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Needlestick Injury Factor Data Analysis: Basis for Developing Policies and Training Programs among Healthcare Workers in Bo Government Hospital

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Abstract

This study aims to assess the prevalence and contributing factors of needlestick and sharps injuries (NSIs) among healthcare workers (HCWs) at Bo Government Hospital, Southeast Sierra Leone. The primary objective is to identify key risk factors and evaluate the effectiveness of current safety protocols in reducing NSI incidents in the main operating theater and theater complex. A descriptive cross-sectional study was conducted involving 60 randomly selected HCWs, including doctors, nurses, and support staff. Data were collected through structured interviews using a questionnaire that addressed demographics, knowledge of blood-borne diseases, adherence to standard precautions, and experience with NSIs. The data were analyzed using descriptive statistics to identify trends and associations between NSI occurrences and various occupational factors. The study revealed that 60% of the respondents had experienced NSIs, with a significant proportion attributing incidents to factors such as inadequate training, improper use of protective equipment, and high workload. Despite awareness of reporting mechanisms, only 40% of those affected reported their injuries to the appropriate authorities. The findings highlight the need for enhanced training programs, improved safety protocols, and more robust reporting systems to mitigate the risk of NSIs and ensure the safety of HCWs. This study underscores the urgent need for targeted interventions to reduce NSIs, thereby protecting HCWs from potential exposure to blood-borne pathogens and improving overall patient care quality in the hospital.

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INTRODUCTION

Needlestick Injury (NSI) is one of the serious challenges faced by healthcare workers (HCWs) worldwide, especially in developing countries like Sierra Leone. NSI occurs when the skin is punctured by a needle or other sharp instruments that have been contaminated with a patient's blood or body fluids. These injuries pose a significant risk of transmitting more than 20 bloodborne pathogens, including hepatitis B virus (HBV), hepatitis C virus (HCV), and HIV. These risks raise deep concerns about the safety and health of healthcare workers who interact daily with sharp medical instruments. Furthermore, the psychological impact of NSI, such as anxiety and stress from the potential exposure to infectious diseases, cannot be overlooked.

According to the World Health Organization (WHO), approximately 3 million healthcare workers worldwide are at risk of exposure to bloodborne viruses each year due to needlestick injuries. Of these, around 90% of incidents occur in developing countries, where access to adequate personal protective equipment and safety training is often limited. WHO also reports that the risk of transmission through percutaneous injury from patients with hepatitis B ranges from 6% to 30%,

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depending on the HBe antigen level. Meanwhile, the risk for hepatitis C is between 1% and 3%, and for HIV, it is around 0.3%. These figures illustrate the seriousness of the NSI threat to the health of healthcare workers, particularly in areas with a high prevalence of bloodborne diseases. In Sierra Leone, particularly at Bo Government Hospital, official data on NSI incidents is very limited. This is largely due to the absence of a proper and accurate standard reporting system. The lack of reliable data makes it difficult to identify trends in NSI incidents and formulate effective prevention strategies. As a result, the risk of NSI at this hospital remains high, while prevention and management efforts are often reactive and unstructured.

Research on NSI has been conducted in various countries, but most studies have focused on countries with better resources. In developed countries, strict injury reporting and prevention systems have significantly reduced NSI incidents. For example, in the United States and Europe, the introduction of better personal protective equipment, intensive training, and strict injury reporting programs have helped lower NSI rates. However, in developing countries like Sierra Leone, where healthcare systems still face many challenges, efforts to reduce NSI have not yet achieved adequate results. Previous studies in Sub-Saharan Africa have shown that NSI prevalence among nurses and midwives is quite high. A study conducted by Fredrich M. Nsubuga et al. (2005) in Sub-Saharan Africa reported that 57% of nurses and midwives had experienced at least one needlestick injury. Meanwhile, the annual needlestick injury rate was 4.2 percent per person per year. Another study conducted at Koidu Government Hospital in Kono District in 2019 showed that 66% of healthcare workers at the hospital had experienced a needlestick injury. However, despite these high numbers, there are no accurate official statistics on NSI incidents at Bo Government Hospital, reflecting the need for further research to understand the scale of this problem.

