**Original Research Article**

**The Role of workload and Job specification in needle stick injuries among Health care practitioners in Tertiary Hospitals, Rivers State,** **Nigeria**

**Abstract**.

**Background**

Needle stick injuries have been a major preventable hazard among hospital staff for centuries. With a prevalence ranging from 37-95% among various sets of healthcare workers. It has also resulted in health care workers acquiring some viral infections over time. This can alter the quality of life of affected individuals. Most of these infections occur in developing countries including Nigeria. Various contributory factors have been found in several studies.

The aim of this study was to establish if the job description of health care workers in two tertiary hospitals in Rivers State and the work load played a role in the occurrence of needle stick injuries.

**Methods**

This study was carried out over a period of one month among two tertiary hospitals in a southern state in Nigeria using a multi stage sampling technique. Purposive, stratified proportionate and simple random techniques were used. 879 personnel were recruited and a structured questionnaire was used.

**Results**

Lack of concentration as a result of increased workload was highlighted to be a key cause of needlestick injuries among this population. Job specification was found to increase the chance of needle stick injury by ten.

**Conclusion**

Working long hours among professionals and specific locations in the hospital environment increase the chance of needlestick injuries. The findings in this study were, however, not statistically significant.

**Keywords**: Health care workers, Job specification, Needle stick injury, Viral infection, Workload

**Introduction**.

Persons who work in the hospital environment are exposed to various types of hazards. Needle stick injuries though preventable have been part of hospital work life for centuries and it is a major health hazard. (1, 2) It has resulted in subsequent exposure to and seroconversion of various hospital staff. This occurrence dates as far back as 1978. Various studies have documented people acquiring hepatitis B and C as well as HIV over the years. (1, 2) Among healthcare workers in developing countries, up to half of those who acquired these infections got them from needle stick injuries. (2) Acquiring any of these viral illnesses has the potential to affect the quality of life of the concerned individual. The percentage of health care practitioners exposed in a year varies and there are reports of 48% in Tanzania (3) 37.1% in Eritrea(2) 37.5% in Namibia,( 4) and 25.3% among health care workers in military hospitals in Tehran(5). In an A&E in a south-south hospital in Nigeria the percentage was 51(6) and it was 53.8% among resident doctors in a tertiary hospital in southern Nigeria. (7) In Ondo state, 55% percent of hospital staff reported having a needle stick injury at least once in their lifetime. (8) In Taiz, a city in Yemen up to 95% of nurses had had a needle stick or sharp injury in their work life. (9)

Various factors over the years have been attributed to lead to needlestick injuries and they include, recapping of needles, (1, 2), being a nurse, doing procedures and working in the A and E department, intensive unit and theatre (3, 9, 5), lack of protective equipment as well as failure to adhere to laid down guidelines plays a role.(3) Giving of intramuscular injections (5) and being female are contributory. (9)

It has been noted that 90% of exposure to infective agents by health care workers happen in developing countries, (3, 5) of which Nigeria is one.

The study done in Ondo state noted that because doctors were not that involved in giving intramuscular (IM) injections, they were less at risk to NSI from injections. (8) However, doctors give intravenous (IV) injections, are involved in surgeries and phlebotomy and are at risk through other routes. (6, 2,10)

This information is particularly important because the general compliance rate for vaccination among doctors isn’t excellent. Out of the three most common blood transmissible viral infections, Hepatitis B is the only one with a vaccine. Compliance is a good way to prevent infection. (pre-exposure prophylaxis) A Nigerian based review established that a hospital in Sokoto state had a compliance rate of 56% among HCW that had taken the complete three doses of the hepatitis B vaccine. University of Nigeria Teaching Hospital (UNTH) had 48.9%, Irrua had 42.12% and a Jos and Yenagoa combined study had a fully vaccinated status of 36.2%. (11) A more recent nationwide study established a similar finding that the fully vaccinated status for HCW in Nigeria was 42.0%. (12) A study done among doctors in Rivers State and published in 2022, had a vaccination status of 76%, however this did not differentiate between full or partial vaccination. (24)

The aim of this study was to establish if the job description of health care workers and the work load played a role in the occurrence of needle stick injuries.

