797
Level of the risk of needle stick/sharp injury	-1.244	0.001	0.288	0.142	0.586
Use of personal protective equipment	0.006	0.997	1.006	0.054	18.731
Ever experienced needle stick/sharp injury	1.293	0.045	3.643	1.029	12.901
Frequency of injury experienced	0.659	.157	1.933	0.777	4.813
Average monthly income	- 0.426	0.429	0.653	0.227	1.878
Get care after injury	1.062	0.021	2.893	1.176	7.117
Department currently working	0.006	0.952	1.006	0.820	1.236

4. Discussions:

Needle stick injuries are the most common route by which blood-borne viruses and/or infections such as HIV and hepatitis B and C. Such infections serve as high occupational risks and threats to healthcare workers, especially where basic rules of occupational safety and health are not implemented⁽¹⁾.

Unavailability or partially used of Personal Protective Equipment (PPE), inadequate trained staffs were reported to increase rates of NSIs, especially among nurses in emergency department. Similar results in terms of poor HCWM have been reported by previous studies in many African countries.

In this study, the risk of injury among healthcare workers who recap the needles after using two hands was around 1.478 times higher than among those healthcare workers who used one hand,

the reason is that handling the needle with one hand may lead to miss recapping and cause injury; also there are some circumstances where a lot of patient may need to be attended for and the work force is less, thus the available nurses are force to do work quickly leading to increased risk of NI injury. This finding is higher than the study done in Addis Ababa which was 1.025, 3.091 but low to 7.1 compared to the study done in Jeddah-Saudi Arabia, 43.5 in Amhara-Ethiopia,⁽¹⁴⁾ and 3.17 in India⁽¹⁵⁾ respectively

Knowledge and concern about needle injury was found to be significantly associated with the risk of needle stick/sharp injury. The risk of injury among healthcare workers who have concerned about the risk of needle stick/sharp injury was 3.643 times less probable to injure compared to healthcare workers who do not concerned about stick/sharp injury, and that may be related to being careful when they are working. This finding is lower when compare with the study done in Haramaya and Jigjiga University in Eastern Ethiopia 64.8,⁽¹⁶⁾

Daily working hours were found to be significantly connected to the risk of needle stick/sharp injury. The risk of injury among healthcare workers who worked more than 40 hours was high; about 4.280 times more likely to get injure than those healthcare workers who worked less than 40 hours and that may be likely due work overload leading to tiredness and confusion which made them more expose to injury, this rate is higher than of Jeddah, Saudi Arabia 1.00⁽¹⁷⁾, but lower when compared to the study of Northern Ethiopia⁽¹⁾.

As expected, the risk of injury among healthcare workers who do not use safety box was about 1.915times higher as compared to those healthcare workers who were using safety box. The presence of the box helps in eliminating the used needle, subsequently decreasing the chance of injury. The finding is lower than that found in Amhara Ethiopia 25.18⁽¹⁸⁾.

In addition, getting care after injury was found to be significantly associated with the risk of needle stick/sharp injury. Healthcare workers who do not get care after injury were 2.893 times more likely to suffer from injury complications compared to those healthcare workers who get care after injury. It is obvious that getting care after injury reduces the probability of transition of many infectious agents. This outcome is low than the one in Amhara Ethiopia 89.1.

Training was negatively and insignificantly related to the risk of needle stick/sharp injury at 95% confidence level. The risk of injury among healthcare workers who were trained was around 0.319 times less likely to injure than those who were not trained, obviously because of their reduced skills. The rate is low than that in Amhara Ethiopia 0.319⁽¹⁸⁾. This difference might be related to the fact that the above studies were conducted by selected types of health professionals from hospitals, health centers, and clinics, and includes socio-demographic/economic status, cultural characteristic of the study participants, sampling method, and sample size. In this study, the majority of injuries were slight skin penetration. Besides this, frequency of injury experienced was found to be insignificantly associated with the risk of needle stick/sharp injury. The risk of injury among healthcare workers who frequently experienced NI was 1.933 times more likely to have complications and major accidents than those healthcare workers who do not frequently experience needle stick/sharp injury; this is lower than the study done in India (33.3 %) and Ethiopia (49.5%)⁽¹⁴⁾ respectively

