

## An Epidemiology of Reported Needlestick Injuries among Health Care Workers in Sabah Health Government Facilities from 1999 – 2008

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### Abstract

**Introduction:** Health care workers (HCWs) are at a high risk of occupational exposure to blood and body fluids of patients, resulting in possible transmission of blood-borne pathogens such as hepatitis B virus, hepatitis C virus and human immunodeficiency virus. The information on epidemiology of needle stick injury among HCWs is useful in recommending safer work practices.

**Materials and Methods:** All cases of NSI reported within the period 1999 to 2008 from public health care facilities to the Sabah State Health Department were identified and analyzed accordingly. NSI is defined as any injury caused by hollow-bore needles or suture needles regardless of whether they are contaminated by blood/ body fluids or not. Health care worker is defined as Ministry of Health staff, trainees and health facilities support service workers. The software used for data analysis was SPSS version 15.0.

**Results:** A total of 378 cases of NSI were notified after considering NSI definition. Majority of HCWs involved in NSI were from the younger age group (20-29 years old, 61.9%), female gender (76.1%), Kadazan Dusun Murut ethnicity (33.5%), nurses (41.1%) and those who had worked for more than one year (66.6%). The place of occurrence was mostly in Kota Kinabalu district (25.3%), hospital setting (90.5%) and in-patient wards (60.8%). Of this in-patient ward, 64.5% was in medical and surgical wards. About 60% of NSI occurred during the morning shift (7am-2pm) and mostly among the nurses (54.0%). The duration of seeking treatment from injury was mostly within 24 hours (83.3%). The mechanism of accident happens while performing disposal activity (35.3%) and followed by any clinical procedure involving needle (31.1%). Other mechanism of accident was recapping (17.6%) and jolted/ accident (16.1%). Of all the reported NSI, 53.1% involved intravenous procedure. The body part involved in injury was mostly the right finger (57.1%). Almost all the needles were contaminated with blood or body fluid (90.0%). Post injury management, 73.5% were given first aid treatment and 99.4% were not awarded any medical leave. Existing control measures for NSI were standard operating procedure (SOP) (47.9%), training (36.9%) and PPE (10.5%).

**Conclusion:** NSI commonly occurred among nurses, those in the younger age group and those working in medical/ surgical ward. Working during morning shift seems to predispose nurses to NSI. Since most NSI occurred during intravenous procedure and disposal activity, safer work practices should be emphasized to minimize these injuries. Further study in hospital and primary health care setting will determine the details of contributing factors of NSI.

**Keywords:** Needle Stick Injuries, Health Care Workers.

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**Introduction**

Health care workers (HCWs) are at a high risk of occupational exposure to blood and body fluids of patients, resulting in possible transmission of blood-borne pathogens such as hepatitis B virus, hepatitis C virus and human immunodeficiency virus. At present, there being no cure for the mentioned diseases, suffering and ultimately death will be the price to pay for their ignorance.<sup>1</sup> In Malaysia, data collected by Occupational Health Unit, Ministry of Health from 1998-2005, showed needle stick injury (NSI) was the major cause of injuries among HCW with a total of 74.9% of all injuries notified. In Sabah, a similar trend was observed where NSI was the commonest injury reported among HCWs in public health care facilities. Therefore, the information on epidemiology of needle stick injury among HCWs is useful in recommending safer work practices.

