

Original Research Paper

# Prevalence and Risk Factors Associated with Needle Sticks and Sharp Injuries among Nurses at the Accident and Emergency Department of Komfo Anokye Teaching Hospital, Kumasi-Ghana

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**Abstract:** Needle Sticks and Sharps Injuries (NSSI) represent a major occupational hazard in the health care industry, with professional nurses incurring a large proportion of the total burden particularly with items that have been previously used on patients. This study investigated the prevalence and risk factors associated with needle sticks and sharp injuries among nurses at the accident and emergency department of Komfo Anokye Teaching Hospital, Kumasi-Ghana. A cross-sectional quantitative descriptive survey was conducted among 113 Nurses at Accident & Emergency department of Komfo Anokye Teaching Hospital in Ghana using a simple random sampling in selecting participants. A structured questionnaire was used to collect data from the participants. The study shown a prevalence of 47% needle stick and sharp injury among nurses with 33.6% of those injuries resulting from needle stick. Majority (25.5%) of the respondents allowed the injury to bleed as an initial intervention measure. Majority (68.1%) reported the incidence of the injury while (31.9%) did not. Majority (33.3%) of them did not report because they did not know who to report to. Work pressure (53.1%) was identified as the major contributing factor for needle stick and sharp injuries. The study shown a prevalence of 47% needle stick and sharp injury among nurses with 33.6% of those injuries resulting from needle stick. Nurses should be trained on safety measures of handling and disposing needles and sharps and should also be encouraged to report NSSIs in order to get the right treatment and counselling.

**Keywords:** Ghana, Needle Sticks, Nurses, Prevalence, Risk Factors

## Introduction

Needle Sticks and Sharps Injuries (NSSIs) are common occupational injuries among health care workers (van der Molen *et al.*, 2011; Kebede *et al.*, 2012). Needle sticks and sharps injuries are wound caused by needles and other sharp medical devices that accidentally pierce or cut the skin. Such injuries though small can be dangerous because these sharps and needles

have come into contact with blood and other body fluids and they may carry the risk of infections. HIV and hepatitis infection can be contracted through NSSIs. Injuries with NSSIs involve needles, scalpels, lancets, razor blade, scissors, metal wire, retractors, clamps, pins, staples, cutters and glass items. Health Care Workers (HCWs), including the nurses, doctors, dentist, operating departments, laboratory workers, phlebotomist, cleaners and laundry workers, are at risk of injuries with

sharps (European Agency for Safety and Health at Work, 2009). Among all the health professional groups, the nursing staff had been identified as the highest at risk for sharps-related injuries (Kable *et al.*, 2011; Kumar *et al.*, 2012; Adib-Hajbaghery and Lotfi, 2013). Nurses had a large percentage of the total burden of NSSIs especially with items that had been earlier used on patients (Clarke *et al.*, 2002; Ayranci and Kosgeroglu, 2004; Smith *et al.*, 2006).

World Health Organization (WHO) reports had addressed the risk factors in accordance with earlier reviews, on NSSIs, to include, the lack of engineering controls to ensure safer needle devices, insufficient hospital staffing and recapping of needles after use (Wilburn and Eijkemans, 2004; Prüss-Üstün *et al.*, 2005). The International Healthcare Worker Safety Center, in the US, had shown that, injections and drawing of venous blood accounted for 23.6 and 11.5% of NSSIs, respectively (Perry *et al.*, 2003). Registered Nurses (RN) working on patient care units with lower staffing rates and higher levels of emotional fatigue related to their jobs also had significantly greater possibilities of NSSIs (Clarke *et al.*, 2002). Nursing practices that increased the risk of needle stick injury were often connected with activities such as recapping of needles, failing to dispose of used needles properly, collision with other workers and hidden needles in bed linens (Kumar *et al.*, 2012). In sub-Saharan Africa, only few studies had examined the occurrence and risk of sharps injuries among nursing staffs (Nsubuga and Jaakkola, 2005); Amira and Awobusuyi, 2014). Comparing nurses with the physicians, nurses had highest risk of needle stick and sharps injury (Memish *et al.*, 2013). Ancillary staffs were also at risk of NSSIs, because of their involvement in handling items contaminated with blood, (Amira and Awobusuyi, 2014).