Use of personal protective equipment was positively and insignificantly linked with the risk of needle stick/sharp injury. The risk of injury among healthcare workers who do not use personal protective equipment was about 1.006 times higher than healthcare workers who use personal protective equipment, this is less compared to study done in North-East Ethiopia (70.6%)⁽⁹⁾. The prevalence was found to be higher in healthcare workers who worked in emergency unit 1.006

times more compared with those healthcare workers who worked in other departments. This is clearly because of much number of patients who are being attended to at the emergency unit and the constant need in to serve the crowded patient waiting on the line. This is in agreement with previous study in Bahir Dar, Northwest Ethiopia (21.4) which found that the emergency department was more affected than other unit⁽¹²⁾.

4:1 Limitation

Among the health workers in Juba Teaching Hospital, there was lack of responding and many workers refused to participate in questionnaire especially the oldest women aging at 30 years and above. Lack of accessing some of the health workers who were on night duties. And also lack of awareness about the important of NSIs.

4:2 Recommendations

1. In this study we observed that most of NSIs occurred in emergency units and laboratory department. Safety box was positively and insignificantly allied with the risk of needle stick/sharp injury; this can be improved by providing enough safety boxes in all the departments and conducting tailored training to the staffs on the risk of NI injuries and its complications
2. Working hours were found to be significantly connected to the risk of needle stick/sharp injury which can be solved by reducing working hours to less than 40 hours or providing additional staffs
3. Job satisfaction also was found to be significantly linked with the risk of needle stick/sharp, in this point there is much need for providing good salary packages and incentives to health workers.

4. The use of PPE was positively and insignificantly linked with the risk of needle stick/sharp injury here also there is a need for providing enough PPE in all departments especially the emergency unit.
5. In addition, get care after injury was found to be significantly associated with the risk of needle stick/sharp injury, most of the health care workers do not get care after injury due lack of awareness about the importance of prophylaxis measures and also lack /or lack of those prophylaxis medicine and vaccine that are essential for the workers occupational safety

5. Conclusion

NSI are the most common occupational hazards and interns constitute a high-risk group. Most of the NSI go reported with many HCW not adhering to universal precautions and taking adequate post exposure actions and PEP. In this study, there was a high prevalence of NSI among interns with inadequate post exposure actions. There is an urgent need to introduce health education training programs to all HCW especially to young doctors like interns before they enter their professional career of clinical practice and an urgent need to put prophylactic measures readily available for staffs.

LIST OF ABBREVIATIONS AND ACRONYMS

NSIs: Needle Sticks Injuries

HBV: Hepatitis B Virus

HCV: Hepatitis C Virus

HIV: Human Immunodeficiency Virus

PPE: Personal Protective Equipment

HCW: Health Care Workers

HCFs: Health Care Facilities

LMICs: Lower- and Middle Income Country

WHO: World Health Organization

CDC: Center for Disease Control

PEP: Post Exposure Prophylaxis

HCWM: Health-Care Waste Management

Declarations:

- **Ethics approval and consent to participate**

Permission to carry out the study was granted by the ethical committee, Faculty of Medicine and Health Sciences in Upper Nile University and the Ministry of Health, Republic of South Sudan.

- **Consent for Publication**

Informed consent were obtained for the questioners from the participants prior to data collection. Anybody who declined their data are not collected and they were excluded.

Patients' information that were obtained, were kept confidential and an effort was made to maintain the privacy and autonomy of the participants by encrypting all the information through the process of data analysis.

- **Availability of Data and Materials**

Datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

- **Competing Interests**

The authors declare that they have no competing interests

- **Funding**

Not Applicable

- **Authors' contributions:**

SM, MW, DW, ON, MC and EW were very helpful in data collection for this research. PK, PA, OW, TD and TZ were a major contributors to writing the manuscript. SN gave a final review and approval to the manuscript and finally DA analyzed and interpreted the patient data statistically. All authors read and approved the final manuscript.