One of the main challenges in managing NSI risk in Sierra Leone is the lack of knowledge and awareness among healthcare workers about the dangers of these injuries and appropriate prevention measures. A study conducted at Koidu Government Hospital showed that many healthcare workers lacked adequate knowledge about NSI, leading to high-risk behaviors that could increase the likelihood of injury. Factors such as long working hours, high work pressure, and lack of training also contribute to the high rate of NSI. Other research indicates that NSI occurs more frequently among certain healthcare workers, such as nurses, surgeons, and anesthesia technicians, who are often involved in high-risk procedures such as injections, blood sampling, and the use of other sharp instruments. Studies also show that these injuries are more common during night shifts when staff may be more tired and less vigilant. Other factors contributing to NSI include improper use of protective equipment, such as poorly fitting gloves, and failure to adhere to standard safety protocols.

While previous research has identified various risk factors associated with NSI, in-depth and focused research on specific risk factors in hospitals in Sierra Leone, particularly at Bo Government Hospital, remains very limited. This research contributes new insights by conducting an in-depth evaluation of the specific risk factors influencing the occurrence of NSI at Bo Government Hospital. The focus on identifying and mitigating NSI risks in this specific operational environment has not been previously undertaken at this hospital, making the findings relevant for developing more effective policies and interventions.

This study aims to assess the factors influencing the likelihood of needlestick injuries among healthcare workers in the operating rooms of Bo Government Hospital. By evaluating healthcare workers' knowledge and attitudes, the causes of injuries, and the impact of these injuries, the data obtained can serve as a basis for developing more effective policies and training programs. Additionally, this research can provide insights into how healthcare workers' perceptions and knowledge can influence their behavior in preventing NSI, which can be used to design more targeted interventions.

METHOD

Study Design

This study will employ a descriptive cross-sectional design, conducted among healthcare workers in the main operating theater and theater complex at Bo Government Hospital, Sierra Leone, during the research period.

The Study Area

The study will be conducted at the main operating theater and theater complex of Bo Government Hospital, located in the Bo district. The hospital is situated at Baima and Hospital Road in Bo, adjacent to Bo Government Secondary School. The hospital has various facilities, including an administrative structure, an X-RAY department, a laboratory unit, an outpatient department, inpatient wards for surgical and medical cases, and the theater complex. The theater complex, which is the primary focus of this study, comprises eight sub-units, including:

1. Triage for pregnant women.
2. Labor Ward for childbirth.
3. Operating theater for caesarean section and gynecological surgeries.
4. Postnatal Ward for postnatal cases.
5. High Dependency Unit (HDU) for pre- and postnatal mothers in critical condition.
6. Neonatal Ward for critical neonatal cases.
7. Kangaroo Mother Care (KMC) unit for premature babies.
8. Baby Friendly Hospital Initiative (BFHI) unit for babies whose mothers work at the hospital.

The complex has approximately 40 beds, 10 delivery couches, and 20 baby cribs, with 248 healthcare staff who are prone to needlestick injuries. The complex was constructed in 2015 by the United Nations Family Planning Agency (UNFPA) and receives its water supply from a borehole located behind the complex near the Bo School fence..

Study Population, Sample and Sampling Technique

The study population consists of 85 healthcare workers employed in the theater complex, including surgeons, community health officers, nurses, nursing aides, surgical training program students, and cleaners. The study population breakdown is as follows:

1. Surgeons: 4 (3 males, 1 female)
2. Surgical Assistant Community Health Officers (SACHO): 6 (5 males, 1 female)
3. Community Health Officers: 6 (3 males, 3 females)
4. Nurses: 47 (12 males, 35 females)
5. Nursing Aides: 12 (1 male, 11 females)
6. Surgical Training Program Students (STP): 2 (2 males)
7. Cleaners: 8 (5 males, 3 females).

The study will include a sample size of 60 participants, who will be randomly selected from the population of healthcare workers in the theater complex. A random sampling technique will be employed to ensure accurate representation of the entire population.

Study Unit

A total of 60 participants will be randomly selected to represent the entire theater complex. Each participant will be provided with detailed information about the study and will be required to provide written consent before participating in the interview session.

Type of Data To Be Collected

Questions will be asked to both nurses and cleaners, and response will be recorded in the questionnaires.

Data Collection

Data will be collected through structured interviews using a questionnaire filled out by the researcher. The questionnaire will be divided into four sections:

1. The first section will collect demographic data and individual factors influencing participants' knowledge and attitudes.
2. The second section will gather data on knowledge and attitudes regarding needlestick injuries.

3. The third section will identify the causes of needlestick injuries.
4. The fourth section will evaluate the effects of needlestick injuries on healthcare workers.
5. For participants who cannot read or write, the questionnaire will be read and explained in the local language.