In Ghana, data collection on NSSIs was inadequate (Kommogldomo, 2016). Under reporting was a major challenge. As a result, authorities were unable to quantify exposure level for policymaking. There was also lack of data to be used for the purpose of prevention and in the case of later infection (Rais and Jamil, 2013). Low reporting of NSIs had been attributed to lack of awareness and perceived low risk of transmission of infection, (Chalya *et al.*, 2015). This study therefore assessed the risk factors associated with needle sticks and sharp injuries among nurses at the accident and emergency department of Komfo Anokye Teaching Hospital in Ghana.

## Methods

A cross-sectional quantitative descriptive survey was conducted among 113 Nurses at Accident and Emergency department of Komfo Anokye Teaching

Hospital in Ghana between August and October 2018 using a convenient sampling technique in selecting participants. The sample size was estimated using Leslie Kish formula with a prevalence of 50% ( $P = 0.5$ ) and a margin of error of 5% at a 95% confidence interval. All Nurses, who were on duty, were included in the study. Nurses who were off duty, on leave and not present at the time of the study were excluded from the study. A pilot tested predesigned validated questionnaire was used to collect data from the respondents. Results were analyzed using SPSS version 20 and data presented using tables and graphs.

## Results

### Socio-Demographic Characteristics of Respondents

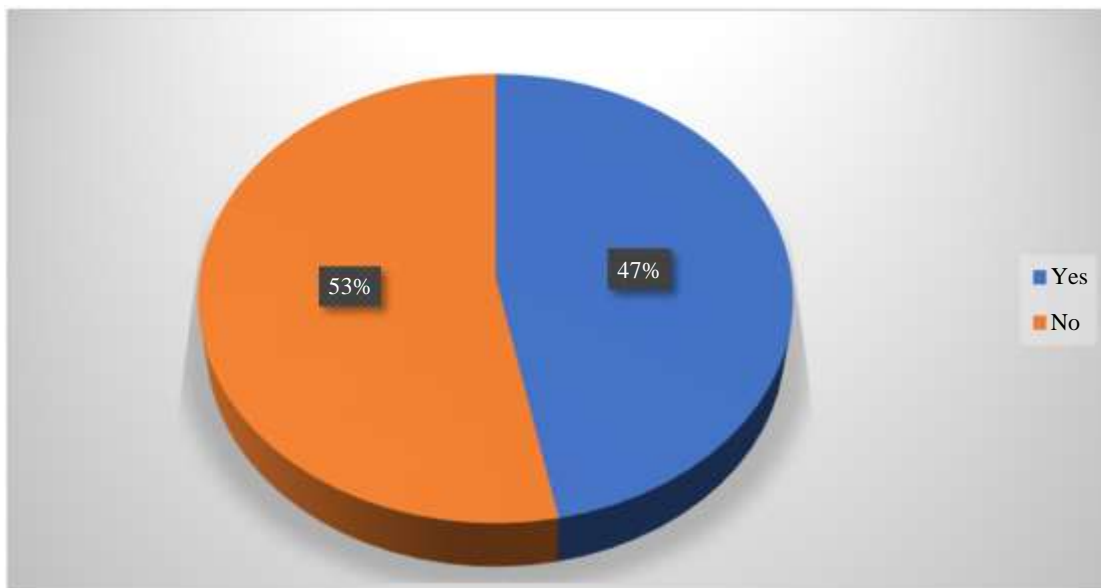
The Table 1 shows findings on the socio-demographic characteristics of respondents.

Majority (56.6%) of the respondents were female and the mean age was 26. 23. Majority (53.1%) were married and (46.9%) were single. Registered general nurses form a simple majority of the study (54.0%), Emergency nurses were (26.5%) and (19.5%) were enrolled nurses (Fig. 1).

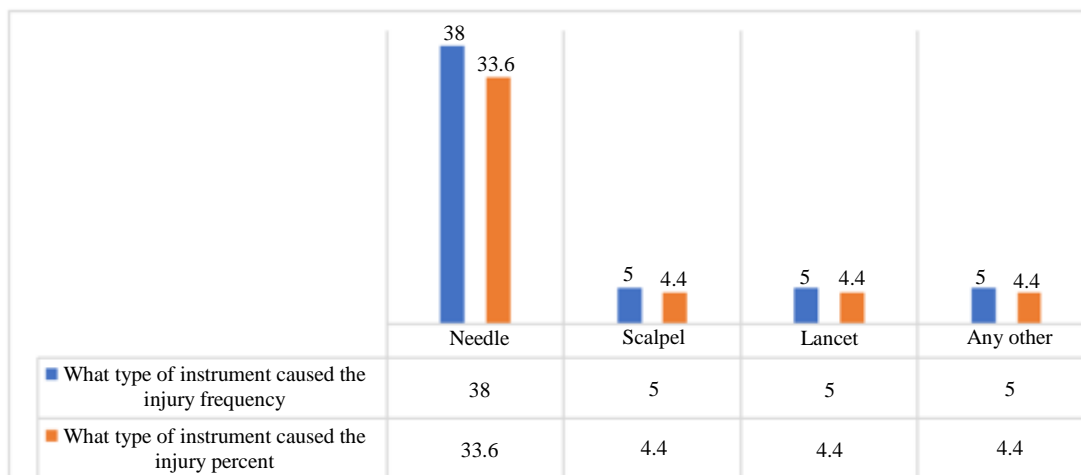
The study shown that majority 60 (53. %) of the respondents never had a needle stick and sharp injuries while 53 (47. %) of respondents ever had a needle stick and sharp injuries (Fig. 2).