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REFEREANCES**Works Cited**

1. *Prevalence of needle stick injury and its associated factors among nurses working in public hospitals*. Gerensea, Awoke Kebede and Hadgu. Dessie town, Northeast Ethiopia : s.n., March 16, 2018, Kebede and Gerensea BMC Res Notes, p. 1.
2. *Prevalence of needlestick injury among healthcare workers*. Teshiwal Deress Yazie*, Kasaw Adane Chufa and Mekonnen Girma Tebeje. 2019, Yazie et al. Environmental Health and Preventive Medicine , p. 1.
3. *Understanding the Hospital Sharp Injury Reporting Pathway*. Leslie I, Boden, PhD, Yolanta V, Petrofsky, Dean, Hashimoto. 2015, American Journal of Industrial Medicine, p. 3.
4. *Prevalence of needle stick injuries among nurses in a tertiary care hospital and their*. Jalina Laishram, Avinash Keisam, Ebenezer Phesao, M. Shyami Tara, Valerie J. Laloo,. 2013, International Journal of Medicine and Public Health, p. 1.
5. *Epidemiology of sharp instruments injuries*. Osman, Tarig. 2014, International Journal of Infectious Control, p. 1.
6. *Epidemiology and risk factors of needlestick injuries among health care workers*. Soheil Hassanipour, Mojtaba Sepandi, Reza Tavakkol, Mousa Jabbaril, Hadiseh Rabiei, Malakoutikhan, Mohammad Fathalipour, Gholamhossein Pourtaghi. April 1, 2021, Hassanipour et al. Environmental Health and Preventive Medicine, p. 2.
7. *Worldwide Prevalence of Occupational Exposure to Needle Stick Injury among Healthcare Workers*. Dechasa Adare Mengistu, Sina Temesgen Tolera, and Yohannes Mulugeta Demmu. June 29, 2021, Canadian Journal of Infectious Diseases and Medical Microbiology, p. 1.
8. *Prevalence of needle stick injuries among health workers of various hospitals*. Shweta Rajpal, Sunil Kumar Garg, Tanveer Bano, Ganesh Singh. February 11, 2021, International Journal of Community Medicine and Public Health, p. 3.
9. *Factors Associated with Needle Stick and Sharp Injuries Among Healthcare Workers*. Bazie, Getaw Walle. Dessie- North East Ethiopia : s.n., November 3, 2020, Dovepress, p. 2.
10. *Healthcare Waste Management*. Ahmed Ali Hassan 1, Terry Tudor 1,* and Mentore Vaccari. 2018, www.mdpi.com/journal/environment, pp. 9-10.
11. *The Frequency, Causes and Prevention of Needlestick Injuries in Nurses of Kerman*. Abbas Balouchi, Hosein Shahdadi, and Hosein Raemanesh. Kerman : s.n., September 29, 2015, Journal of Clinical and Diagnostic Research, p. 1.

12. *Factors associated with needle stick and sharp injuries, among healthcare workers* . Lulie Walle¹, Emebet Abebe², Medihanit Tsegaye², Hanna Franco², Dereje Birhanu³, Muluken Azage. 2013, International Journal of Infection Control, p. 2.
13. G, Vaiada. 2005, SA millions, p. 3.
14. *Magnitude and Determinants of Needlestick and Sharp Injuries among Nurses Working in Tikur Anbessa Specialized*. Bikis Liyew, ¹ Menbeu Sultan, ² Mebrat Michael, ³ Ambaye Dejen Tilahun, ¹. 2020, Hindawi BioMed Research International, p. 7.
15. *Prevalance of Needle Stick Injury among Interns of Rural Medical Teaching Hospital*. Aishwarya Megnath, Aliya Nurath, N Asha Rni. 2017, Journal of Medical Science and Health , p. 6.
16. *Prevalance and Associated Factors of Needle Stick Injury among Nursing and Medwifery Students* . Yeshitila M, Mengistie B, Demessie A, and Godana W. 2015, Primary Health Care: Open Acces, p. 5.
17. *Prevalance and associated factours for needle sticke and sharp injuries among dental assistance*. Lama AlDa khio, Nagarajkumar, Wenugadhathi, Ohoud-ALseraihi, Mustafa, ALzoughool. 2019, Enviromental Health and Prevantive Medicine , p. 5.
18. *Prevalance of Needle and Sharp Injury and Associated Factors among Midwive*. Addisu Getie, Adam Wondmieneh, Getachew. 2021, Dovepress , p. 4.

