UNIVERSITI PUTRA MALAYSIA

KNOWLEDGE, AWARENESS AND PRACTICE OF NEEDLE STICK AND SHARPS INJURIES AMONG HEALTHCARE SERVICE PROVIDERS IN KING FAHD HOSPITAL SAUDI ARABIA

AL JOHANI ABDULRAHMAN AWADH

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By

AL JOHANI ABDULRAHMAN AWADH

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Master of Science

September 2016

DEDICATION

This thesis is dedicated to my beloved wife and family.

Thanking you for your understanding and support.

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Master of Science

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AL JOHANI ABDULRAHMAN AWADH

September 2016

Chairman : Karmegam Karuppiah, PhD
Faculty : Medicine and Health Sciences

This study aims to shed lights on the knowledge, awareness and practice of needle stick and sharps injuries among healthcare service providers in Saudi Arabia using a King Fahd Hospital, the largest hospital in the country as a case study. The main objectives of study are (1) to assess the status of knowledge, staff attitude, precautionary measure and compliance with needle safety precautions, (2) study the relationship between the four dimensions, (3) identify the differences in four dimensions by the demographic factors (gender, job function, and experience) and lastly (4) to suggest practical solution for the needle stick and sharps injuries (NSSI) elimination. Results showed that 247 respondents achieved high level in terms of knowledge, precautionary measures and compliance with needle safety precautions while staff attitude achieved above average. Only precautionary measures were found to significantly influence compliance with needle safety precautions, in which higher precautionary measure, resulted in higher compliance with needle safety precautions. Level of knowledge showed significant differences for the interaction of gender and job function. Staff attitude showed significant differences for the interaction of gender and job function, and gender and experience. Precautionary measures showed significant differences for interaction of gender and experience. Lastly, based on the current status of knowledge, staff attitude, precautionary measure and compliance with needle safety precautions, study suggest the implementation of engineering control and elimination or substitution control will be more effective to deal with NSSI.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

PENGETAHUAN, KESEDARAN DAN AMALAN TENTANG KECEDERAAN DISEBABKAN OLEH PENGGUNAAN PICAGARI DAN PERALATAN TAJAM DI KALANGAN PEKERJA PERKHIDMATAN KESIHATAN DARI HOSPITAL RAJA FAHD ARAB SAUDI

Oleh

AL JOHANI ABDULRAHMAN AWADH

September 2016

Pengerusi : Karmegam Karuppiah, PhD
Fakulti : Perubatan dan Sains Kesihatan

Kajian ini bertujuan merungkai pengetahuan, kesedaran dan amalan terhadap kecederaan batang jarum dan alatan tajam di kalangan pekerja kesihatan di Arab Saudi, dengan menggunakan hospital terbesar di negara ini iaitu Hospital King Fahd sebagai kajian kes. Objektif utama kajian ini adalah (1) untuk menilai status pengetahuan, sikap kakitangan, langkah berjaga-jaga dan pematuhan langkah keselamatan jarum, (2) mengkaji hubungan di antara empat dimensi yang dikaji, (3) mengenal pasti perbezaan dalam empat dimensi terhadap faktor demografi (jantina, fungsi kerja, dan pengalaman) dan akhir sekali (4) untuk mencadangkan penyelesaian praktikal untuk batang jarum dan kecederaan sharps penyingkiran (NSSI). Hasil kajian berdasarkan 247 responden menunjukkan pencapaian yang tinggi dari segi pengetahuan, langkah berjaga-jaga dan pemathuan langkah keselamatan jarum, manakala sikap kakitangan hanya mencapai tahap atas rata-rata. Hanya langkah berjaga-jaga didapati mempengaruhi pematuhan langkah-langkah keselamatan jarum, di mana langkah berjaga-jaga yang tinggi akan menyebabkan pematuhan langkah keselamatan jarum tinngi. Tahap pengetahuan menunjukkan perbezaan yang signifikan bagi interaksi jantina dan fungsi kerja. Sikap kakitangan menunjukkan perbezaan yang signifikan bagi interaksi jantina dan fungsi kerja, dan jantina dan pengalaman. Langkah berjaga-jaga menunjukkan perbezaan yang signifikan bagi interaksi jantina dan pengalaman. Berdasarkan status semasa pengetahuan, sikap kakitangan, langkah berjaga-jaga dan pematuhan langkah keselamatan jarum, kajian mencadangkan pelaksanaan kawalan kejuruteraan dan penghapusan atau penggantian kawalan akan lebih berkesan untuk menangani NSSI.