**Table 1:** Socio-demographic characteristics of respondents ( $n = 113$ )

Responses	Frequency	Percent
Gender		
Male	49	43.4
Female	64	56.6
Age		
20-24 years	5	4.4
26-30 years	41	36.3
31-35 years	44	38.9
36-40 years	20	17.7
Above 40 years	3	2.7
Marital Status		
Single	53	46.9
Married	60	53.1
Nurses Group		
Registered general nurse	61	54.0
Emergency nurse	30	26.5
Enrolled nurse	22	19.5
Length of Service		
1-5 years	37	32.7
6-10 years	62	54.9
11-15 years	9	8.0
More than 15 years	5	4.4
Hours at work per shift		
8 h	77	68.2
12 h	26	23.0
More than 12 h	10	8.8



**Fig. 1:** Prevalence of NSSIs among nurses at Komfo Anokye Teaching Hospital



**Fig. 2:** Source of needle stick and sharp injury among nurses at Komfo Anokye Teaching Hospital

Out of the total number (53) of respondents who ever had a needle stick and sharp injuries, 38 (33.6%) of those injuries were from needle sticks.

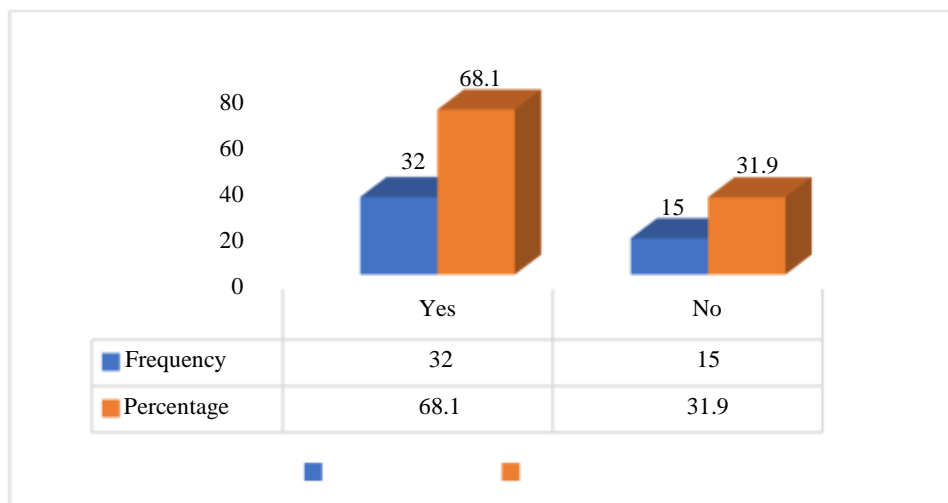
Measures taken following needle stick and sharp injury among Nurse at Komfo Anokye Teaching Hospital.

The study shown that most of the respondents 12 (25.5%) allowed the injury to bleed after a needle stick or sharp injury as the initial intervention measure while 11 (23.4%) washed the injury site with soap and water, 9 (19.1%) notified the infection control office of the hospital and 5 (10.6%) applied antiseptic agent to the site. However, 10 (21.3%) of the respondents allowed the injury to bleed for some time, then washed the injury site with soap and water, later applied

antiseptic agent to the site before notifying the infection control office of the hospital (Fig. 3).

Out of the total percentage of respondents of 60 who have ever had a needle stick and sharp injuries, majority 32 (68.1%) reported the incidence of the injury while 15 (31.9%) of respondents did not (Table 2).

The study looked at reasons why some of the nurse do not report needle stick and sharp injuries. Out of the total percentage (39.1%) of respondent who have ever had needle stick and sharp injuries, (33.3%) of them did not report the incidence of the injury because they did not know who to report to. Also, a proportion (26.7%) of the respondent did not report because of the fear of stigma and 13.3% did not report because they felt it was not important.