APPENDICES:

QUESTIONEIRE

Research questionnaire on the prevalence of needle stick injuries among healthcare workers in Juba teaching hospital**Consent**

Dear sir/madam, Dr. Prof/ sister/brother

We are medical students from the Upper Nile University, doing research in the above mentioned topic as a part of the requirements for the fulfillment of bachelor of Medicine and bachelor of Surgery. We do hereby; kindly request your positive cooperation in providing for us useful information for this study. The information will only be used for the research purpose and will be strictly kept confidential. You may opt to decline from participating before giving consent to the researchers, and should you need to know the results of the study, it's the duty of the researchers to keep you informed.

Agree Not agree

DEMOGRAPHIC DATA

Table I: Socio demographic characteristic of healthcare workers (n =) at Juba Teaching Sex Hospital, Central Equatorial State (CES), South Sudan, 2021

1. of respondent:

Male Female

2. Age

20 – 24 25 – 29 30 – 34 35 – 39 40

3. Religion:

Christian Muslim None

4. Educational status:

Read & write Basic Secondary Technical & vocational

Diploma

Degree above

5. Marital status:

Married Unmarried

Table II: Participant's behavior, and working environment among healthcare workers at Juba Teaching Hospital, CES, South Sudan, 2021

1. Were you concerned about the risk of needle stick/sharp injury?
Yes N
2. How do you rate the risk of needle stick/sharp **injury**?
Not risky Low risk Moderate risk High k
3. Do you think needle stick or sharp injury is avoidable?
Yes
4. Do you think disease can transmit by needle stick/sharp injury?
Yes N
5. Do you recap needles after use?
Never Sometimes Mostly All the time
6. How do you recap the needles after use?
With one hand Using two hand
7. Do you use personal protective equipment?
Yes N
8. Was safety box available at your workplace?
Yes
9. Did you receive medical care after injury?
Yes
10. Did you report your injury to concerned body?
Yes N
11. If you answer is NO the Reasons for not reporting
I don't think it's important to report fear of stigma
Thought patient was low risk for HIV No body to report to
12. Were safety guidelines available at your work environment?
Yes N
13. Was working guidelines available at your working place

14. Yes
15. Was there protocol for reporting the injury to organization?
Yes
16. Have you ever had training on occupational health safety?
Yes
17. What are number of working hours/week?
Up to 40 hours More than 40 hours
18. Are you satisfied on your job?
Yes
19. Are you satisfied with the working environment?
Yes No

Table III: Needle and sharp injury handling method of healthcare workers at Juba Teaching Hospital, CES, South Sudan, 2021

1. Ever Experienced needle and sharp injury in your entire job
Yes
2. Frequency of injury experienced in entire job career
Once More than once
3. Needle and sharps injury occurred in the last 2 weeks
Yes
4. Frequency of injury occurred in last 2 weeks
Yes
5. Needle and injury occurred in the last 12 months
Yes
6. Frequency of sharp injury in last 12 months
Once More than once
7. Material caused the injury
Needle Lancet/scalpel/blade Glass/other sharp objects
8. Type of injury sustained
Deep Superficial

Table IV: Factors associated with occurrence of sharp injury among healthcare workers at Juba Teaching Hospital, CES, South Sudan, 2021

1. Average monthly income

≤4000 SSP

≥ 4000 SSP

2. Get care after injury

Yes

3. Report injury to higher officials

Yes

4. Job satisfaction

Yes

5. Satisfaction on working environment

Yes

6. Department currently working

Laboratory Emergency Unit Pediatrics ward

Maternity ward Operation theatre room Medical ward

Surgical ward waste handler unit