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Al Johani Abdulrahman Awadh

This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Master of Science.

The members of the Supervisory Committee were as follows:

Karmegam Karuppiah, PhD
Senior Lecturer
Faculty of Medicine and Health Sciences
Universiti Putra Malaysia
(Chairman)

Kulanthayan Subramaniam @ K.C. Mani, PhD
Associate Professor
Faculty of Medicine and Health Sciences
Universiti Putra Malaysia
(Member)

Vivien How, PhD
Senior Lecturer
Faculty of Medicine and Health Sciences
Universiti Putra Malaysia
(Member)

BUJANG KIM HUAT, PhD
Professor and Dean
School of Graduate Studies
Universiti Putra Malaysia

Date:

Declaration by graduate student

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Name and Matric No: AL Johani Abdulrahman Awadh, GS60604

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Signature: _____
Name of Chairman of Supervisory Committee: Dr. Karmegam Karuppiah

Signature: _____
Name of Member of Supervisory Committee: Assoc. Prof. Dr. Kulanthayan Subramaniam

Signature: _____
Name of Member of Supervisory Committee: Dr. Vivien How

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LIST OF ABBREVIATIONS

ANA	American Nurses Association
AIDS	Acquired Immune Deficiency Syndrome
BBF	Blood and Body Fluids
HBV	Hepatitis B Virus
HCV	Hepatitis C Virus
HCW	Healthcare Worker
HIV	Human Immunodeficiency Virus
NIOSH	National Institute of Occupational Safety and Health
NSSI	Needle Stick and Sharps Injuries
PPE	Personal Protective Equipment
SPSS	Statistical Package for the Social Sciences
WHO	World Health Organisation

CHAPTER 1

INTRODUCTION

1.1 Background

In most professions and occupations, accidents are reasonable among the workforce as it is almost impossible to avoid in the daily performance of their tasks. Drivers often face the possibilities of traffic accidents, players must accept the likelihood of injuries, law enforcement officers must accommodate the risk of an aggressive offender defying arrest, and for the present study, even healthcare providers contend with the eminent risk of contracting the conditions they fight among patients. Lorentz (2000) investigated the risk of needle stick injuries and based on his findings on metropolitan law enforcement officers, their duties adopted a similar approach to the proposed study. In this understanding, it emerges that healthcare providers while discharging the professional duty, as they often do, accommodate some accidental infections that endanger their very lives (Pruss-Ustun, Rapiti, & Hutin, 2005).

In addition, past study further highlighted that health care workers are exposed to blood-borne pathogens, especially Hepatitis B, Hepatitis C and Human Immunodeficiency Virus (HIV) through job-related risk factors like needle stick, stab, scratch, cut, or other bloody injuries (Wicker, 2008). The accidents may accrue when the professionals are using such needles, or even when such needles, are not properly, adequately and effectively disposed (Jahan, 2005). A practicing nurse may for instance reach for a bandage when dressing a patient, not knowing that a used needle was placed below the bandage after use with this or another patient. Such occurrences are accidental and unexpected thus; needle sticks portend a significant risk for healthcare workers in their every-day practice. Based on one of the prospective reports, the rate of injuries to staff nurses was 0.8 per nurse-year (and) prospective and retrospective rates were similar, while institutional rates were significantly lower (Aiken, Sloane, & Klocinski , 1997). It was also revealed by Braun (2001) that most needle stick and sharps injuries occur within the patient room, followed by operating room and the emergency department" of a healthcare facility, as exemplified by the figure below:

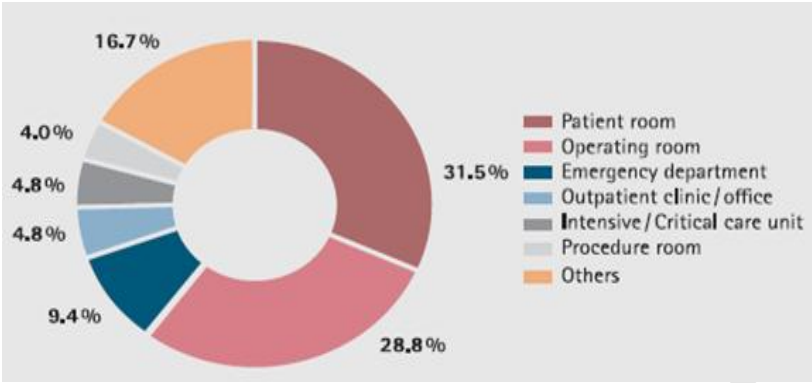

Figure 1.1: Most Needle Stick and Sharps Injuries Occur in a Healthcare Facility (Source: Braun, 2001)

The present research undertaking also focuses on sharps injuries. While such sharps include clinical needles, the category also incorporates numerous clinical equipment's with sharp-edged surfaces such as staples, razor blades, pins, glass-based items, scissors, scalpels, retractors, lancets, metal wires, clamps, pins, staples and cutters, whose form and nature can easily pierce, cut or tear the skin of a healthcare professional while delivering their duties in practice. In reality, needle sticks and sharps portend highly significant hazards for all healthcare professionals, particularly those who daily practice involve the usage of such equipment (Pruss-Ustun, 2005).

As needle sticks and sharps are potentially dangerous when in use, being unpacked or transported for use, after they are used but before being disposed, and even after they are disposed. The accidental injuries are regarded in the proposed research study as hazards, from the perspective of their potential impact. This is because such injuries can and do cause the accidental transmission of infectious diseases, sometimes being the cause for blood-borne viruses, bacteria and fungi, to transfer from a patient to a healthcare service provider.

The literature largely emphasizes on how needle stick and sharps injuries are critically hazardous when treating patients diagnosed with hepatitis B and C, as well as with the Human Immunodeficiency Virus/ Acquired Immune Deficiency Syndrome (HIV/AIDS). According to Makary (et al., 2007), patients with a history of infection with Human Immunodeficiency Virus, Hepatitis B, or Hepatitis C are considered as high-risk patients from the perspective of the needle stick and sharps injury hazards. When or after a practicing nurse punctures his or her skin with needles or sharps used with a patient with such conditions (thus contaminated), they unwillingly transmit the hazardous fluids into the body thus contaminating their health, sometimes severely. A piercing or cut on the skin may also not enable the transmission of such infections, but it opens the skin and creates an additional risk factor when the healthcare

service provider comes into contact with other patients and their body fluids (Aiken, Sloane, & Klocinski, 1997). The risk levels of these hazards however, is determined by several factors including the design of these equipment, the nature of clinical procedure, during which the equipment are used, and the condition and environment of work when the equipment are being used.

The risk level is also determined by the knowledge, competence, and experience of professionals using the equipment, the policy protocols, guidelines, and requirements of the institution where the equipment are used, as well as the disposal protocols and procedures upon usage of the equipment. In agreement, an empirical investigation of nurses' risk of exposure to blood results from injuries with needles and sharps complimented by a strategy estimating the risks as well as identification of the factors triggering the risks (Aiken, Sloane, & Klocinski, 1997). The output of this past research showed that diminishing the frequency with which nurses recap needles, increasing precautions they take, reducing use of temporary nursing personnel, and implementing organizational changes may lower the odds of nurses being injured. Consequently, the study proposed herein focuses on a case study organization that is Saudi Arabia's biggest healthcare facility, to determine how the organization embraces the risk of needle stick and sharps hazards among its workforce, because its approach has significant demand on the status of the hazards.

1.2 Problem Statement

In year 2000, the World Health Organization (WHO) conceded that the burden of disease at national and local levels caused by sharps injuries to health-care workers have reached phenomenal levels globally, particularly in cases of Hepatitis B virus, Hepatitis C virus and HIV infections (WHO, 2000). Many developed countries are facing the needle stick and sharps injury hazards with an increasing cause for concern as the rate became even more critical, perhaps explaining why specific nations are fighting a rising trend of such risks even today (Mulder, 2005; Perry, 2000; Pruss-Ustun, 2005). Needle stick injury can affect health care workers and in result, they can face high risk of blood borne infection. Instruments which can cause infections are needle, scissors and others. Hepatitis and HIV can be transmitted through used needles and other different fatal virus can also be transferred through used needles (Nagandla et al., 2015). Past study established that practicing nurses were the most frequent victims of the needle stick and sharps injury hazards, before recommending that the prevention should be based on different working lines including immunization, education of health care workers and proper engineering control measures (Memish et al., 2013). Deductively from the foregoing, the need for a country-specific evaluation of needle stick and sharps injury hazards is thus critical as argued by WHO, which justify the choice of Arab Saudi in this study.