Data Analysis

Data from the questionnaires will be analyzed using descriptive statistics, including frequency distributions and percentages. Tables will be used for systematic data organization, and the results will be presented in the form of pie charts and graphs to facilitate interpretation.

Ethical Considerations

Ethical approval will be obtained from the relevant authorities before the study commences. All participants will be assured that the information they provide will be used solely for academic purposes and will be kept strictly confidential. Additionally, participants will be assured that the study is risk-free and cost-free, except for the time they spend participating.

RESULTS AND DISCUSSION

Results

In this is where the researcher presents the data collected from respondents. Subjecting the data to tabulation and graphic forms, to allow for easy handling and analysis. The total sample was 50 respondents. The rest of the other data are presented in Tables 1, 2, 3, and 4.

Table 1. Analyses of Respondents for Respondents' Bio Data

No	Aspect	Results
1	Respondent identity/cadre	the respondent identity or cadre, 10 (20%) are medical Doctors, 30 (60%) are Nursers and 10 (20%) are Community Health Officers (CHO).
2	Age	(10%) of the respondents are between 18 – 25 years, 35 (70%) are of age between 26 – 35 years and 10 (20%) are from 36 and above years.
3	Gender	24 (48%) female and 26 (52%) Males.
4	Socio – Economic status	25 (50%) are employed while 25 (50%) are volunteering.
5	Religion of respondents	25 (50%) are Christians, 20 (40%) are Muslim and 5 (10%) of them are neither Christians nor Muslim.

Table 2. Respondents' Knowledge and Attitude

No	Question	Results
1	Have you ever heard about a Needle stick injury?	All of the respondents have heard about needle stick injury and this is what they know about it, 10 (20%) said is the piercing of the skin/tissues with sharp object during treatment, 10 (20%) said is about penetration of used sharps including needles into the tissues and 30 (60%) except all the above definition like Piercing of the skin/tissues with sharp object during treatment , Penetration of used sharps including needles into the tissues , sticking sharp objects into the body mucosa and Is an occupational hazard.
2	Is there any existing opportunity in this hospital to report occupational hazards?	30 (60%) of the respondents accepted that there is an existing opportunity in the hospital to report hazard cases occasionally while 20 (40%) of them don't of any existing opportunity in the hospital.
3	Where do you report?	30 (60%) of the respondents do report hazard cases occupationally, and among them, 5 (10%) do report to the HIV

No	Question	Results
		unit, 20 (40%) to the IPC unit, and 5 (10%) to their in - charge and also the medical officer.
4	If yes, when last did you have the training?	among the 30 (60%) of respondents who have taken a training on needle stick injury, 5 (10%) have trained few months ago, 10 (20%) of them is for a very long time, 5 (10%) was since last March of this year, 5 (10%) was since last year and 5 (10%) was about three years ago.
5	What do you think about occupational safety and Health (OSH) in this unit/workplace?	The figure above is asking the respondents about their understanding in Occupation Safety and Health (OSH) in their unit of working, 45 (90%) said is poorly implemented and promoted while 5 (10%) said is effectively implemented and promoted.
6	Do you think that Needle stick Injuries are preventable?	45 (90%) of the respondents said that Needle stick injury is preventable while 5(10%) do not believed that it is preventable
7	What do you think about staff commitment to the mitigation of Needle stick injury in this unit?	The commitment of staff due to the mitigation needle stick injury in the unit is about 10% high, 50% satisfactory, 20% poor and 10% of the respondent don't know how it is.
8	Are staff comfortable or always happy or get the urge to report Needle stick injuries when they sustain the injury?	there is an equal (50% - 50%) comfortability among the workers in order to share the aspect of needle stick injury when it happened to them or patient in the unit.
9	What makes staff reluctant to report when they sustain Needle Stick Injury?	the respondents shared their views about why they are always reluctant to report any needle stick injury, there is an equal percentage (10%) about their view, some say because no appropriate action is being taking health wise, other say because of not to be call a quack, or lack of concentration in the job and inexperience in the job, or most do not know where to report and poor psychological support or No room of it (No office to report) or Some staff rely on their own treatment after a needle injury or Some staff won't take it important or assume the patient does not have any disease condition or To know the diagnose of the patient and for further management of affected person or Work load / Emergency and about 20% said Some of the staff did not know about the support in the hospital.
10	How are victims of Needle Stick Injury supported by colleagues in the unit?	6 (12%) said they are provided with PEP and 6 (12%) counseling, 10 (20%) said the get prompt services, 10 (20%) will sent the victim to seek care elsewhere, 15 (30%) express ordinary sympathy to victim and 3 (6%) always provide psychological support to the victim.
11	Have you ever supported the prevention of Needle Stick Injury in this Unit?	respondents were asked if they have given support to prevent the Needle stick injury, 30 (60%) have done it but 20 (40%) have not supported in any way to prevent the NSI.
12	How frequently do you think staff are sustaining Needle Stick Injury in this unit?	respondents were asked how frequently can the staff sustain needle stick injury, 5 (10%) said daily, 1 (2%) is weekly, 29 (58%) said monthly, and 15 (30%) said sometimes, but not that frequency.