Though a large percentage (40-70%) of needle stick injuries in developing countries are under reported (2) establishing the factors which militate it is a step in limiting or reducing the incidence.

**Methodology**

**Study Design**; The study was a prospective cross-sectional study. It was carried out over a period of one month in 2024

**Study Site**; This study was carried out among the two tertiary hospitals located in Rivers State, a south -south state in Nigeria. It is a state known for the production of crude oil, a cosmopolitan state.

These hospitals are the University of Port Harcourt teaching hospital and the Rivers State University Teaching Hospital.

**Study Population**. The study population was all health professionals in the hospitals making up a total of three thousand, six hundred and fifty.

**Sample size**; Using the Cochrane formular a sample size of 879 was calculated.

**Sampling technique**. This made use of a multistage sampling technique. The first step was purposive sampling technique by which the hospitals were chosen.

The second step was a stratified proportionate sampling technique which was used to select the number of healthcare workers from each tertiary health institution for the study respectively.

For the third step, simple random sampling technique was used to select the healthcare workers that participated in the study.

**Data Analysis**: A self-administered structured questionnaire was used. Data obtained from the questionnaire was inputted into an excel sheet and then exported into SPSS.

**Results**

A total of 879 participants were incorporated into this study.

**Table 1: Workload and needle stick injuries**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Workload** | **M** | **Std. Dev.** | **Remark** |
|  | Improper disposal of needles and other sharp objects may expose workers to injury due to prolonged duty stay. | 2.56 | 0.62 | HE |
|  | Some workers may lack concentration during intravenous administration. | 2.73 | 0.82 | HE |
|  | Every healthcare worker has a chance to get needle stick injury due to too much responsibility at work. | 2.69 | 0.75 | HE |
|  | Increased in work load can lead to needle-stick injury. | 2.78 | 0.83 | HE |
|  | **Grand Mean** | **2.69** | **0.755** | **HE** |

This shows a grand mean and standard deviation of 2.69 and 0.755.

**Table 2: Job specification and Prevalence of Needle Stick Injuries**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Model Summary | | | | |
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .098a | .010 | .007 | .23484 |
| a. Predictors: (Constant), Department | | | | |

From the above table, R is 0.098 and R-square is 0.010 which can be regarded as 10% of job specification determining needle stick injury among healthcare workers in tertiary health institutions. The result indicated that job specification was 10 times more likely to determine needle stick injury among healthcare workers.

**Table 3: Association between workload and needle stick injuries among healthcare workers in tertiary health institutions, Rivers State.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ANOVAa | | | | | | |
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | .008 | 1 | .008 | .142 | .706b |
| Residual | 21.042 | 378 | .056 |  |  |
| Total | 21.050 | 379 |  |  |  |
| a. Dependent Variable: PDNSI | | | | | | |
| b. Predictors: (Constant), | | | | | | |

From the above table, the F-value is 0.142 at 0.706 significant levels. Since the level of 0.706 is greater than 0.05 significant level. Hence, there is no significant association between workload and needle stick injuries among healthcare workers in tertiary health institutions, Rivers State.

**Table 4: Job specification and needle stick injuries among healthcare workers in tertiary health institutions, Rivers State.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ANOVAa | | | | | | |
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | .204 | 1 | .204 | 3.693 | .055b |
| Residual | 20.846 | 378 | .055 |  |  |
| Total | 21.050 | 379 |  |  |  |
| a. Dependent Variable: PDNSI | | | | | | |
| b. Predictors: (Constant), Department | | | | | | |

From the above table, the F-value is 3.693 at 0.055 significant levels. Since the level 0.055 is greater than 0.05 significant level. There is no significant association between job specification and needle stick injuries among healthcare workers in tertiary health institutions, Rivers State.

**Discussion**

Many factors can predispose to needle stick injury. In this study, top determinants on the list were increased workload and lack of or reduced concentration when giving intravenous injections.

