EFFECTIVENESS OF A TRAUMA TRIAGE EDUCATIONAL PROGRAMME ON KNOWLEDGE AND SKILL OF EMERGENCY NURSES IN PUBLIC HOSPITALS IN THE WEST BANK, PALESTINE

By

KHALAF ABDELFATTAH MOHD AWWAD

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

January 2023

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DEDICATION

Firstly, I dedicate this to God.

Secondly, I dedicate this to my parents, my wife, and my children.

Thirdly, I dedicate this to my supervisors.

Lastly, I dedicate this to all the staff in Universti Putra Malaysia.

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Doctor of Philosophy

EFFECTIVENESS OF A TRAUMA TRIAGE EDUCATIONAL PROGRAMME ON KNOWLEDGE AND SKILL OF EMERGENCY NURSES IN PUBLIC HOSPITALS IN THE WEST BANK, PALESTINE

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January 2023

Chairman : Associate Professor Ng Yee Guan, PhD
Faculty : Medicine and Health Science

Trauma at the time of writing is the ninth leading cause of death across all age categories and is predicted to rise to the 7th leading cause of death by 2030 as a consequence of increasing treatment errors. Furthermore, the number of trauma individuals diagnosed in hospitals has grown from 1.5 in 2015, to 5 and 8 million in 2017 and 2020, respectively. Injuries are also the world's fifth leading cause of moderate to serious disability. A lack of knowledge and skill could have an effect on health outcomes in an unstable trauma triage system. As a result, trauma patients' care and the hospital's care system would be jeopardised.

The study's objective was to develop, implement, and evaluate the effectiveness of a trauma triage educational programme on knowledge and skill among emergency nurses in public hospitals in Palestine. Phase one – One hundred and fifty-four emergency nurses from 11 government hospitals participated in a cross-sectional study, the data were gathered using a self-administered structured questionnaire, and knowledge and skill questionnaire was collected from March and May 2021. The data were analysed using descriptive analysis and linear logistic regression. The data were collected using a pre-tested self-administrated structured questionnaire. The study analysis was done using Statistical Package for Social Sciences (SPSS) version 24 software. All tests were estimated to be two-sided, and the statistical significance was considered to be at $p< 0.05$. Phase two – A single-blinded randomised control trial was conducted to evaluate the effectiveness of an advanced trauma life support programme on the knowledge and skill scores among 112 emergency nurses in public hospitals in Palestine from April to July 2021. The data were analysed using repeated measures ANOVA and T-test.

Phase One – The respondent's mean age was 30.5 ± 6.74 years, with the majority (52.6%) falling into the 29-and-under age group. In terms of gender, males made up the majority of responders (61.7 %). The study of the relationship showed that there was a weak positive significant correlation between knowledge and skill in trauma triage among emergency nurses. According to the final linear regression model, emergency nurses with married marital status have higher knowledge with a score of 1.078 compared to emergency nurses with single marital status. Emergency nurses with postgraduate education have lower knowledge with a score of 1.457 compared to emergency nurses who have diploma education. Emergency nurses with 5-7 years working experience have lower knowledge with a score of 1.677 score compared to emergency nurses who have 1-3 years working experience. Emergency nurses with moderate/high skill score have a higher knowledge score, 0.076, than emergency nurses who have a low skill score. The final linear regression model for skill showed that emergency nurses with 5-7 years working experience have higher skill with a score of 7.505 compared to emergency nurses who have 1-3 years working experience. Emergency nurses with moderate/high knowledge scores have a higher skill score, 1.689, than emergency nurses who have low knowledge scores. Phase two – There were significant mean score differences between the experimental and control groups in the pairwise comparisons of the groups in terms of knowledge and skill. There were significant mean score differences in knowledge between the baseline and post-intervention in the experimental group, as well as between the baseline and the three-month follow-up, and the post-intervention and three-month follow-up, whereas there were significant mean score differences in knowledge between the baseline and post-intervention in the control group, as well as between the baseline and three-month follow-up.