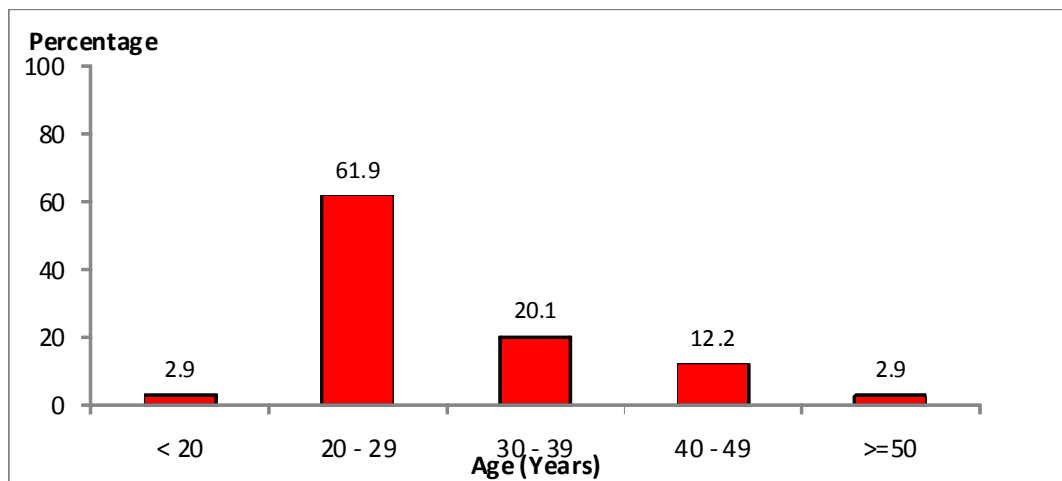
**Materials and Methods**

All cases of NSI reported within the period 1999

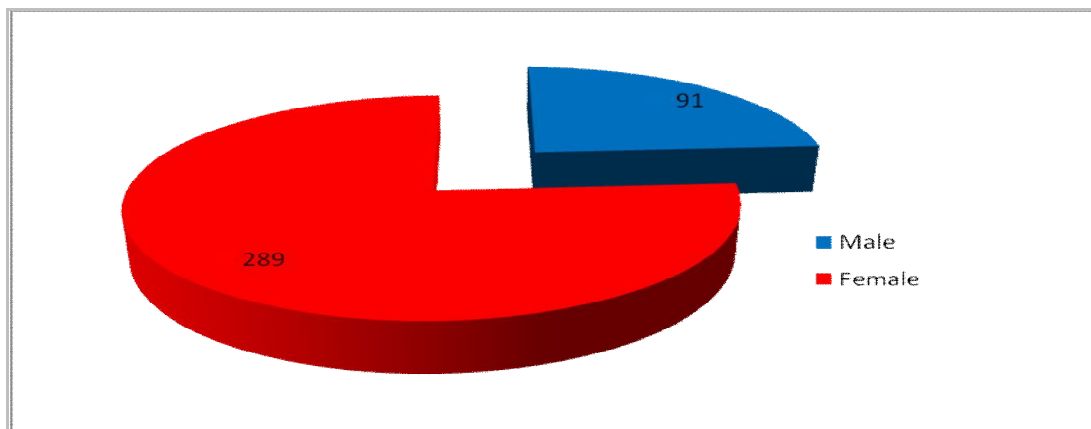
to 2008 from public health care facilities to the Sabah State Health Department were identified and analyzed accordingly. As required by the Ministry of Health, all injuries occurring among HCWs during work must be notified to the State Occupational Health Unit within 2 weeks using the Workers Environmental Health Unit (WEHU A1 & A2) form. All the forms were compiled by years of notification. The data on NSI from these forms was entered into a computer database. NSI are injuries caused by suture needle and hollow bore needle and does not include injuries via scalpel blades, lancet and glass pieces or by other means regardless of whether they are contaminated by blood/ body fluids or not.<sup>12</sup> Health care worker is defined as Ministry of Health staff, trainees and health facilities support service workers. SPSS version 15.0 was the software used for data analysis.

**Results**

A total of 380 cases were analyzed based on the definition of NSI.

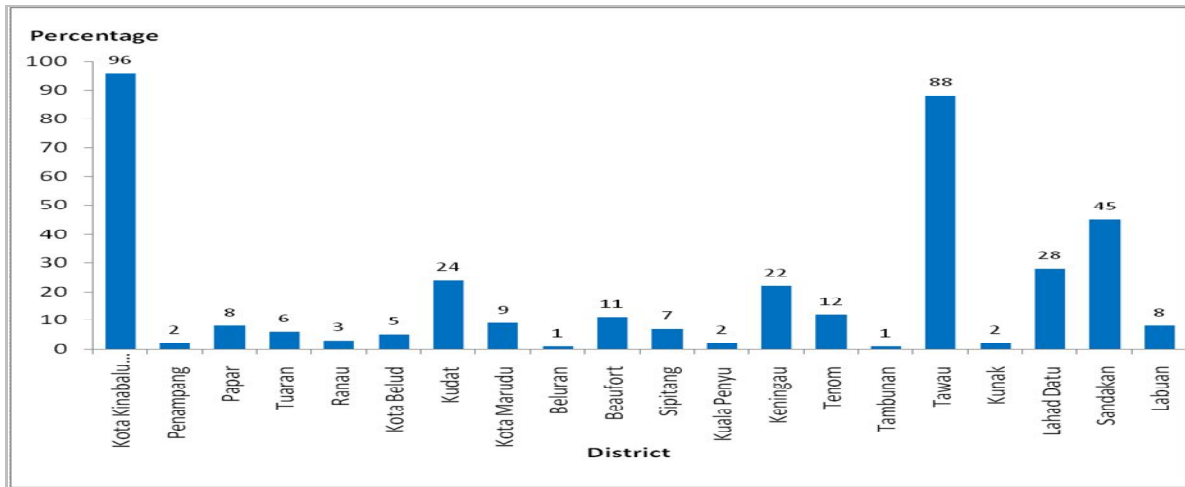


The majority of HCWs involved in NSI were from the younger age group (20-29 years old, 61.9%).



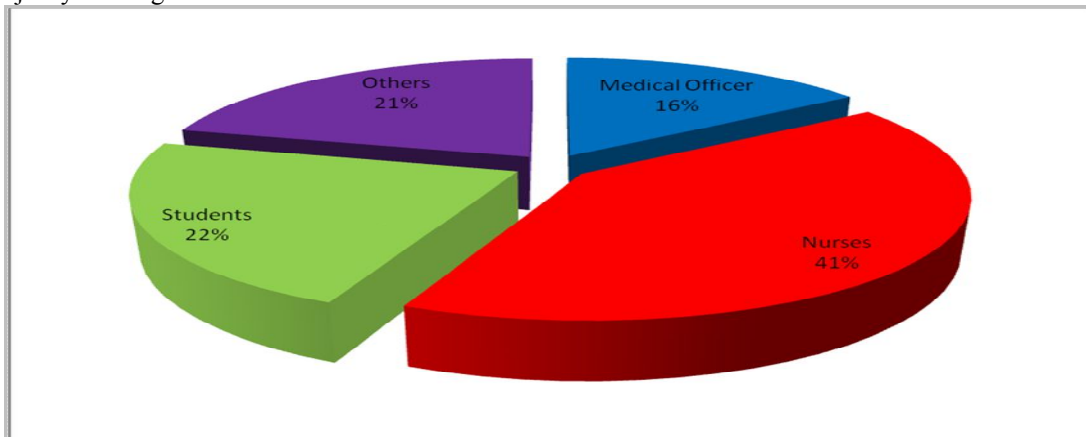
The majority of those injured were of female gender (76.1%) taking into account maximum

people who take admission into nursing colleges are females.