**Fig. 3:** Reporting rate of needle stick and sharp injuries among Nurses at Komfo Anokye Teaching Hospital

**Table 2:** Reasons for not reporting needle stick and sharp injuries among Nurses at Komfo Anokye Teaching Hospital

Response	Frequency	Percent
Did not know whom to report to	5	33.3
I do not think it was important to report	2	13.3
Fear of stigma	4	26.7
Thought patient was at low risk for HIV infection	1	6.7
Belief my vaccination status is sufficient	2	13.3
Lack of knowledge of appropriate procedure after injury	1	6.7
Total	15	100.0

**Table 3:** Contributing factor(s) of needle stick and sharps injuries among Nurses at Komfo Anokye Teaching Hospital

Response	Frequency (n)	Percent (%)
Fatigue	10	8.8
Work Pressure	60	53.1
Non co-operative/restless clients	10	8.8
Unsafe medical sharps	5	4.4
Unclear work procedures	16	14.2
Work overload	3	2.7
Indiscriminate needles and sharps disposal by some nurses	7	6.2
Lack of access and failure to use sharps containers immediately after injection	2	1.8
Total (n)	113	100.0

Table 3 above shows contributing factor (s) of needle stick and sharps injuries among Nurses at Komfo Anokye Teaching Hospital. The study identified work pressure (53.1%) as the major contributing factor for needle stick and sharp injuries.

## Discussion

Needle stick and sharp injuries were among the most common occupational injuries in HCWs that comprise about 12% of all working people worldwide. WHO study reported that the global burden of NSIs average to 0.2-4.7 NSI per HCW annually, which was approximately three million HCWs affected yearly (Prüss-Üstün *et al.*, 2005). Among HCWs, the highest incidence of these injuries had been reported among

nurses. This was shown in a study that reported 52.8% of nurses being victims of needle stick and sharp injuries from daily administration of injections (Fourie and Keogh, 2011). Various international studies had investigated the incidence of NSIs and had shown the occurrence varies between different countries, with NSIs more prevalent in developing countries. Also, the exact number of NSIs was undefined due to the lack of reporting (Memish *et al.*, 2013); NSIs recorded through standard occupational recording systems can underrate the true incidence by ten times the amount (Memish *et al.*, 2013). WHO reports revealed the number of sharps and needle injures per person among healthcare workers in Africa, Western Mediterranean and Asia to be 4 per year, a low data compared with developed countries such as the United States and Europe (Prüss-Üstün *et al.*, 2005).

A study conducted in western Tanzania, among HCWs at a tertiary care hospital, found high rates of NSIs among nurses (71.0%) and it occurred frequently in the Accident and Emergency department (33.3%), (Chalya *et al.*, 2015; Lori *et al.*, 2016) conducted a study among nurses at the A&E of KATH and found a high rate of sharps related injuries among the nurses.

Ghana like many developing nations do not have empirical national statistics on needle stick injuries even though some individuals might have done some works in that area (Kommogldomo, 2016). These statistics are however important for policies on occupational health exposure of healthcare workers. The Occupational Health and Safety Policy Guidelines for the health sector of Ghana came into existence in June 2010; therefore, it is not farfetched that there is not enough data on occupational health exposures.

#### *Prevalence of NSSIs Among Nurses at Komfo Anokye Teaching Hospital*

In this study, the prevalence of NSSIs is 47% among nurses at the KATH. Having such high prevalence of needle stick amongst nurses means that, these nurses are at risk of occupationally acquired bloodborne diseases (such as hepatitis B and C and HIV) as the result of Needlestick and Sharps Injuries (NSIs). The high prevalence of needle sticks amongst nurses at KATH might be due to the work pressure because of the excessive number of patients per nurse since KATH is a teaching hospital and a referral facility for all hospitals in the Ashanti and its neighboring regions within the middle belt of Ghana. The result of this study is slightly different from the results of (Lee and Hassim, 2005) which shown a prevalence of 50.7% of needle sticks among nurses in a General Hospital in Malaysia.

#### *Source of Needle Stick and Sharp Injury Among Nurses*

This study also shown that needles are the major source of needle stick and sharp injuries among nurses at KATH. So many reasons may have accounted for this; nurses recapping used needles before disposal, improper handling and disposal of needles by nurses or nurses unable to disposed off used needles promptly after use. This result is in line with the findings of (Lori *et al.*, 2016) which found needles as the major source of needle stick and sharp injuries among Nurses.