Phase One – Trauma triage care is the weakest link in developing-country hospitals. Low levels of knowledge and skill will harm the trauma triage system and increase medical errors in hospitals. Among emergency nurses, there was a weak positive significant correlation between knowledge and skill in trauma triage. Phase Two – The advanced trauma life support programme provides one of the most efficient ways for nurses to enhance their knowledge and skill in trauma triage in the emergency department. It is a popular programme for enhancing nursing skills. Attending a half-day or two-day advanced trauma life support programme training course can help nurses improve their knowledge and skill.

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

KEBERKESANAN PROGRAM PENDIDIKAN TRIAGE TRAUMA MENGENAI PENGETAHUAN DAN KEMAHIRAN JURURAWAT KECEMASAN DI HOSPITAL AWAM DI TEBING BARAT, PALESTIN

Oleh

KHALAF ABDELFATTAH MOHD AWWAD

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Trauma sehingga masa pada penulisan ini adalah penyebab utama kematian kesembilan merentas semua kategori umur dan diramalkan akan meningkat kepada punca utama kematian ke-7 menjelang 2030 akibat peningkatan kesilapan rawatan. Tambahan pula, bilangan individu trauma yang didiagnosis di hospital telah meningkat daripada 1.5 juta pada 2015 kepada 5 dan 8 juta pada 2017 dan 2020, masing-masing. Kecederaan juga merupakan punca utama kelima di dunia bagi kecacatan sederhana hingga serius. Kekurangan pengetahuan dan kemahiran boleh memberi kesan kepada kesihatan disebabkan sistem triage trauma yang tidak stabil. Akibatnya, penjagaan pesakit trauma dan sistem penjagaan hospital akan terancam.

Objektif kajian ialah untuk membangunkan, melaksana dan menilai keberkesanan program pendidikan triage trauma dalam pengetahuan dan kemahiran dalam kalangan jururawat kecemasan di hospital awam di Palestin. Fasa satu - seratus lima puluh empat jururawat kecemasan dari 11 hospital kerajaan mengambil bahagian dalam kajian keratan rentas, data dikumpulkan menggunakan soal selidik berstruktur yang ditadbir sendiri dan soal selidik pengetahuan dan kemahiran dikumpulkan dari Mac hingga Mei 2021. Data dianalisis menggunakan analisis deskriptif dan regresi logistik linear. Data dikumpul menggunakan soal selidik berstruktur ditadbir sendiri yang telah diuji sebelumnya. Analisis kajian dilakukan menggunakan perisian *Statistical Package for Social Sciences* (SPSS) versi 24. Semua ujian dianggarkan mempunyai taburan normal dan nilai signifikan dianggap pada $p<0.05$. Fasa dua - percubaan kawalan rawak buta tunggal telah dijalankan untuk menilai keberkesanan program sokongan hayat trauma lanjutan terhadap skor pengetahuan dan kemahiran dalam kalangan 112 jururawat kecemasan di hospital awam di Palestin dari April hingga Julai 2021. Data dianalisis menggunakan langkah berulang ANOVA dan ujian-T.