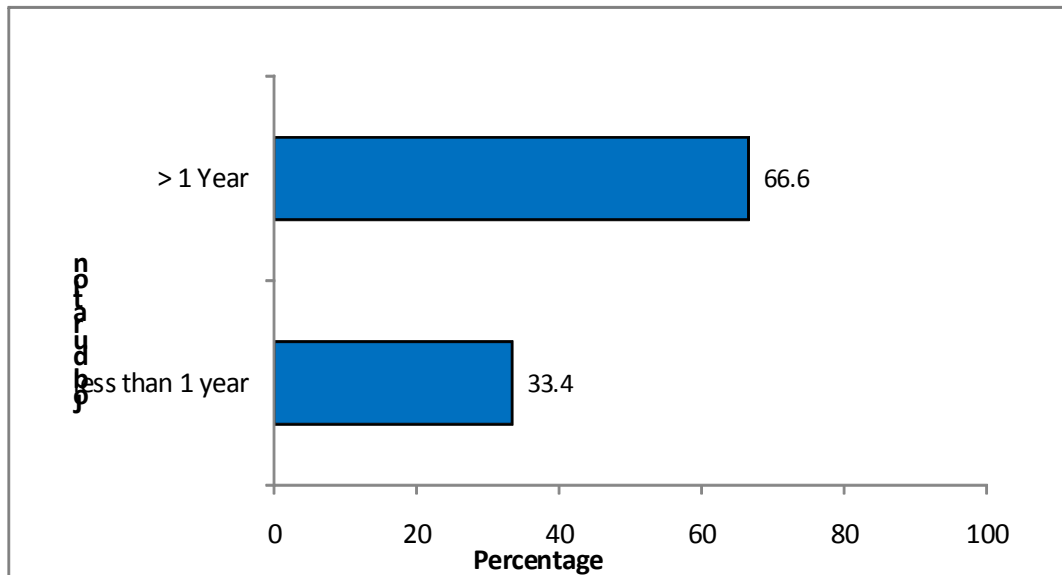


Kadazan Dusun Murut (KDM) ethnicity forms the majority among the different races in Sabah

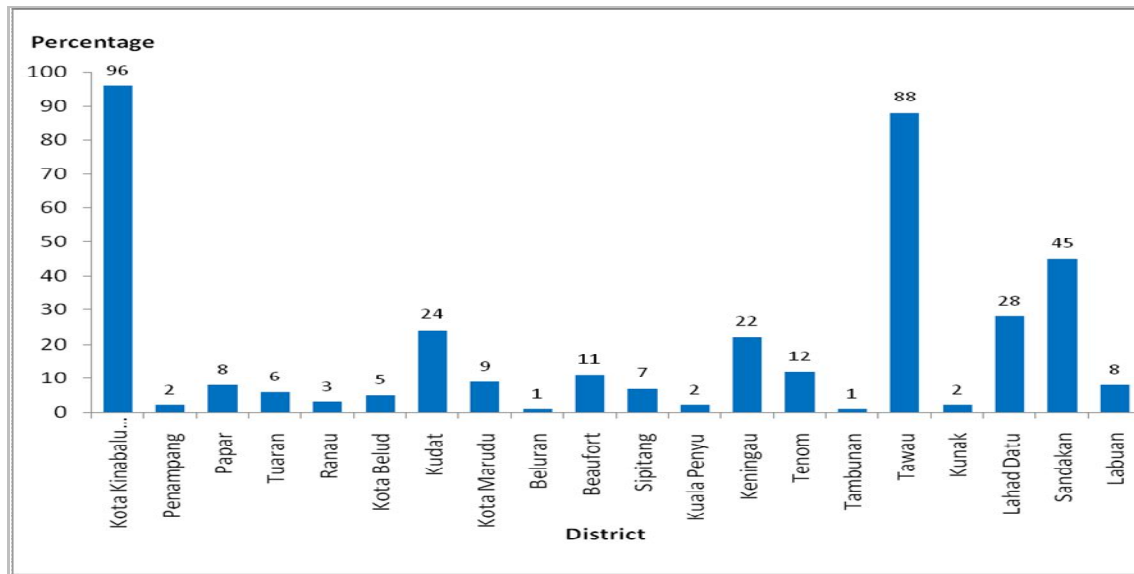
(33.5%) and Malays at 20%.



Nurses (41.1%) are the main group frequently injured followed by students (22%) and doctors (16%).

