UNIVERSITI PUTRA MALAYSIA

EFFECTIVENESS OF EDUCATION STRATEGIES IN REDUCING NEEDLE STICK INJURIES AMONG NURSES OF PRIVATE HOSPITALS IN JORDAN

FIRAS SHEHADEH ABDULLAH KHRAISAT

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Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfillment of the Requirements for the Degree of Doctor of Philosophy

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DEDICATION

If there is someone in this world to whom I dedicate this piece of work, it would be my mother Fatima, the person I love and appreciate the most. Mom you are the light in my heart, all I am asking for is your gratification and prayers. It is also dedicated to my father, thank you very much for everything you have done, and thank you for every sacrifice you have made just to give us a better life on the expense of your health and sweat, thank you Father

I also dedicate this work to my brothers and sisters, and my family. May Allah give you a life full of his blessings

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfillment of the requirements for the degree of Doctor of Philosophy

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Chairman : Associate Professor Muhamad Hanafiah Juni, PhD
Faculty : Medicine and Health Sciences

Introduction: Needle stick injuries are "punctures of the skin with a needle". Needle stick injuries cause severe consequences such as the transmission of blood borne diseases. Nurses are the most occupational group under the risk of acquiring a needle stick injury. In Jordan, a study revealed that 92% private hospital nurses have acquired at least one needle stick injury within the past 12 months (Hassan and Wahsheh, 2009). Another study in Jordan showed that 90% (46 out of 51) of the nurses working in private hospitals acquired at least one needle stick injury (Abozead et al., 2015).

Objective: To develop, implement, and evaluate the effectiveness of educational module and strategies to reduce needle stick injuries among nurses of private hospitals in Jordan.

Methodology: This study utilized a Randomized Control Trial design with four arms; three intervention groups and one control. All private hospitals were screened for inclusion eligibility, then simple random sampling was performed to select four hospitals, and then a total of 102 nurses were sampled inside each hospital using stratified random sampling with total of 408. Education was provided utilizing three strategies: Social Media, Audio-visual, and combined. Data were collected on three waves; baseline, three months, and six months after completing the interventions.

Results: Significant difference in injury occurrences after three months found only between control group and combined intervention group (P= 0.002). After 6 months significant differences were found between control and social media groups (P= 0.032), control and audio-visual groups (P= 0.007), and control and combined groups (P<0.001). For the knowledge, attitudes, and practices, after 3 months the number of variables with significant differences between intervention and control groups was six (P<0.05), and increased to nine after 6 months (P<0.05). For the beliefs, at baseline only 3 variables out of 26 showed significant differences between study groups (NSI not preventable, P=0.04; Injection likelihood, P= .002; Any training/education, P= .04), but after 3 months the number of variables increased to five, and increased to eleven after 6 months (P<0.05). The results for risk factors of needle stick injuries were fatigue (P<0.001), lack of assistance (P= 0.001), emotional distress (P= .021), being rushed (P= .002), and Lack of skills (P= .001). The hierarchical regression for the prediction of changes in injury occurrence produced a model with four predictors after three months (P< .001), and six predictors after six months (P< .001).

Conclusion: the newly developed education module and strategies are successful in significantly decreasing the occurrence of needle stick injuries in all three intervention groups. Changing nurses' beliefs towards needle stick injuries and increasing their knowledge resulted in changing behaviors, which lead to decrease the occurrence of needle stick. Five risk factors were found to be significantly associated with needle stick injuries; fatigue, lack of assistance, emotional distress, being rushed, and Lack of skills. The reduction in injuries could be predicted by the intervention strategies, changes in knowledge, practices, attitudes, and beliefs.

Key words*:* Needle sticks injury, Education strategies, Private hospitals, Nurses, Jordan.

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

KEBERKESANAN STRATEGI PENDIDIKAN DALAM MENGURANGKAN KECEDERAAN CUCUKAN JARUM DALAM KALANGAN JURURAWAT HOSPITAL SWASTA DI JORDAN

Oleh

FIRAS SHEHADEH ABDULLAH KHRAISAT

Julai 2017

Pengerusi : Profesor Madya Muhamad Hanafiah Juni, PhD
Fakulti : Perubatan dan Sains Kesihatan

Pengenalan: Kecederaan tersusuk jarum suntikan adalah akibat daripada tusukan jarum kepada kulit. Kecederaan tersusuk jarum boleh menyebabkan kesan teruk seperti penyebaran penyakit bawaan darah. Jururawat merupakan golongan yang paling berisiko untuk terdedah kepada kecederaan tusukan jarum suntikan. Satu kajian di Jordan telah menunjukkan seramai 92% jururawat hospital swasta mengalami sekurang-kurangnya satu kecederaan tertusuk jarum dalam tempoh 12 bulan yang lalu (Hassan dan Wahsheh, 2009). Manakala kajian lain di Jordan juga mendapati 90% (46 daripada 51) jururawat yang bekerja di hospital swasta mendapat sekurang-kurangnya satu kecederaan tertusuk jarum (Abozead et al., 2015).