As early as year 1995, Shanks (1995) investigated that the occupation risk of needle stick injuries among health care personnel in Saudi Arabia, including 65% of nurses and 35% of ward-based interventions, ultimately concluding that the hazards needed urgent measures to effectively address based on findings generated from King Khalid National Guard Hospital in Jeddah, Saudi Arabia. Following the finding, only few studies were initiated in Arab Saudi to further address the addressed problem by Shanks (1995). Jahan (2005) conducted a 2-year retrospective survey (2002 - 2003) and discovered that 53.4% of 73 self-reported needle stick injuries occurred when needles had already been used but before they were disposed appropriately. Thus, the researcher concluded that it was important to increase the awareness, training, and education of health care workers for reporting and prevention of needle stick injuries. By 2012, over 477 needle stick and sharps injuries recorded at hospitals in Saudi Arabia within four years, incorporating 31% of these injuries occurring in wards, 17% in emergency departments and 15% in intensive and critical care units (Memish et al., 2013). In recent study by Nagandla et al. (2015), they discovered there is still high prevalence of needle stick injuries among the healthcare workers and 36.8% of them do not report it due to low awareness of the effects come with needle stick injuries. In a mini-systematic literature review, Khraisat (et al., 2014) established that the needle stick and sharps injury hazards has been the subject of empirical research globally and in Saudi Arabia, with an overwhelming body of evidence. However, all these findings fail to provide a strategic, focused, and comprehensive guideline on how to reduce, eliminate, and avoid needle stick and sharps injuries in specific contexts, and even when they do, such guidelines are not applicable, relevant and considerate of more than just one environment/ context.

The brief review of research in Saudi Arabia as provided by the previous paragraphs attests to this argument. This inadequacy of contemporary knowledge on the needle stick and sharps injury hazards in Saudi Arabia was the ground upon which the proposed study was conceived and developed, intended for implementation in a manner that is reliable, accurate and in generalizable manner, resolves the concern in Saudi Arabia, and by implication, globally.

1.3 Significance of the Study

The main findings of proposed study will help inform stakeholders pertaining to the current status of knowledge, awareness and practice of needle stick and sharps injuries among healthcare service providers. Using the information, proper policy and strategy can be taken to reduce, prevent, avoid, and eliminate needle stick and sharps injuries among healthcare workers in the country's health care settings. By taking the right and effective action, it will surely improve the quality of life for the healthcare professionals, avoid unwanted increase in healthcare expenditure by individuals and health care facilities, improve positive healthcare outcomes for patients (Memish et al., 2013), and eventually reduce the disease burden that Saudi Arabia has to contend with (Pruss-Ustun, Rapiti & Hutin, 2005). It is thus, hoped that the

findings generated by the proposed study, will serve the best interests of all healthcare stakeholders in Saudi Arabia, incorporating patients, healthcare professionals, hospitals and clinics, health insurance firms, and the government.

1.4 Objective of Study

With the gap between study of needle stick injuries and actual situation of hospitals in Saudi Arabia, researcher aims to examine the current status of knowledge, awareness and practice of needle stick and sharps injuries among healthcare service providers and lastly propose practical solutions to minimize and eventually achieve zero injury. With that, researcher proposes few specific objectives to be deliver at the end of study as follows:

i. To determine status of knowledge, staff attitude, precautionary measure and compliance with needle safety precaution for needle stick and sharps injuries among healthcare service providers.
ii. To examine causal relationships of level of knowledge, staff attitude, and precautionary measure towards the compliance with needle safety precaution for needle stick and sharps injuries among healthcare service providers.
iii. To determine the demographic factors (gender, job function and experience) that affect the differences in level of knowledge, staff attitude, precautionary measure and compliance with needle safety precaution for needle stick and sharps injuries among healthcare service providers.