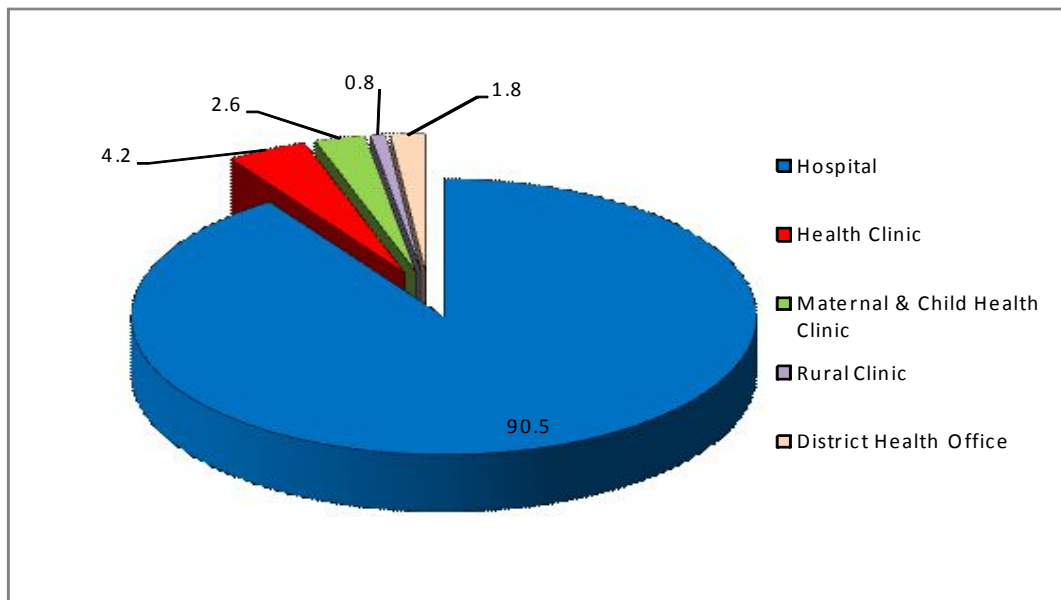


One third (33%) of those injured worked for less than a year while 67% had worked for more than a year.



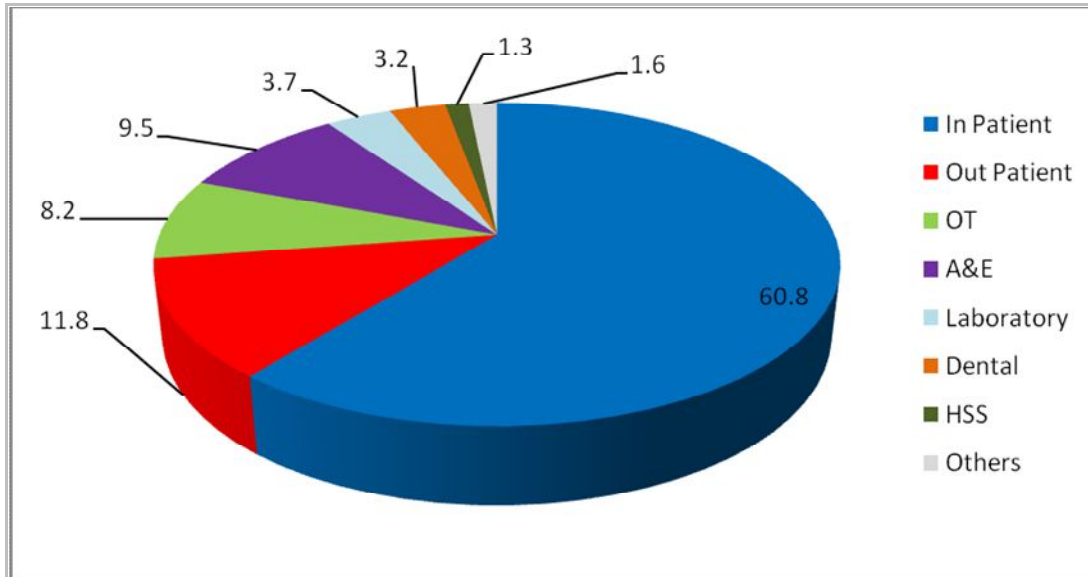
The majority of reported NSI was received from Kota Kinabalu district (25.3%) while Tawau had 23% followed by Sandakan (12%). These are the

major towns in Sabah and they all have a general hospital and numerous other health facilities.

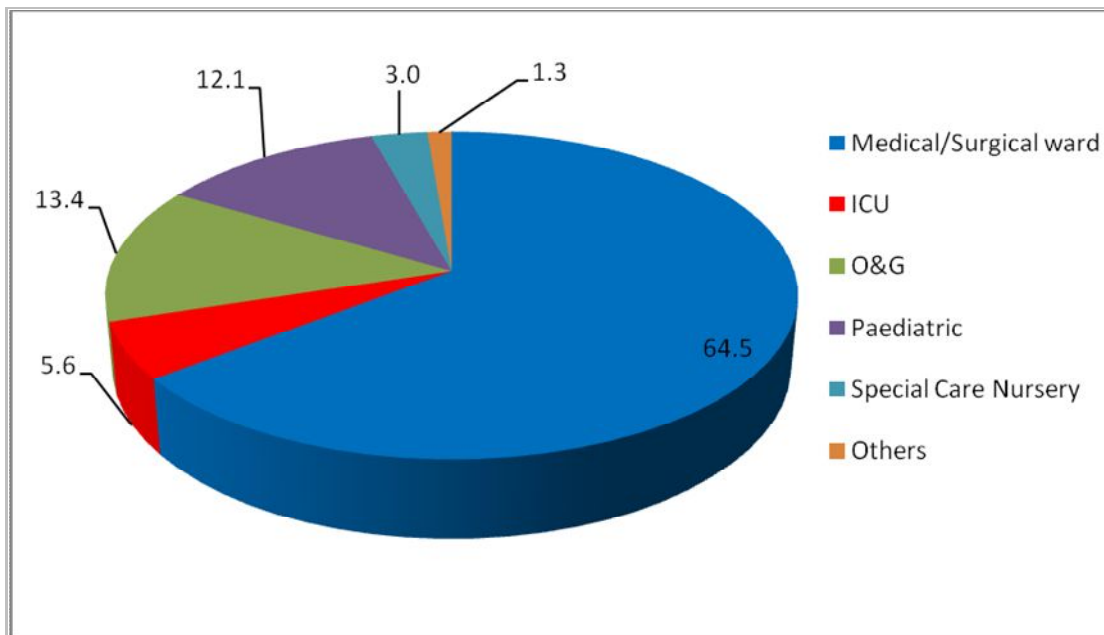


90.5% of the total NSI cases were received from the various hospitals. The rest of the cases was reported from the other health facilities like the