Fasa satu – nilai min umur responden ialah 30.5 ± 6.74 tahun, dengan majoriti (52.6%) jatuh ke dalam kumpulan umur 29 dan ke bawah. Dari segi jantina, lelaki merupakan majoriti responden (61.7 %). Kajian menunjukkan bahawa terdapat korelasi signifikan positif yang lemah antara pengetahuan dan kemahiran dalam triage trauma dalam kalangan jururawat kecemasan. Berdasarkan model regresi linear yang terakhir, jururawat kecemasan yang telah berkahwin mempunyai pengetahuan yang lebih tinggi iaitu 1.078 markah berbanding jururawat kecemasan yang berstatus bujang. Jururawat kecemasan dengan pendidikan lepasan ijazah mempunyai pengetahuan yang lebih rendah iaitu 1.457 markah berbanding jururawat kecemasan yang mempunyai pendidikan diploma. Jururawat kecemasan dengan pengalaman bekerja 5-7 tahun mempunyai pengetahuan yang lebih rendah iaitu 1.677 markah berbanding jururawat kecemasan yang mempunyai pengalaman bekerja 1-3 tahun. Jururawat kecemasan dengan skor kemahiran sederhana/tinggi mempunyai pengetahuan yang lebih tinggi iaitu 0.076 markah berbanding jururawat kecemasan yang mempunyai skor kemahiran rendah. Model regresi linear yang terakhir bagi kemahiran menunjukkan bahawa jururawat kecemasan dengan pengalaman bekerja 5-7 tahun mempunyai kemahiran yang lebih tinggi iaitu 7.505 markah berbanding jururawat kecemasan yang mempunyai pengalaman bekerja 1-3 tahun. Jururawat kecemasan dengan skor pengetahuan sederhana/tinggi mempunyai kemahiran yang lebih tinggi iaitu 1.689 berbanding jururawat kecemasan yang mempunyai skor pengetahuan rendah. Fasa dua – terdapat perbezaan skor min yang signifikan antara kumpulan eksperimen dan kawalan dalam perbandingan berpasangan kumpulan dari segi pengetahuan dan kemahiran. Terdapat perbezaan skor min yang signifikan dalam pengetahuan antara garis dasar dan pasca intervensi dalam kumpulan eksperimen, serta antara garis dasar dan susulan tiga bulan, dan selepas intervensi dan susulan tiga bulan, manakala terdapat perbezaan skor min yang signifikan dalam pengetahuan antara garis dasar dan pasca intervensi dalam kumpulan kawalan, serta antara garis dasar dan susulan tiga bulan.

Fasa satu - penjagaan triage trauma adalah elemen paling lemah di hospital negara membangun. Tahap pengetahuan dan kemahiran yang rendah akan membahayakan sistem triage trauma dan meningkatkan kesilapan perubatan di hospital. Dalam kalangan jururawat kecemasan, terdapat korelasi signifikan positif yang lemah antara pengetahuan dan kemahiran dalam triage trauma. Fasa dua - program sokongan hayat trauma lanjutan menyediakan salah satu cara paling berkesan untuk jururawat meningkatkan pengetahuan dan kemahiran mereka dalam triage trauma di jabatan kecemasan. Ia adalah program popular untuk meningkatkan kemahiran kejururawatan. Menghadiri kursus latihan program sokongan hayat trauma lanjutan selama setengah hari atau dua hari boleh membantu jururawat meningkatkan pengetahuan dan kemahiran mereka.

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

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Declaration by the Graduate Student

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This is to confirm that:

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- supervision responsibilities as stated in the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2012-2013) are adhered to.

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M	Mean
AOR	Adjusted Odds Ratio
ATLS	Advanced Trauma Life Support
CI	Confidence Interval
COR	Crude Odds Ratio
ESI	Emergency Severity Index
CTAS	Canadian Triage and Acuity Scale
ATS	Australasian Triage Scale
DV	Dependent Variable
IV	Independent Variable
MTS	Manchester Triage System
K&S	Knowledge and Skill
MoH	Ministry of Health (Palestine)
TBI	Traumatic Brain Injury
RCT	Randomised Control Trial
ACS	American College of Surgeons
PIS	Participant Information Sheet
SD	Standard Deviation
SPSS	Statistical Package for Social Sciences Programme
UPM	Universiti Putra Malaysia
WHO	World Health Organization
X^2	Chi Square
ATTT	Alfred Trauma Team Training
NIS	National Triage Scale
TATTT	Toowoomba Adult Triage Trauma Tool

ETC	European trauma course
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
Mesh	Medical Subject Heading-terms
SQRT	Standard Quality-Rating Tool
EPHPP	Effective Public Health Practice Project
ATCN	Advanced Trauma Care for Nurses
TTKQ	Trauma Triages' Knowledge Questionnaire
TTSQ	Trauma Triages' Skills Questionnaire
NSIs	Needlestick injuries
JKEUPM	Jawatankuasa Etika Universiti Penvelidikan Melibatkan Manusia
RMC	Research Medical Centre
BLS	Basic Life Support
ACLS	Advanced Cardiovascular Life Support
ER	Emergency Room
RN	Registered Nurse
ATNC	Advanced Trauma Nursing Course
PROSPERO	International Prospective Register of Systematic Reviews