Objektif: untuk merangka, melaksana, dan menilai strategi intervensi dalam mengurangkan kecederaan tertusuk jarum suntikan di kalangan jururawat hospital swasta di Jordan.

Metodologi: Kajian ini memanfaatkan reka bentuk Percubaan Kawalan Secara Rawak menggunakan empat kumpulan; tiga kumpulan intervensi dan satu kumpulan kawalan. Kesemua hospital swasta disaring bagi mengenalpasti kelayakan responden untuk terlibat di dalam kajian ini dan kemudian empat buah hospital telah dipilih melalui kaedah pensampelan rawak mudah yang mana seramai 102 para jururawat dipilih daripada jumlah keseluruhan 408 daripada setiap hospital terbabit melalui kaedah pensampelan rawak berstrata. Pendidikan intervensi diberi menggunakan tiga strategi iaitu: Media Sosial, Audio-visual dan secara gabungan. Data dikumpul

mengikut tiga peringkat; tahap dasar, bulan ketiga dan bulan keenam selepas intervensi dijalankan.

Keputusan: Selepas 3 bulan, berbezaan signifikan dalam kejadian kecederaan tertusuk jarum hanya didapati di antara kumpulan kawalan dan gabungan intervensi (P = 0.002). susulan selepas 6 bulan mendapati perbezaan ketara diantara kumpulan kawalan dan media sosial (P = 0.032), kumpulan kawalan dan audio-visual (P = 0.007), serta kumpulan kawalan dan gabungan (P <0.001). Bagi pengetahuan, sikap, dan amalan, bilangan pembolehubah dengan perbezaan yang signifikan antara kumpulan intervensi dan kawalan selepas 3 bulan adalah enam (P <0.05), dan meningkat kepada sembilan selepas 6 bulan (P <0.05). Bagi kepercayaan pula, pada tahap dasar hanya 3 pembolehubah daripada 26 menunjukkan perbezaan yang signifikan antara kumpulan kajian (kecederanan tusukan jarum tidak dapat dicegah, P = 0.04; Kebarangkalian tusukan, P = .002; Sebarang latihan/pendidikan, P = .04), walaubagaimanapun selepas 3 bulan bilangan variabel meningkat kepada lima dan terus meningkat kepada sebelas selepas 6 bulan (P <0.05). Manakala keputusan untuk faktor risiko kecederaan tusukan jarum adalah keletihan (P <0.001), kekangan bantuan (P = 0.001), tekanan emosi (P = .021), tergesa-gesa (P = 0,002) serta kekurangan kemahiran (P= .001). Regresi hierarki dalam meramal perubahan kejadian kecederaan menjana satu model dengan empat peramal selepas tiga bulan (P <.001), dan enam peramal selepas enam bulan (P <.001) intervensi.

Kesimpulan: Modul dan strategi pendidikan yang baru dibangunkan berjaya secara signifikan dalam mengurangkan kejadian kecederaan tusukan jarum pada ketiga-tiga kumpulan intervensi. Mengubah kepercayaang serta meningkatkan pengetahuan jururawat terhadap kecederaan tusukan jarum telah mengakibatkan perubahan tingkah laku yang membawa kepada penurunan kecederaan tusukan jarum. Lima faktor risiko telah didapati berhubungkait secara siginifkan dengan kecederaan tusukan jarum; keletihan, kekangan bantuan, tekanan emosi, tergesa-gesa, dan kurang kemahiran.

Kata kekunci: Kecederaan tusukan jarum, Strategi pendidikan, Hospital swasta, Jururawat, Jordan.

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In the Name of *Allah* the most Gracious the Most Merciful Praise be only to *Allah*, The Almighty, for His Bounty and Blessings upon us, and peace upon Prophet Mohammed *(S.A.A.W)*, his companions, and his followers until the last day.