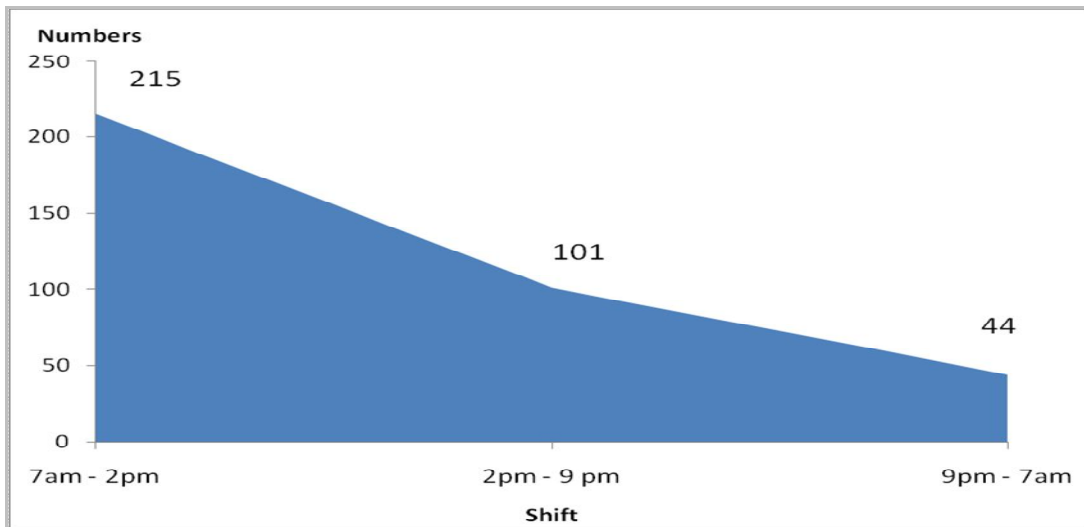
district health clinic (4.2%) and maternal & child health clinic (2.6%).



Injuries frequently occur in the in- patient wards (61%) while 12% were from the out- patient unit and the rest from the accident & emergency unit (10%).

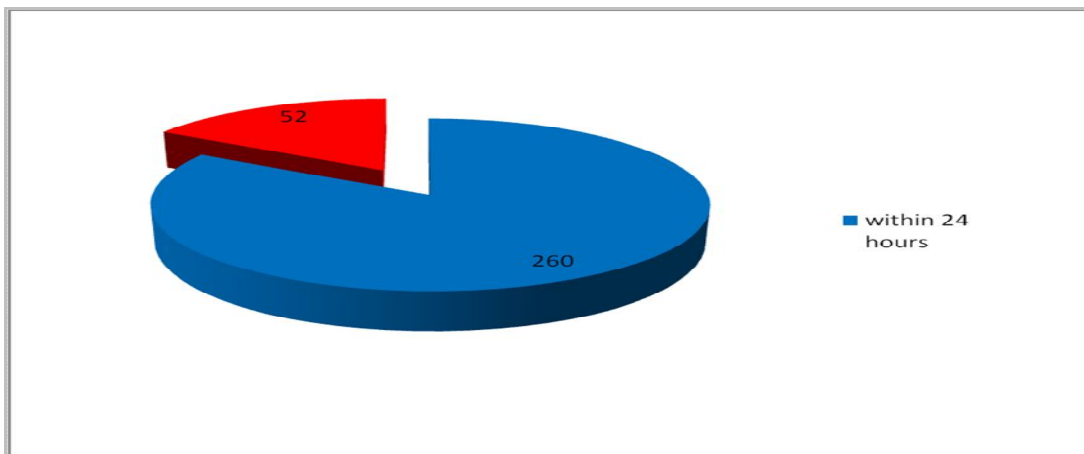


Of the cases from the in- patient wards, a total of 65% were from the medical and surgical wards, while 13% were from the obstetrics & gynecology unit. 12% of the cases of NSI were from the pediatric ward.



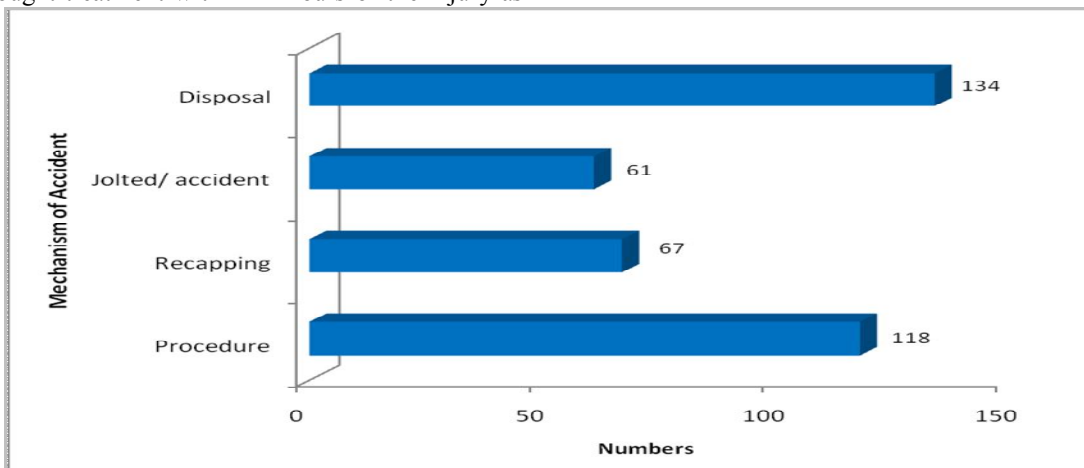
The morning shift (7am-2pm) recorded 60% of the NSI cases and involved mostly nurses (54.0%).