CHAPTER 1

INTRODUCTION

1.1 Background

Trauma is an individual's injury arising from various potential mechanisms including road traffic accidents affecting the body, accidents causing the body to fall, gunshot wounds, and others (Stewart et al., 2017). Furthermore, injuries can be defined by severity, ranging from minor to critical, or life-threatening to fatal (Stewart et al., 2017). Every year, nearly five million people die from trauma, making it a serious global health issue (Khan et al., 2020; Mock et al., 2015). Moreover, 90% of traumas occur in low- or middle-income countries (Haagsma et al., 2016). Additionally, 180 million people are disabled annually and need to make adjustments to their life (Haagsma et al., 2016). In the continent of Africa trauma resulted in 1.3 million deaths and more than 5.8 million disabilities (Bergman et al., 2008; Kilenzi & Lubuulwa, 2022).

Furthermore, worldwide results of the prevalence of injuries amount to 15 million individuals each year – more than 40 patients per day suffer a mild, moderate, or severe physical disability in the world (Alharbi et al., 2019; Naci et al., 2009). Dalal, Lin, Gifford, & Svanström (2013) found that countries, such as the USA, Canada, and Italy, lost an estimated USD 167.8 billion due to road traffic accidents alone. In Italy, the general prevalence rate of trauma death was around 27 patients for every 100 inhabitants per year, and, in those deaths, 18 percent happened within forty-eight hours in hospitals (Bagher, 2017; Chiara et al., 2010). In 2003, more than 29 million people in the United States, representing 10 percent of the total population, suffered non-fatal injuries, and the injury was the third leading cause of death overall (Chen et al., 2019; Kauvar et al., 2006). In India, thirteen traumatic patients die every week, and in 2007 around one million and a half died as a result of this cause, which was the highest in the world (Rastogi et al., 2014; Roy, 2017). The incidence of trauma in adults in Canada is around seventy-two per one thousand population (Choukou et al., 2019; Karmali et al., 2005). In trauma scales, such as 3-level, 4-level or 5-level, hospitals around the globe use categorical triage systems to prioritise patients in the emergency department (Frisch, 2020).

Table 1.1 : Prevalence of trauma deaths in the world

Location	Outcomes
India	13 patients die per week. 1.5 million trauma deaths in 2007
United States	10% of total population suffered trauma in 2003
Italy	27 deaths because of trauma from 100 trauma patients per year, 18% of the 27 within 48 hours in hospitals
Canada	72 deaths because of trauma from 100 trauma patients per year

A traumatic head injury is a trauma that causes scalp, skull, or brain injury. Injury, particularly traumatic brain injury (TBI), was the main cause of morbidity and death globally, primarily among children and young people (Even et al., 2022). Worldwide, sixty-nine million people are expected to suffer a traumatic brain injury annually, with the South-East Asian and Western Pacific areas facing the highest overall injury risk (Dewan et al., 2018). Another study indicated that around 1.2 million traumatic brain injuries occur annually, leading to 50.000 instant deaths and 235.000 hospital admissions globally (E. E. H. Mohammad, 2018). In the United States, fifty-six thousand deaths are related to TBI and contribute to 30% of all injury-related deaths (VanItallie, 2019). The respondents in the previous study in Nepal found that the main (50%) causes of death in the emergency department were due to head and chest injuries, followed by (41.1%) chest and abdominal injuries related to trauma cases (Shrestha et al., 2017).

Chest trauma is responsible for 25% of trauma deaths; these injuries add up to 50% of global trauma-related mortality. Trauma to the chest is strongly associated with multiple organ damage that encourages a crisis of bad results for trauma patients (Dogrul et al., 2020). The fatality rate of patients with blunt chest injuries in the United States and Europe can be as high as sixty percent (Bayer et al., 2017). Moreover, twenty to twenty-five percent of deaths in patients with multiple injuries are linked to a chest injury (Manay et al., 2017). Additionally, chest trauma contributes to more than thirty-five percent of injury-related deaths in the US and involves a wide range of injuries that can cause major morbidity and mortality (Meredith & Hoth, 2007; Milczarek et al., 2022). During the primary trauma assessment, timely diagnosis is essential to determine those injuries that are instantly life-threatening and require rapid action (Edgecombe & Angus, 2019; El-Senousy et al., 2020).