1.5 Research Questions

In the light of the objectives of the present study, the researcher poses the following research questions:

i. What is the status of knowledge, staff attitude, precautionary measure and compliance with needle safety precaution for needle stick and sharps injuries among healthcare service providers?
ii. Does demographic factors have significant differences in terms of the level of knowledge, staff attitude, precautionary measure and compliance with needle safety precaution for needle stick and sharps injuries among healthcare service providers?
iii. What are the causal relationships for level of knowledge, staff attitude, and precautionary measure towards the compliance with needle safety precaution for needle stick and sharps injuries among healthcare service providers?
iv. What are the effective solution to prevent and eliminate needle stick and sharps injuries among healthcare professionals?

1.6 Research Hypotheses

The implementation process, data collection, and analysis of the proposed research undertaking will seek to validate or invalidate these hypotheses. As such, few main research alternative hypotheses have been proposed as follows:

H1a: There is significant impact for level of knowledge towards the compliance with needle safety precaution for needle stick and sharps injuries among healthcare service providers.

H1b: There is significant impact for level of staff attitude towards the compliance with needle safety precaution for needle stick and sharps injuries among healthcare service providers.

H1c: There is significant impact for level of precautionary measures towards the compliance with needle safety precaution for needle stick and sharps injuries among healthcare service providers.

H2a: There is significant differences between gender and level of knowledge among healthcare service providers.

H2b: There is significant differences between job functions and level of knowledge among healthcare service providers.

H2c: There is significant differences between experience group and level of knowledge among healthcare service providers.

H2d: There is significant interaction effect between gender and job functions with level of knowledge among healthcare service providers.

H2e: There is significant interaction effect between gender and experience group with level of knowledge among healthcare service providers.

H2f: There is significant interaction effect between job functions and experience group with level of knowledge among healthcare service providers.

H2g: There is significant interaction effect between gender, job functions and experience group with level of knowledge among healthcare service providers.

H3a: There is significant differences between gender and level of staff attitude among healthcare service providers.

H3b: There is significant differences between job functions and level of staff attitude among healthcare service providers.

H3c: There is significant differences between experience group and level of staff attitude among healthcare service providers.

H3d: There is significant interaction effect between gender and job functions with level of staff attitude among healthcare service providers.

H3e: There is significant interaction effect between gender and experience group with level of staff attitude among healthcare service providers.

H3f: There is significant interaction effect between job functions and experience group with level of staff attitude among healthcare service providers.

H3g: There is significant interaction effect between gender, job functions and experience group with level of staff attitude among healthcare service providers.

H4a: There is significant differences between gender and level of precautionary measures among healthcare service providers.

H4b: There is significant differences between job functions and level of precautionary measures among healthcare service providers.

H4c: There is significant differences between experience group and level of precautionary measures among healthcare service providers.

H4d: There is significant interaction effect between gender and job functions with level of precautionary measures among healthcare service providers.

H4e: There is significant interaction effect between gender and experience group with level of precautionary measures among healthcare service providers.

H4f: There is significant interaction effect between job functions and experience group with level of precautionary measures among healthcare service providers.

H4g: There is significant interaction effect between gender, job functions and experience group with level of precautionary measures among healthcare service providers.

H5a: There is significant differences between gender and level of compliance with needle safety precautions among healthcare service providers.

H5b: There is significant differences between job functions and level of compliance with needle safety precautions among healthcare service providers.

H5c: There is significant differences between experience group and level of compliance with needle safety precautions among healthcare service providers.

H5d: There is significant interaction effect between gender and job functions with level of compliance with needle safety precautions among healthcare service providers.

H5e: There is significant interaction effect between gender and experience group with level of compliance with needle safety precautions among healthcare service providers.

H5f: There is significant interaction effect between job functions and experience group with level of compliance with needle safety precautions among healthcare service providers.

H5g: There is significant interaction effect between gender, job functions and experience group with level of compliance with needle safety precautions among healthcare service providers.