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This thesis was submitted to the Senate of the Universiti Putra Malaysia and has been accepted as fulfillment of the requirement for the degree of Doctor of Philosophy. The members of the Supervisory Committee were as follows:

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LIST OF ABBREVIATIONS

CDC	The Centers for Disease Control and Prevention
EFA	Explanatory Factor Analysis
CFA	Confirmatory Factor Analysis
GEE	Generalized Estimated Equations
HBM	Health Beliefs Model
HCWs	Health Care Workers
I-CVI	Item Content Validity Index
KAP	Knowledge, Attitudes, Practices
NSI	Needle Stick Injury
NSSI	Needle Stick and Sharp Injuries
PPE	Personal Protective Equipment
S-CVI	Scale Content Validity Index
AIDS	Acquired Immunodeficiency Syndrome
HIV	Human Immunodeficiency Virus
HBV	Hepatitis B Virus
HCV	Hepatitis C Virus
BBPEs	Blood Born Pathogen Exposures
PPE	Personal Protective Equipment

CHAPTER 1

INTRODUCTION

1.1 Background

Needle stick injuries (NSIs) are serious occupational hazards that can affect healthcare workers, but this problem is often preventable (Centers for Disease Control and Prevention, 2008). Jordan is a developing country in the Middle East with a population of 7,009,000. Almost all the population is Arab descendants and Islam is the official and most predominant religion accounting for approximately 97.2% of the population (CIA world fact book, 2015). Jordan is known in the Middle East for providing a high quality of health services. Jordan has progressive healthcare system although its services are mainly concentrated in Amman the capital of Jordan.

In 2010, Jordan was ranked as the leading medical tourism destination in the Arab World by the World Bank. In Jordan there are three providers of healthcare in the public sector; the Ministry of Health (MOH), the Royal Medical Services (RMS), and the United National Relief and Works Agency (UNRWA). Many challenges face the health sector in Jordan, like the exponential growth of population, weak national economy, low gross domestic products, and scarcity of financial recourses. In addition, needle stick injuries are considered a challenge in the health industry especially in the private sector, even though the health private sector is functioning on high level of standards in Jordan, needle stick injuries remain a challenge due to the presence of human factor in performing operational work (Abozeadet al., 2015). Although there is not a national database in Jordan, relevant studies indicate that needle stick injuries constitute a significant problem for Jordanian nurses (Hassan and Wahsheh, 2008; Hassan and Wahsheh, 2009). Unfortunately, there is no national program in Jordan for needle stick injuries, each hospital relays on own policies and procedures.

In Jordan, the structure of nursing profession consists of a system of technical classification of professionals; the first technical classification degree is “Registered Nurse”; these are the new hires with no previous experience. The second technical degree is “practicing Nurse” who have minimum two years experience after the last academic degree. The third technical degree is “Assistant Specialist Nurse” who have minimum experience of four years as a practicing nurse. The fourth technical degree is “Specialist Nurse” who have minimum experience of four years as an Assistant Specialist Nurse. The last technical degree is “Consultant Nurse” who needs to have minimum of Master degree and four years experience as a specialist nurse. (Jordanian Nursing Council, 2008).

Quality management is associated with needle stick and sharp injuries in order to protect healthcare workers from harm and to prevent adverse events (Kaźmierczak and Bogusz-Czerniewicz, 2012). Hospital management should exercise control over all processes using quality management approaches to enhance occupational safety. Nursing leaders focus on effective methods and procedures to control and reduce needle stick injuries. Processes like elimination of hazards, the use of personal protective equipment, administrative controls, engineering controls, and work practice controls. Quality management eliminates the hazards of needle stick injuries by implementing standards to control the usage of needles and eliminate their wastes. It also focuses on administrative controls by setting policies and procedures to limit exposure to hazards like needle stick injuries, which will lead to controlled work place practices like preventing re-capping and emptying sharp containers when they are full.

1.2 Needle Stick Injuries among Nurses

Among all health occupational groups that work in hospitals, the most frequent group to have needle stick injuries are nurses (Trivedi, Kasar, Tiwari, Verma, and Sharma, 2013). Nursing shortage and reducing costs are important contributing factors for prolonged nursing working hours, fatigue, stress, and heavy workloads; which can increase the probability of occupational-related injuries among nurses while they try to fulfill their work duties and demands. In the USA, nurses have the highest rates among all healthcare workers of needle stick injuries, (Khushdil, Farrukh, Sabir, Awan, and Qureshi, 2013).