Abdominal trauma is a significant matter of public health for all countries and all socioeconomic classes. The abdomen is the third most frequently injured region, with surgery needed in around twenty-five percent of trauma cases (Camp et al., 2018; Dharmarajan & Ramu, 2016). Abdominal trauma appears in seven to ten percent of all trauma patients and it is often linked to chest or head injuries in severe trauma situations (Shuster et al., 2018). In Europe, the fatality rates of abdominal trauma ranged from ten to thirty percent of overall trauma deaths (Bäckman et al., 2020). An earlier study in Malaysia concluded that abdominal injury is a serious medical condition and must not be neglected (Rusli et al., 2020). It also added that suitable consideration to trauma patients' assessment and treatment is essential, so any victim with a head injury and coma must be viewed as having an intra-abdominal injury unless otherwise shown (Rusli et al., 2020). Appropriate treatment methods need to be routinely defined and evaluated in order to reduce mortality in cases of head, chest, and abdominal injuries (Frink et al., 2017).

Thus, emergency nursing is one of professional nursing's most challenging and short-staffed areas (Abellanoza et al., 2018). In the development of trauma care systems, emergency nurses are considered vital in the successful care and treatment of trauma patients (Abellanoza et al., 2018). Furthermore, nurses in the emergency department can start initial treatment immediately while patients may have to wait to be attended to by a doctor (Aloyce et al., 2014a). For this reason, one of the nurse's most important roles is to conserve patients' lives, particularly in emergency situations (Grover et al., 2017).

As professionals of immediate patient care, emergency nurses play a significant role in the prevention of medical errors for many patients entering the hospital by correctly providing triage (Blakemore, 2018). This makes it sound as though the main nursing role is the prevention of medical errors.

Adequate knowledge and skill among emergency nurses for the timely evaluation and correct determination of a patient's level of diagnosis are essential requirements for efficient triage (Eisa & Alenizi, 2020; Pardey, 2007). Also, the knowledge and skill of triage among nurses are the significant variables in emergency department oversight (Kerie et al., 2018). Moreover, the knowledge and skill of the triage nurse and the relationship were mentioned as important factors in emergency department triage (Aloyce et al., 2014a).

Triage is the classification of patients through medical needs and has been created to categorise injuries into major and minor (Bazyar et al., 2019). Triage starts at the front entrance of the emergency department and continues until the patient's critical situation is stabilised (Yancey & O'Rourke, 2020). Moreover, it can lead to the determination of the order and priority of emergency transport or the patient's transport destination in the hospital units (Napi et al., 2019). Triage aims to promote patient safety by ensuring timely care and prioritisation according to the degree of trauma and injury (Evans et al., 2017).

The Palestinian Ministry of Health reported a total population of around 8 million in Palestine, which is divided between the Gaza Strip and the West Bank (Ministry of Health, 2019). Hence, it needs an appropriate trauma care system, such as advanced trauma life support courses to save trauma patients' lives or minimise complications (Ministry of Health, 2019). Advanced trauma life support is rated as the best popular programme of trauma triage internationally compared to other trauma care programmes (Awwad et al., 2021). However, this programme does not apply to the emergency departments in Palestine (Ministry of Health, 2019). Also, no recent study has been carried out in Palestine.

To date, education is one of the best ways to provide effective human strength to solve society's needs (Ary et al., 2018). The target of the educational programmes nowadays is to improve the levels of knowledge and skill, and the quality of human lives through special strategies, such as programmes of varying duration and method of delivery that change human attitude in a positive manner (Fayolle, 2018). One of the most common education programmes in emergency medicine is advanced trauma life support (ATLS), which is a course taught to physicians and nurses. This course was developed by the Trauma Committee of the American College of Surgeons and has spread rapidly around the world (Abu-Zidan, 2016). A systematic review had shown that regular refresher triage training, collaboration between emergency departments, and continuous education were necessary to strengthen the use of triage systems and improve nurses' triage performance (Tam et al., 2018). The ATLS programme enhances the protection of patients with multiple trauma (Abu-Zidan, 2016). It introduced a "golden hour" in terms of dealing with multiple trauma patients and emphasises the need for treating life-threatening situations promptly (Gondek et al., 2017). The ATLS guide is now in the