Only 12% of the cases occurred in the night shift (9pm-7am).



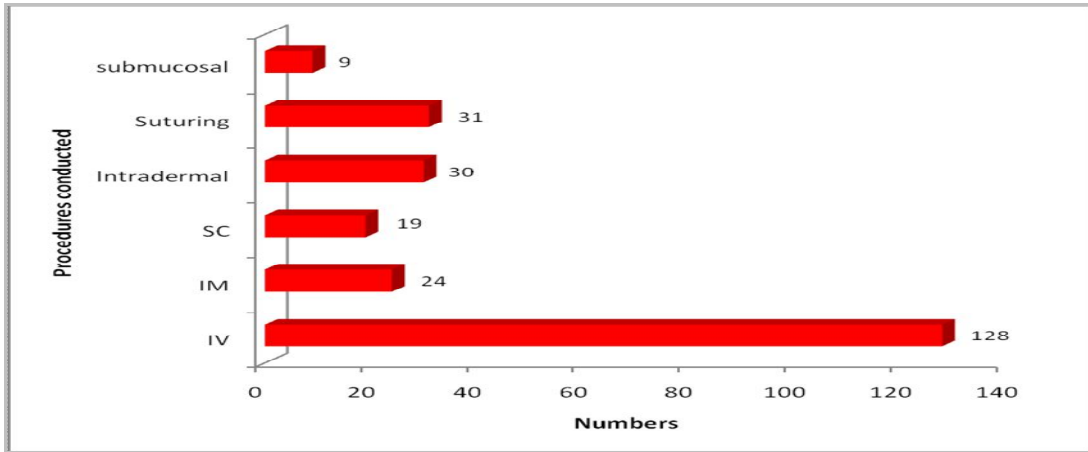
The majority (83%) of those who were injured sought treatment within 24 hours of the injury as

compared to only 17% who were treated later.

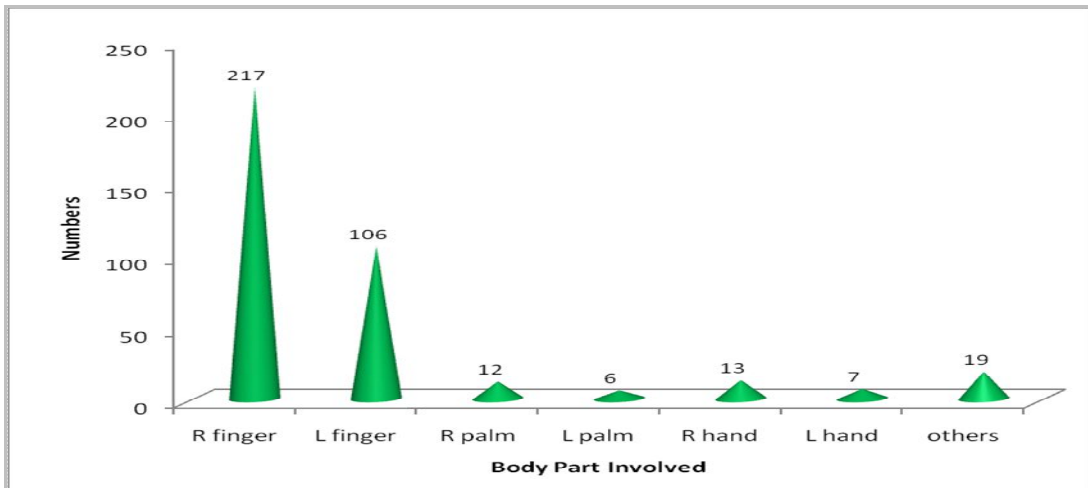


The mechanism of accident for NSI was while performing disposal activity (35%) and was followed by clinical procedures involving the use

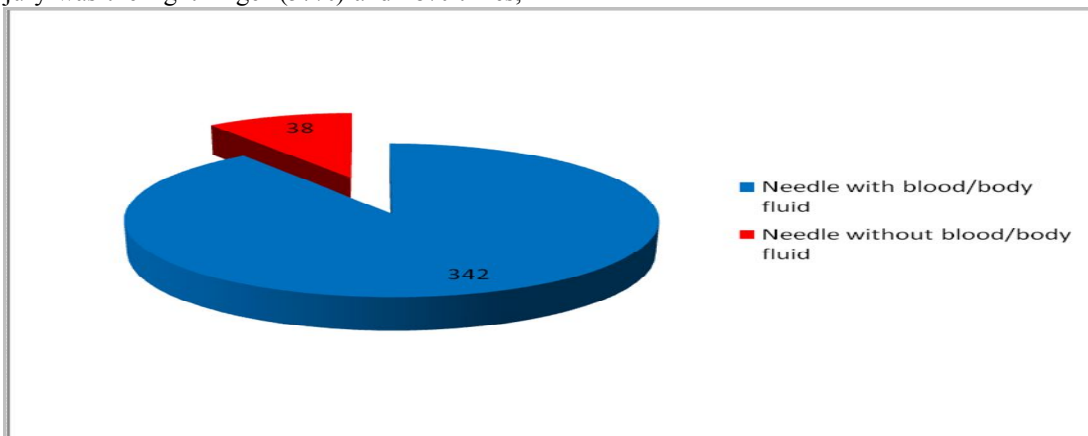
of needle (31%). Other mechanism of injury was due to recapping (17.6%) and jolted/ accident (16.1%).