Nurses form the majority of hospital workers, and their work requires them to be in direct contact all the time with patients, patients' families, and other health occupations inside hospitals at all times, and they are always expected to apply all required policies and procedures perfectly, not forgetting the long learning hours required to learn all the new medical techniques and strategies in medical treatment to keep the practice up to date, besides the fact that nurses spend the longest times of direct care to the patients compared to all other healthcare workers, all the previous mentioned factors can contribute to high job stress among nurses. Job stress can be the highest among nurses affecting their behavioral, cognitive, physiological, and psychological functions, making them at risk to have needle stick and sharp injuries (Park and Kim, 2013). There are causal relationships between needle stick injuries and difficult working conditions, lack of training, lack of enforcement, unsafe procedures, unsafe devices, and fatigue (Van der Molen, Zwinderman, Sluiter, and Frings-Dresen, 2011).

Underreporting of NSIs among nurses is a very common problem, the occurence of occupational exposure is significantly higher than current estimates (Ashat, Bhatia, Puri, Thakare, and Koushal, 2011), for that reason a low needle stick injury rate must not be interpreted as a non-existing problem. Underreporting is a serious issue even

in hospitals with easily accessible reporting systems (Wicker, Walcher, Wutzler, Stephan, and Marzi, 2014).

1.3 Problem Statement

In Jordan, a study compared the occurrence of needle stick injuries among nurses between private and public hospitals (Abozead et al., 2015), the study found that 90% of nurses who work in private hospitals have reported suffering at least one needle stick injury during their work, which is an alarming number compared to only 70% of the nurses working in public hospitals. Another study in Jordan included 452 nurses revealed that 412 nurses (92%) have acquired at least one needle stick injury within the past 12 months of the study (Hassan and Wahsheh, 2009). 65% of Jordanian nurses expressed that they did not have adequate and current training or education in any issue related to one of blood-borne pathogens that results from needle stick and sharp injuries (Hassan and Wahsheh, 2009).

The previous finding can lead to certain problems; firstly, nurses working in private hospitals are highly and significantly exposed to the hazards of needle stick injuries (Kebede, Molla, and Sharma, 2012); relevant literature showed that nurses have the highest rate of needle stick injuries among healthcare workers due to their maximum exposure to needles and other sharp instruments (Khushdil et al., 2013). According to the World Health Organization (WHO), Needle stick and sharp injuries are responsible for approximately three million cases of occupational exposure to blood and bodily fluids among healthcare professionals (WHO, 2003).

Secondly, private hospital nurses are under the risk of occupational transmission of serious infections that can alter their well-being and even threaten their lives, and many of the working nurses are women of childbearing age that can transmit the risk to another human being. The WHO announced that 40% of Hepatitis B and Hepatitis C cases, and 2.5% of HIV cases among healthcare workers are due to occupational exposures that include needle stick injuries (WHO, 2002). Many needle stick injuries can be prevented using proper strategies, but the risk related to non-compliance to these strategies still exists. It was reported that 40% to 65% of HBV and HCV infections among h nurses were attributable to needle stick injuries in the developing countries (Hassan and Wahsheh, 2009).

1.4 Significance of the Study

This study is providing a new module to reduce needle stick injuries. The effectiveness of this module is tested for its ability to increase the nurses' knowledge about needle stick injuries and their threats on private hospital nurses, enhance their attitudes, modify their practices, and change their beliefs about the threats of needle stick injuries and the motivation of take actions to reduce this threat. The Health

belief Model (HBM) was utilized as the ground theory to establish the educational module.

Moreover, this study is providing various strategies to deliver the educational module for the private hospital nurses. These strategies are tested for their effectiveness to prevent needle stick injuries, which will prevent the occupational transmission of blood borne diseases and save nurses from suffering emotional distress and anxiety. This study can be an eye-opener for leaders for the importance of shifting the focus from rewarding/ punishment approach in order to enforce policy implementation into another approach that focuses on the nurses' cognitive perceptions and beliefs to modify behavior to implement required policies and guidelines. These strategies are the use of Social Media to provide education, Audio-visual material, and a combined strategy of Social Media and Audio-visual materials.

1.5 Research Questions

This study seeks to answer the following questions:

15.1 What is the effect of the intervention strategies on needle stick injury occurrence among nurses in Jordanian private hospitals?