tenth edition (Henry, 2018), and trauma treatment in the UK has improved considerably across the three decades since it became popular, mainly as a result of the founding of trauma hospitals and the ATLS programme (Choi et al., 2021). ATLS techniques have become the standard for early trauma diagnosis and management for both military and government trauma procedures (Hall et al., 2017; Luedi et al., 2017).The ATLS is an effective programme among nurses related to trauma triage and has shown statistical significance in improving their knowledge and skill on trauma triage (Ahmadi et al., 2017; Awwad et al., 2021; Ghazali et al., 2020).

1.2 Statement of the Problem

Erroneous decision-making during trauma triage for patients with major trauma may result in untimely or delayed immediate care or inaccurate triage in the emergency department, thereby resulting in less satisfactory patient conditions or outcomes (Bashiri et al., 2019). Thus, inaccurate trauma triage among nurses may leads to complications that can make the trauma patient worse, thereby requiring additional time for treatment, and, potentially leading to death (Awwad et al., 2022).

Multiple injuries include a concurrent injury or persistent injury to more than two bodily locations or areas caused by the same injury, with at least one location having a serious injury (Zhang et al., 2019). Head, chest, and abdominal injuries are the most prevalent and critical causes of trauma-related death and disability globally (Yimam et al., 2021). Chest trauma is the third highest cause of death in multiple trauma patients following abdominal trauma and head trauma (Dogrul et al., 2020). Nowadays, injuries are estimated to be the ninth leading cause of death in all age groups and will become the seventh leading cause of death by 2030 with the increase in treatment errors (James et al., 2020). Then, injuries will rank fifth among the world's leading causes of moderate and severe disability (Vos et al., 2020). Comparatively few trauma patients suffer from complications after 24 hours of trauma. Most deaths occur within the first four hours after the patient enters an emergency department if the correct strategy is not provided- or even with the correct strategy (Eckert & Martin, 2017). The idea of the "golden hour" highlights the higher risk of death and the need for urgent action during the first hour of diagnosis following multiple injuries (Podell et al., 2023).

Emergency nurses with sufficient knowledge and skills for the timely evaluation and correct determination of a patient's level of diagnosis are a must for efficient triage (Al-Metyazidy et al., 2019; Phukubye et al., 2019). Knowledge and triage skills among nurses are significant variables in the purview of the emergency department, and previous studies have shown that emergency nurses have a poor or moderate level of knowledge and skill concerning trauma triage (Duko et al., 2019). Furthermore, if the knowledge and skill of the emergency nurses are inconsistent or below the required standard, patient care and the emergency department's effectiveness will be damaged. Previous research found that emergency nurses lacked the necessary knowledge and skill, which impacted patient triage categorisation, prioritisation, assessment, and allocation (Awwad et al., 2022; Duko et al., 2019). Only a few survey studies have shown the relationship between triage knowledge and triage skill among emergency nurses regarding trauma for which the results had either a strong or weak positive

relation (Awwad et al., 2022; Kerie et al., 2018). As a result, research on trauma triage among emergency nurses is needed to determine the knowledge and skill levels of nurses, the relationship between knowledge and skill, and triage, and whether triage knowledge and skill have improved from the past to the present (Awwad et al., 2022).

According to previous research, nurses who completed the trauma triage programme were able to improve their knowledge and skill for quick attention when compared to those who did not complete the training courses (Al-Marzooq, 2020; AlShatarat et al., 2022). The ATLS establishes the nurse's responsibility for meeting the various needs of trauma patients. However, there is a lack of outcomes concerning the knowledge and skill of emergency nurses about the ATLS programme due to limited previous research (Awwad et al., 2021). The lack of knowledge and skill of ATLS among emergency nurses has the potential to have a negative effect on the patient's outcome in trauma cases (Awwad et al., 2021).