Table 3. Causes Of Needle Stick Injury

No	Questions	Results
1	Needle stick injury is caused by so many things?	30 (60%) know that it can be caused by many things while 20 (40%) don't know about it.
2	If yes, what are the causes?	Among the 30 respondents, 5 (10%), said is by Mistaken, Lack of Knowledge of using the needle, lack sharp box in the unit, during medication hours, when collecting specimens for the patient, during penetration of needle in the tissue after treatment

		procedure, Lack of attention when giving injection, unsafe disposal of sharp, Lack of proper care, unexperienced in the job and talking when working thinking about home issue, doing hidden treatment, worry to go home.
3	How are these causes related to your work?	is 5 (10%) each which are By Causing trauma and injury, Causing cross infection, Lack of timing in drug administration in ward way of handing sharp in treatment, Make the job in accursing and also lead anxiety to the worker in the unit, Mostly during the time of working and after the procedures, one of the frequency use instruments, oversized glove and Related to our procedure because equipment can used during the procedure while 15 (30%) don't know any causes of needle stick injury related to their work.

Table 4. Effects Of Needle Stick Injury

No	Questions	Results
1	Has any staff ever fallen ill or sick due to a particular Needle Stick injury in this unit?	10 (20%) of the respondents are aware of some staff fall ill because of needle stick injury while 40 (80%) have never notice any of the staff fall ill because of Needle Stick Injury.
2	Are you aware of any death due to a particular Needle Stick Injury among staff in this Unit?	5 (10%) of them are aware and 45 (90%) of the respondents have never take note of any death of staff by needle stick injury.
3	Are staff stigmatized in this unit when they sustain Needle Stick Injury by assuming that they are already infected with blood-borne diseases?	15 (30%) of them were stigmatized due to the needle stick injury by other staff while 35 (70%) of them have never experiences any stigmatization by other staff.
4	Are you aware of the risk factors of Needle Stick Injury?	40 (80%) of them are aware of the risk factor of needle stick injure while 10 (20%) are not aware of it.
5	If yes, what are some of the risk factors of Needle Stick Injury?	31 (62%) said it can lead to infectious disease transmission, 1 (2%) said disfigurement, 23 (46%) end up having emotional distress and 1 (2%) have a day off from the hospital.
6	What would you want to recommend to this Unit and the hospital management Committee for the promotion of safety protocols for this institution?	6 (12%) by Always make sure not to recap needle after procedure, to provide sharp box where needle can be disposed, 5 (10%) by Avoid recapping or bending needles that might be contaminated, 7 (14%) by Avoid using needles wherever safe and effective alternatives are available, 5 (10%) by Handle needle with course, you have to be skill of handling it, 7 (14%) is by Health talk, 5 (10%) by Regular training of staff on safety use and disposal of sharp, 5 (10%) of them hope they should call a special training in every unit to avoid piercing them during the procedure, 5 (10%) to inform all unit in the hospital that this needle stick injury unit is known available for all health workers in the hospital and 5 (10%) by Training section on risk factors of needle stick injury to be improved the idea on it.

Discussion

This studied was designed to assess the factors influencing Needle Stick Injury among staff in the theatres at the Bo government hospital in Bo district, southern region of Sierra Leone.

The result of this study disclosed 20% of the respondents are medical doctors, 60% are Nursers and 10% are community health officers. And among theses, 10% of the respondents are between 18 – 25 years, 70% are between 26 -35 years and 20% are between 36 and above where 48% are females and 52% are males.