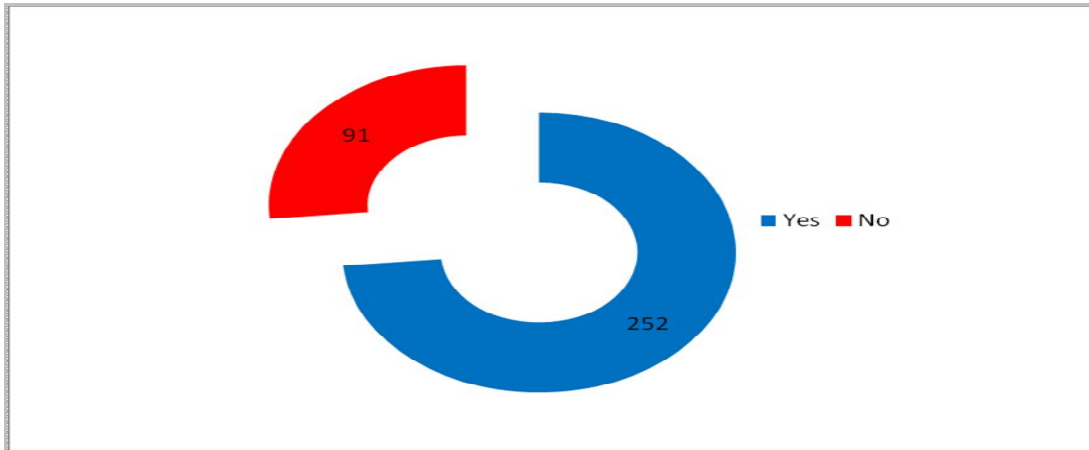
Of all the reported NSI, 53% occurred during intravenous procedures, 13% while suturing and 12% due to intra dermal injections. A total of 83% was due to the act of giving injections.



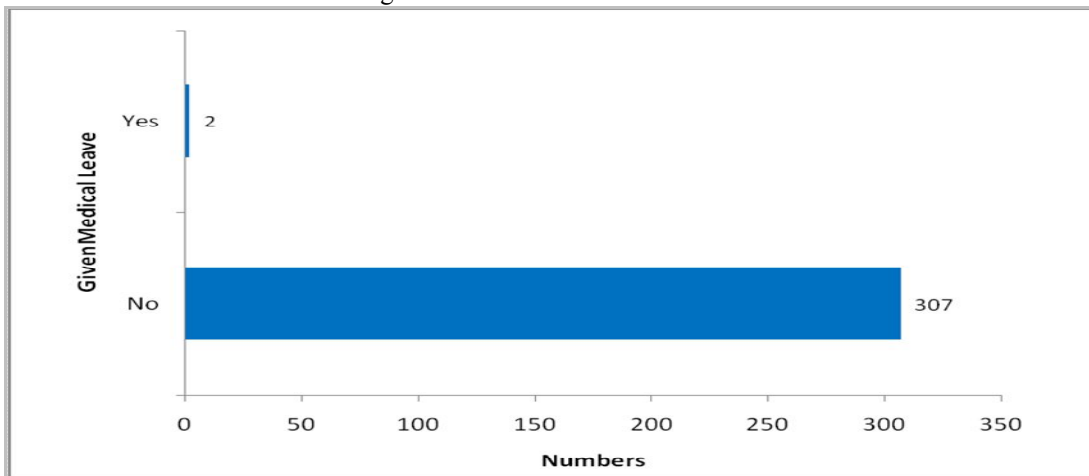
The body part which was most involved in the injury was the right finger (57%) and 28% times, injury occurred in the left finger.



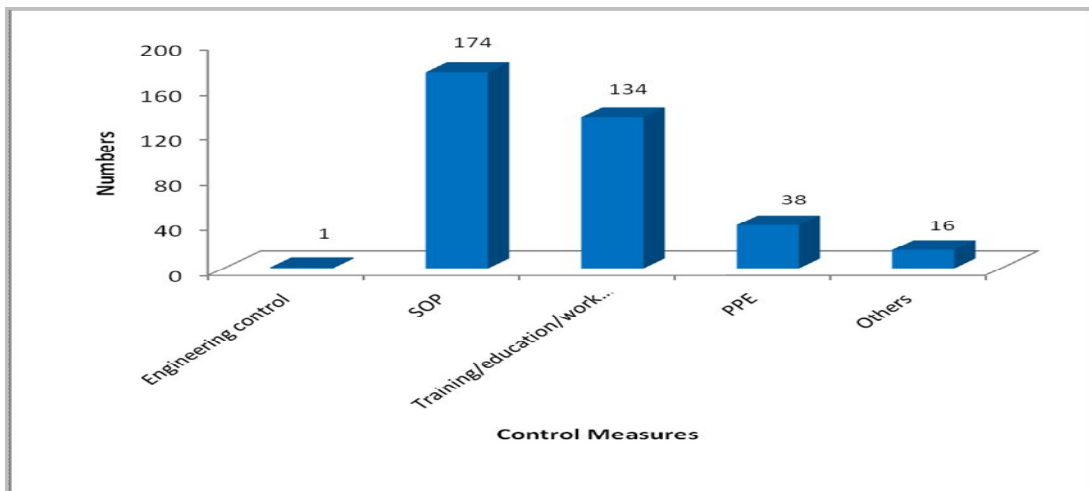
90% of the needles were contaminated with blood and/ or body fluids, while in 10% cases, the needle was clean.