In low-income countries, trauma triage during an emergency is often one of the weakest parts of the health care system (Kaur et al., 2021). In addition, the proportion of trauma patients arriving in the emergency department increased from 1.3 million in 2015 to 5 million in 2017, and 8.4 million is predicted by 2020 (Awwad et al., 2022). Palestine is a low-income country and has experienced more than six centuries of violence and trouble in the region with neighbouring Israel (Caplan, 2019). Israel has occupied Palestine since 1948. This has led to war with Israel thereby making Palestine an unstable country compared to other countries in the Middle East, such as Jordan, Egypt, and Lebanon (Caplan, 2019).

Benner's novice to expert theory emphasised learning through experience and skills attainment, so there was little emphasis on the role of the academic aspects of learning. It focuses on hands-on clinical experiences and direct patient care, without the education and knowledge provided through schooling or courses (Ozdemir, 2019). Despite its popularity, Benner's theory does not account for the development of expertise and randomised control trial (RCT) design well when compared to empirical data (Nichols, 2018). This intuitive grasp is based on experience and not based on extrasensory powers or wild hunches. Improving skills of involvement create disclosive spaces in which pressing concerns or the most plausible action can be discovered. Relational skills are schooled by learning to be at the emergency department in a highly differentiated clinical world where some actions are plausible and effective and other experienced as ill-timed (Benner, 2015). A sense of salience develops over time so that some things stand out as more plausible and appropriate than others. The proficient emergency nurse develops a richer sense of the end and possibilities of practice based on shared notions of good practice within the profession (Benner, 2015). As noted above, the Dreyfus model of skill acquisition is a situated and descriptive phenomenological account of the development of skill over time, it does not point to isolated competencies nor enabling traits or talent (Benner, 2015). Consequently, it allows a practitioner may be at different levels of skills in different areas of practice based on the particular emergency nurse's background experience and knowledge (Benner, 2015).