1.7 Scope of the Study

The research conducted herein specifically focus on studying needle stick and sharps injuries and the hazards accruing thereof in a hospital setting in Saudi Arabia. The study focuses on Saudi Arabia, at the King Fahd Hospital (The largest hospital in the country) as a case study of the research setting. The study hopes to establish the impact of needle stick and sharps injury-borne hazards among healthcare professionals, in the hope of developing appropriate, relevant, effective, sustainable, and localized and yet generalizable recommendations on how to prevent, reduce, avoid and ultimately eliminate such hazards. It is noted that while the country is increasingly investing in improving its healthcare sector, in terms of facilities, equipment, specialty personnel and outcomes, as an economic development goal, Saudi Arabia still relies on a dominant number of expatriate clinical personnel.

1.8 Conceptual Framework

This study focus on a case study organization that is Saudi Arabia's biggest healthcare facility, King Fahd Hospital, with the goal of informing the inadequate contemporary knowledge on the needle stick and sharps injury hazards in Saudi Arabia. Accordingly, the study quantify and analyses the current status and factors to come out with a solution framework that can effectively prevent and eliminate the hazards. The conceptual framework as in Figure 1.2 present the analysis framework that will be conducted throughout the study. For black and straight lines, causal relationships analysis will be conducted on level of knowledge, staff attitude and precautionary measure with compliance with Needle Stick and Sharps Injuries (NSSI) safety precautions to determine the relationships. As for black dotted lines, analysis conducted will focus on finding the significant differences exist between demographic factors with four measured dimensions, i.e. level of knowledge, staff attitude, precautionary measures, and compliance with NSSI safety precautions.

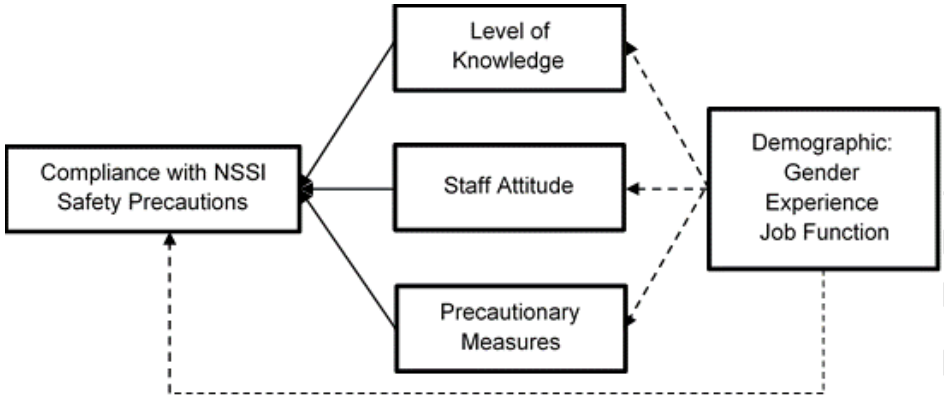

Figure 1.2: Conceptual Framework

1.9 Limitation of Study

Many of the research studies conducted in Saudi Arabia previously, have attempted to quantify the number of needle stick and sharps injury hazards in Saudi Arabia. For instance, Shanks (1995) focused on identifying where and among who needle stick and sharps injuries occurred at the King Khalid National Guard Hospital in Jeddah, Saudi Arabia. Jahan (2005) studied Buraidah Central Hospital and focused on quantifying self-reported needle stick injuries within a two-year period. Memish et al (2013) on the other hand, conducted a retrospective study focused on a systemized reporting system for needle stick and sharps injury accidents among the healthcare professionals in a Saudi Arabian hospital. All these studies relied on the accuracy of self-reports of such injuries and the reliability of such reports is questionable. Such subjects could easily falsify the injuries they report, to salvage their reputation and job security, avoid punitive actions, and safeguard the reputation of their employer. Similarly, study will have to bear with slightly inaccurate data as previous studies due to the fear factor from respondents believing the disclosure of their information especially, job related. In order to minimize falsification, study measures respondents' perspective rather than specific injury occurrences.

Secondly, it is always better to have a wide spread of data sampling in statistical standpoint, ideally includes all the hospitals in Saudi Arabia so that the findings are generalizable across country. Aware of the time, cost and data collection permission constraints, study chose Saudi Arabia's biggest healthcare facility, King Fahd Hospital as a case study with the assumption that all healthcare facilities in Saudi Arabia are similar in terms of status of knowledge, awareness and practices of needle stick and sharps injuries. In addition, choosing the biggest healthcare facilities will be more generalizable as compared to small hospital.

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