In post injury management, 73% were given first aid immediately after the injury and 27% did not get first aid.



99% were not given medical leave for the injury.



48% had a standard operating procedure (SOP) as control measure for NSI, while training (36.9%) and PPE (10.5%) were the other measures used to minimize the risk of NSI in the workplace.

**Discussion**

Workers in the health care are at risk of occupational exposure to blood borne pathogens



including human immunodeficiency virus (HIV), hepatitis B virus (HBV), hepatitis C virus (HCV), and other potentially infectious agents. The primary route of occupational exposure to blood/body fluids borne pathogens is through accidental injury while managing patients. The group of HCWs who are most exposed are the nursing staff followed by other HCWs who use and manipulate sharps. From the data analyzed, NSI was mostly seen in the younger age group. This age group was probably assigned to do the needle-related task and they form the backbone of the facility workforce. Most nurses also graduate in this age group from the nursing colleges and will be posted to health facilities directly upon their graduation. A study in a Greek hospital reported that the highest rate of incidence per year was between 21-30 years old (5.6%) and the majority of NSI was among female HCWs and nurses. This was due to the nature of the job mostly done by female HCWs and nurses 2.8% and 3.2% respectively.<sup>3</sup> NSI was noted to be higher among HCWs who had worked for more than a year. Therefore, NSI is more likely to happen among those who are young and had worked for more than a year. This result may be due to the HCWs' inexperience, lack of supervision or the burden of work. In one study, it was shown that junior staff was at a higher risk of NSI.<sup>2</sup> In a similar study in Singapore, it was noted that junior staff and students are more prone to needle stick injuries as compared to senior staff.<sup>8</sup> In Sabah, most of the cases were in Kota Kinabalu district probably because of the number of the health facilities in place as compared to other districts. It may also be due to awareness in the notification of NSI. NSI mostly occurs in hospital setting, in-patient ward and medical/ surgical wards. Studies by Shanks & Al-Kalai in Saudi Arabia also revealed similar finding.<sup>4</sup> They postulated that probably a difficult practical procedure was performed by these HCWs. NSI was found to be common during morning shift. Most HCWs work during that period as compared to afternoon and night shift. Study by Pournaras et al. revealed most NSI occurred in the morning shift (7am – 3 pm), taking into consideration the number of HCWs is about twice that of each of two other shifts.<sup>3</sup> In NSI management, almost all NSI cases sought treatment within 24 hours. This means that HCWs are aware of the danger of NSI and its consequence. This was also shown by Chia HP et al. where he noted that 35% of HCWs reported at least one needle stick injury and the awareness of risk of contracting diseases from needle stick injuries.<sup>7</sup> The mechanism of accidents leading to NSI was mostly due to disposal activity and assigned procedures. A study in Lebanon

revealed that the incidents were attributed to procedural intervention (29%), disposal (18%) and recapping (11%).<sup>6</sup> Chia HP et al. also noted in their study that the commonest mechanism of injury due to needle stick occurred during procedures and recapping.<sup>7,8</sup> Recapping of needles by hand was found to be as high as 54%. Weatherly KS et al. in their study also observed that nursing staff comprises of health care workers in most institutions and therefore is at a higher risk and injury usually occurs during procedures.<sup>5</sup> In this analysis, the most common procedure resulting in injury was intravenous procedures like branula insertion. Control measures like health education and training should be emphasized in this particular procedure and for all high risk maneuvers. Wooley PD et al. (1991) recommended in their study, that correct techniques of venesection with emphasis on either avoiding recapping needles or recapping safely is essential early in the medical curriculum and needs regular repetition to reduce the incidence of NSI. In this study, the right finger was mostly injured even though a study by Shanks & Al-Kalai<sup>4</sup> revealed that the commonest injured area (46%) was the palmar surface of the distal forefinger of the non-dominant hand. This study assumed that the injury happened while disposing the needle with right finger into the sharp bins and getting the injury. Contaminated needles with blood or body fluid (BBF) will increase the risk of blood borne diseases. Post-injury management by receiving early first aid treatment indirectly will reduce the BBF risk. Existing control measures were inadequately implemented. Under reporting of NSI also cannot be avoided.

## Conclusion

NSI commonly occurred among nurses, those in the younger age group and those working in medical/ surgical ward. Work during morning shift seems to predispose HCWs to NSI. Since most NSI occurred during intravenous procedure and disposal activity, safer work practices should be emphasized to minimize these injuries. Health education and training would be able to increase the awareness and encourage safe work practices among health care workers. This was shown in a study by From P et al. who noted that a short lecture on the subject among a group of medical students was important in decreasing the risk of injury from needle stick.<sup>9</sup> From the study, it was noted that 98% of the participants had not attended any formal training on the subject. Jones DB in a similar study also noted that 74% of the respondents had not been adequately taught on the subject.<sup>10</sup> The study has shown the importance of

health education and training in increasing the knowledge and bringing about attitude changes in the way a work is carried out to avoid needle stick injury. Further study in hospital and primary health care setting will determine the details of factors contributing to NSI.

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