On the measures taken by nurses during needle stick injuries, the study shown that nurses with needle stick or sharp injury either allowed the injury to bleed, washed the injury site with soap and water, notified the infection control office of the hospital or applied antiseptic agent to the site after injury occurred. This is similar to studies of (Manzoor *et al.*, 2010; Muralidhar *et al.*, 2010; Jahangiri *et al.*, 2016) which shown that nurses cleaned

the needlestick wound after the injury and washed the wound with soap and water.

#### *Reporting Rate of Needle Stick and Sharp Injuries Among Nurses*

The study however shown that (33.3%) of nurses did not report the incidence of needle stick or sharp injuries because they did not know who to report to. This might be because safety protocols on needle sticks and sharp injuries and who to call might not be displayed in the wards as recommended by the national guideline on needle stick and sharp injuries. This finding is similar to that of (Muralidhar *et al.*, 2010) which found that healthcare workers did not report the injuries as they did not know where to report. Others also do not because of either the fear of stigma, felt it wasn't important, believed they were protected by their vaccination status, thought patient were at low risk of HIV infection or lack appropriate procedure to follow after the injury. It is important for all nurses and healthcare worker to immediately report all work-related needlestick injuries and cuts from sharp objects particularly those that are contaminated with another person's blood or other potentially infectious material.

#### *Contributing Factor(s) of Needle Stick and Sharps Injuries among Nurses*

Needle stick and sharps injuries are usually caused by simple and preventable mistakes in handling needles and sharp devices. Needle stick injury can occur even before use, during use, after use, before disposal and during or after disposal of the needle or sharp instrument. However, most of these injuries happen after use and before or during disposal process by which time the needle or sharp instrument was already contaminated hence posed the risk of transmission of infectious diseases (Bhardwaj *et al.*, 2014). The study identified Fatigue, Pressure, Non co-operative/restless clients, Unsafe medical sharps, Unclear work procedures, Work overload, indiscriminate needles and sharps disposal by some nurses, Lack of access and failure to use sharps containers immediately after injection as contributing factors to needle stick and sharp injuries. This finding is in line with the findings of (Ilhan *et al.*, 2006; Clarke, 2007; European Agency for Safety and Health at Work, 2009; Gorman *et al.*, 2014) which also found that these factors are interconnected and thus do not occur in isolation.

#### **Conclusion**

This study showed that Nurses at KATH are at high risk of NSSIs. This is shown by the high prevalence of NSSIs among the nurses. Needle sticks are major source of NSSIs among nurses at KATH. The rate of underreporting of NSSIs is also high among nurses who

had needle stick injuries. Work pressure was identified as the major contributing factor for needle stick and sharp injuries among nurses at KATH.

## Recommendation

The Public Health division of the hospital should provide sufficient safety boxes for disposing sharps and needles. Secondly more nurses should be employed to reduce the workloads on nurses at work as work overload contributes to needle sticks injuries. Protective equipment should be provided in sufficient quantities to minimize the effects of injuries on nurses. There should be regular awareness campaign and orientation for newly employed nurses on needle stick and sharp injuries and its preventive measures. Nurses should be encouraged to report NSSIs in order to get the right treatment and counselling. This will enhance data collection on NSSIs and will be a contributing factor to help in policy making. With the high prevalence of NSSIs among nurse at KATH, it will be appropriate for nurses to undergo health screening at regular intervals.

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## Author's Contributions

**Augustine Kumah:** Coordinated the entire study, data analysis, discussion and the writing of the manuscript and its review.

**Hilda Agortimevor:** Coordinated the Literature review contributed to the discussion and writing of the manuscript.

**Francis Akakpo:** Coordinated the data-analysis and contributed to the discussion and writing of the manuscript.

**Hope Akpeke:** Coordinated the data collection, data entering and contributed to the data analysis and the writing of the manuscript.

**Gideon Azi:** Contributed to the data Collection and the writing of the manuscript.

**Etornam Gblende:** Contributed to the Literature review, data analysis and the writing of the manuscript.

## Ethics

Ethical approval was obtained from the Ghana Health Service Ethical and the Kwame Nkrumah University of Science and Technology (KNUST) Ethical Review committees. However, local permission was obtained from the Hospital management of the Komfo Anokye Teaching Hospital, Kumasi and its research ethics committee. The main ethical issues related to the protection of participant information, consent, autonomy and confidentiality. Consent was

obtained from the participants. Participation was voluntary and respondents could withdraw from the study at any stage without any penalty.

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