The result of this study shows that 60% of the respondents accepted the definition about Needle Sick Injury given, 20% say is the piecing of the sink and 20% said is about penetration on used sharps and 60% of the respondents acknowledge that there is an exist place to report about Needle sick injury. And 40% do report to the IPC.

Among the staff, 60% of them have undertaken a training on Needle Sick Injury, where20% of them has taken a very long time since having their last training. 90% said the occupational safety and Health in the unit is poorly implemented and 90% believed that Needle Stick Injury is preventable. 50% of the respondents said that staff mitigation needle stick injury is satisfactory and 50% are comfortable among the workers in order to share the aspect of Needle Stick Injury when it happened to them or patient in the unit.

The data of this study indicate that about 20% of the staff did not know about any support in the hospital for Needle Sticky Injury but 20% of them who always have Needle Sticky Injury get prompt services or seek care elsewhere.

The analysis also revealed that 60% of the staff do give support to prevents Needle Stick Injury but 58% said Needle Stick Injury happened in the hospital almost on monthly bases.

The result of the data indicated that 60% of the respondents know that Needle Stick Injury is causes by many things like by Mistaken, Lack of Knowledge of using the needle, Lack sharp box in the unit, During medication hours, when collecting specimens for the patient, During penetration of needle in the tissue after treatment procedure, Lack of attention when giving injection, unsafe disposal of sharp, Lack of proper care, unexperienced in the job and talking when working thinking about home issue, doing hidden treatment, worry to go home. And 10% these causes can be related to their work like are By Causing trauma and injury, By Causing cross infection, Lack of timing in drugs administration in ward way of handing sharp in treatment, Make the job in accursing and also lead anxiety to the worker in the unit, mostly during the time of working and after the procedures, one of the frequencies uses instruments, oversized glove and Related to our procedure because equipment can used during the procedure.

The result of the data also shows that 80% of the respondents are have never notice any of the staff fall ill because of Needle Stick Injury, 70% of them have never experiences any stigmatization by other staff. and 90% of the respondents have never take note of any death of staff by needle stick injury.

It also shown by the data that 80% of the respondents are aware of the risk factor of needle stick injure and 62% said it can lead to infectious disease transmission and 46% end up having emotional distress and 14% of them recommended that for safety protocols the victims need health talk and by avoid using needles wherever safe and effective alternatives are available.

CONCLUSION

Based on the research findings, it can be concluded that although the level of awareness among theater staff regarding the prevention of needlestick injuries (NSIs) is relatively high, the reporting of these incidents through the Infection Prevention and Control (IPC) unit remains suboptimal and requires improvement. Many staff members have received NSI training several months ago, but the lack of ongoing training could pose a risk to other staff, patients, and visitors. Occupational Safety and Health (OSH) at Bo Government Hospital is also considered to be poorly implemented, which could endanger the safety of all hospital staff. Although most staff feel comfortable reporting NSIs, some are still reluctant to do so, hindering prompt management. NSI victims generally receive support from colleagues, but this support is often limited to sympathy without adequate follow-up action. Staff knowledge of NSI causes is fairly good, but this understanding has not been fully applied in practice. Additionally, most staff are unaware of any illness or death due to NSI in their unit and have not experienced stigma, despite being aware of the risk of disease transmission that could lead to emotional distress. This conclusion emphasizes the need for improved reporting, continuous training, and better OSH implementation to reduce the risk of NSIs in the hospital.

RECOMMENDATIONS

Based on the research findings and conclusions, several recommendations are suggested to reduce and address the factors influencing needlestick injuries in the operating theater of Bo Government Hospital. The hospital management is advised to develop an Occupational Safety and Health (OSH) policy and effectively disseminate it among staff to lead in controlling and mitigating occupational hazards. Additionally, the theater management should collaborate with the hospital management to utilize the capacity gaps identified in this study to build staff capacity in preventing

needlestick injuries in the unit and throughout the hospital. Increasing competitive awareness among staff is also necessary to encourage their commitment to best practices in infection prevention and control as a strategy to ensure the safety and protection of staff, patients, and visitors from disease transmission. It is also recommended to introduce an effective post-exposure prophylaxis system in collaboration with the IPC focal person for the benefit of all those who sustain needlestick and sharps injuries at the hospital. Establishing a risk register to record needlestick injury victims and conducting effective follow-ups on them is important for achieving positive health outcomes. Lastly, the provision of adequate protective materials and increasing staff access to safety boxes for the proper management of needlestick injuries and other sharp objects throughout the hospital is highly recommended.

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