15.2 What is the effect of the intervention strategies on the knowledge, attitudes, and practices among nurses in Jordanian private hospitals?

15.3 What is the effect of the intervention strategies on nurses' beliefs among nurses in Jordanian private hospitals?

15.4 What are the risk factors on needle stick injuries among nurses in Jordanian private hospitals?

15.5 What are the predictor variables of the change in NSI occurrence among nurses in Jordanian private hospitals?

1.6 Research Objectives

1.6.1 General Objective

The general objective of this study is to develop, implement, and evaluate the effectiveness of educational module and strategies to reduce needle stick injuries among nurses of private hospitals in Jordan.

1.6.2 Specific objectives

Specifically, this study aims to:

1.6.2.1 To determine the effect of the intervention strategies on needle stick injury occurrence among nurses in Jordanian private hospitals.

1.6.2.2 To determine the effect of intervention strategies on the knowledge, attitudes, and practices among nurses in Jordanian private hospitals.

1.6.2.3 To determine the effect of intervention strategies on nurses' beliefs among nurses in Jordanian private hospitals.

1.6.2.4 To explore the risk factors of needle stick injuries among nurses in Jordanian private hospitals.

1.6.2.5 To determine the predictor variables of the change in NSI occurrence after the interventions among nurses in Jordanian private hospitals.

1.7 Null Hypotheses

1.7.1 Needle stick injury counts:

H_0: There are no significant differences in NSI occurrence between the intervention groups and the control group after the interventions.

1.7.2 Knowledge, Attitudes, Practices (KAP)

H_0: There are no significant differences in the knowledge, attitudes, and practices of nurses between the intervention groups and control group after the interventions.

1.7.3 Nurses' beliefs

H_0: There are no significant differences in nurses' beliefs between the three intervention groups and the control group after the interventions.

1.7.4 Risk Factors

H_0: There is no significant association between risk factors and the number of NSIs among nurses in Jordanian private hospitals.

1.7.5 Predictors of NSI reduction

H_0: Changes in NSI counts could not be modeled as functions of the particular interventions used, and of changes in nursing-related knowledge, attitudes, practices, and in the beliefs encompassed by the Health Beliefs Model.

1.8 Definition of Terms

1.8.1 Needle Stick Injury: "introduction into the body of health care providers during the routine performance of their duties, of blood or other potentially hazardous material by a hollow bore needle or sharp instruments e.g. needles, lancets and contaminated broken glass" (Waqar, ul Siraj,Razzaq Malik, and Zahid, 2011).

1.8.2 Blood Borne Pathogens: Infectious microorganisms present in blood that can cause disease in humans. These pathogens include, but are not limited to, hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV), the virus that causes AIDS. Workers exposed to blood borne pathogens are at risk for serious or life-threatening illnesses. (OSHA, 2011)

1.8.3 Acquired Immunodeficiency Syndrome (AIDS): "A spectrum of conditions caused by infection with the human immunodeficiency virus characterized by increased susceptibility to opportunistic infections, caused by a retrovirus and transmitted chiefly through blood or blood products that enter the body's bloodstream, especially by sexual contact or contaminated hypodermic needles". (Krämer et al., 2010)

1.8.4 Human Immunodeficiency Virus (HIV): " HIV is the cause of the immunologic findings, for without HIV there is no AIDS A retrovirus of the subfamily lentivirus that causes acquired immunodeficiency syndrome" (Douek et al., 2009)

1.8.5 Hepatitis B: "a viral infection that attacks the liver and can cause both acute and chronic disease. The virus is transmitted through contact with the blood or other body fluids of an infected person". (WHO, 2017)

1.8.6 Hepatitis C: "A liver disease caused by the hepatitis C virus: the virus can cause both acute and chronic hepatitis, ranging in severity from a mild illness lasting a few weeks to a serious, lifelong illness. The hepatitis C virus is a bloodborne virus and the most common modes of infection are through exposure to small quantities of blood. This may happen through injection

drug use, unsafe injection practices, unsafe health care, and the transfusion of unscreened blood and blood products." (WHO, 2017)

1.8.7 Attitude: "psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor". (Eagly & Chaiken, 2007)

1.8.8 Behavior: Conducting oneself or acting in a particular way given certain circumstances (Glanz et al., 1997).

1.8.9 Barrier: Any perceived obstacle, physical or psychological, that interferes with a person performing the intended behavior (Glanz et al., 1997).

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