Table 1 Showed a grand mean greater than 2.5. This signified that workload was a major determinant to needle stick injuries among healthcare workers in tertiary hospitals, in Rivers State. This agrees with what was found among military hospital staff in Tehran and among nurses in Yemen, Iran, and Parkistan. (9, 5, 13, 14) These sets of people all corroborate with the fact that increase workload plays a major role in needlestick injuries.

Increased workload, especially when personnel have to handle multiple cases at the same time, above a certain threshold would affect efficiency and also reduce concentration as some level of distraction can arise. This is a strong reason why increased work load is associated with an increased prevalence of needle stick injuries among some health care workers especially nurses and doctors. Increased work load predisposes to increased fatigue and a higher likelihood of errors. (13, 14) All these factors put together result in the statistics we have worldwide.

This study also showed that job specification had a ten percent chance of increasing needle stick injury. This agrees with what was found in Benin City where Doctors and Nurses had a higher prevalence of NSI. (6) Though this was limited to the A and E department of the hospital only. A study done in Saudi Arabia over a two year period had a similar finding, nurses and doctors had the highest prevalence of NSI’s. (15) This study involved all the health care workers in the hospital.

Hospital staff at risk of higher exposure include, surgeons, nurses (especially midwives), laboratory staff, ICU and emergency room workers. (6, 2, 10, 16) This is because of the nature of their jobs.

Working at night and working for long hours has also been associated with increased NSI. (17, 15)

House officers in Nigeria usually are the ones that put in place intravenous lines and give intravenous drugs. They are also responsible for most of the venepuncture in the wards and clinics. In addition to this they are often stressed because they have a lot of post work duties This actually puts this subgroup of doctors at more risk of needlestick injury. They are also more vulnerable because they have little or no experience. (18)

House keeping staff or health assistants are also implicated because in some places, other hospital staff inadvertently dispose needles wrongly in bags instead of in a bin or carton designated for sharps and therefore put those in charge of disposal at risk. (16)

For the health workers in the emergency, there is more pressure to deliver in emergency situations. At such times, speed and reduced time are key determining factors to outcomes in addition to other influences like clinical acumen and skill. In emergency situations, sometimes the patient may not be very cooperative as they would have been in cold/ non emergency situations. The increased anxiety in emergency situations can account for this. These work together to increase the likelihood for injury. (14) in addiction to this the health worker may neglect to follow laid down protocol in a step by step manner as the focus is on speed. (14)

It is worth mentioning that a study in Egypt recorded ambient room temperature as a factor that can prevent NSI (19) Many emergency rooms and wards in Nigeria do not regularly have an ambient temperature and this can contribute to the already existing factors outlined above. This is not unusual in our developing and evolving economy.( 20) One out of the two emergency wards in our study has a functional air-conditioning system.

Increased thermal temperature has been associated with some level of, mild dehydration, heat exhaustion that can lead to reduced concentration, distraction, impaired mental productivity and increased propensity for mistakes. (21)

The emergency wards in tertiary hospitals are often full and overcrowded for various reasons among which is the ever growing population. This places a higher demand on the fixed infrastructure and the already depleted medical personnel. This depletion has been worsened by the current emigration (of skilled personnel including doctors and nurses) situation in the country known as the “Japa” syndrome in local parlance. (22, 23) This impacts the staff negatively and increases their stress level leading to an increased propensity for errors.

**Conclusion.**

Needle stick injury is a common phenomenon worldwide. In our study most respondents agreed that workload as well as job specification contributed to increased incidence of NSI, however these findings were not statistically significant.

**Recommendation**

Since those working in the A and E and those working with more severe cases as well as those working longer hours and laboratory reception staff are more exposed to needlestick injuries, these subsets of people should be targeted for training and retraining. Ensuring full immunization coverage for them is key, as well as provision of appropriate personal protective equipment and retractable syringes. Ensuring that the environment is as conducive as possible would also help protect staff and patients.

**Limitation**

This study did not take the immunization history of health care workers to confirm if they are up to date.

**CONSENT**

Informed consent was obtained from all participants and approval for the study was obtained from the Hospital Management.

**Ethical Approval:**

As per international standards or university standards written ethical approval has been collected and preserved by the author(s).

Disclaimer (Artificial intelligence)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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