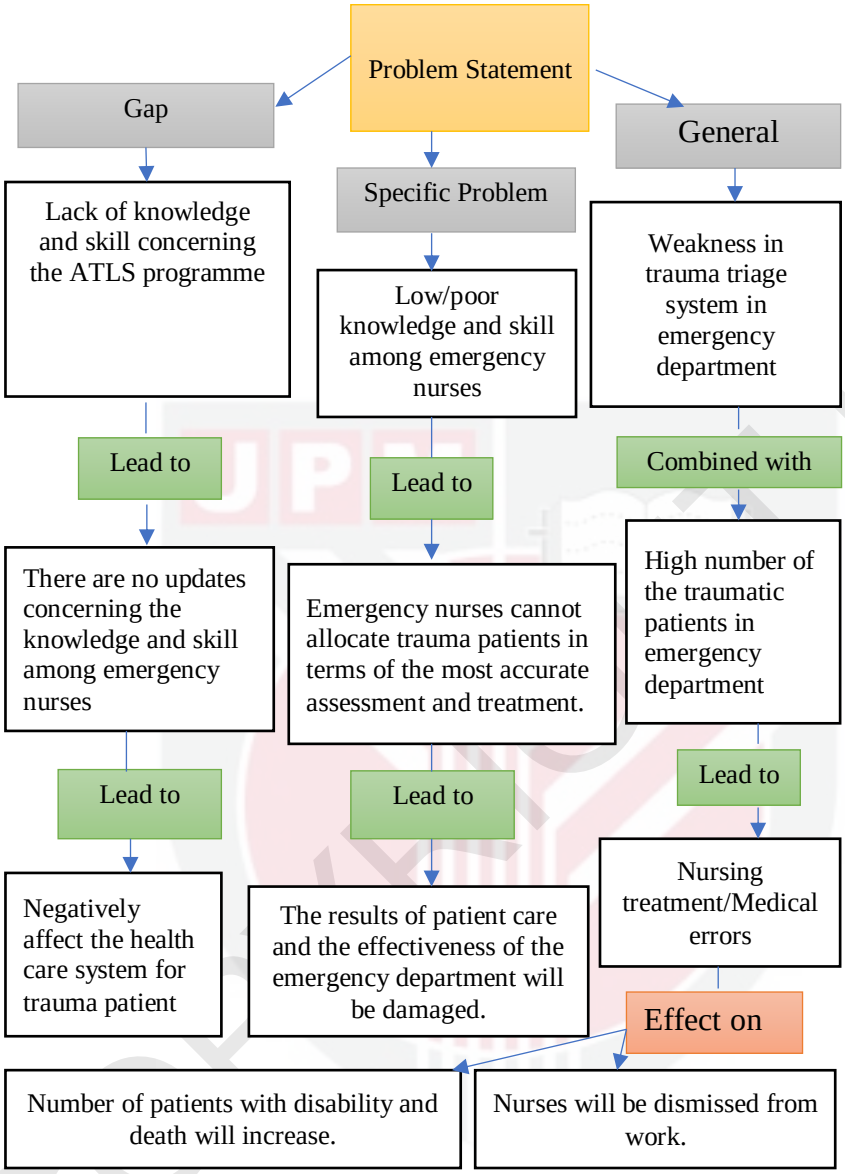

Figure 1.1 : Summary of the problem statement in the study

1.3 Significance of Study

A literature review of this study shows a need for studies or references related to trauma triage knowledge and skill among emergency nurses. This study provides recent information related to trauma triage knowledge and skill. Recent information on trauma triage may potentially update the skills of emergency nurses, who play a critical role in providing medical services at the forefront of the connection with trauma patients.

Moreover, this recent information may potentially help nurses, health care institutions, and authors in the future.

The current study provided the ATLS programme on the head, chest, and abdomen injuries as a package of knowledge and skills among emergency nurses related to trauma triage. ATLS was used to practice and then in theory as different ways to present it to the participants to improve their knowledge and skills. It includes videos, low-fidelity simulation, PowerPoint, scenarios, and group discussion on trauma triage. Also, giving ATLS to emergency nurses improved the knowledge and skills of emergency nurses, which has a domino effect on trauma patients as it possibly enables them to take suitable actions and provide important information.

The systematic literature review in this study showed that a pre-post intervention questionnaire was used in previous studies and that they did not show if there was a relationship between trauma triage knowledge and skills among emergency nurses in trauma triage. However, the current study used pre-, post-, and 3-month follow-up intervention questionnaires. The current study also provided the relationship between knowledge and skills among emergency nurses in the West Bank of Palestine.

This study may potentially be the first in Palestine to use trauma triage knowledge and skills among Palestinian nurses in the emergency department. It may also be the first study to apply ATLS to emergency nurses in the region. Likewise, the results of this study can be extended to other parts of the world for a wider global reach.

1.4 Objectives

1.4.1 General Objective

To develop, implement, and evaluate the effectiveness of a trauma triage educational programme on the knowledge and skills among emergency nurses in public hospitals of the West Bank of Palestine.

1.4.2 Specific Objectives

The specific objectives of the study were divided into two phases.

Phase one:

A) To assess the socio-demographic characteristics and occupational background information on trauma triage among emergency nurses in the West Bank of Palestine.

B) To assess the knowledge and skill scores on trauma triage among emergency nurses in the West Bank of Palestine.

C) To examine the association between the knowledge and skill scores for emergency nurses on trauma triage in the West Bank of Palestine.

D) To examine the association between emergency nurses' socio-demographic characteristics and occupation background information factors with the knowledge and skill scores on trauma triage in the West Bank of Palestine respectively.

Phase two:

A) To develop, implement, and evaluate the effectiveness of a trauma triage educational programme on the knowledge and skills among emergency nurses in public hospitals in the West Bank of Palestine.

B) To compare the socio-demographic characteristics and occupational background information on trauma triage among emergency nurses between the experimental and control groups at the baseline in the West Bank of Palestine.

C) To determine and compare the mean differences in the knowledge and skill scores for emergency nurses at pre-, post-, and 3-month follow-up within and between the experimental and control groups in the West Bank of Palestine.

1.5 Research Question

The research questions of the study were divided into two phases.

Phase one:

1) What are the current knowledge and skill levels among emergency nurses on trauma triage of public hospitals in the West Bank of Palestine?

2) Is there an association between the knowledge and skill scores on trauma triage among emergency nurses in public hospitals in the West Bank of Palestine?

3) Is there an association between the socio-demographic and occupation information with the knowledge and skill scores of Palestinian emergency nurses on trauma triage in public hospitals in the West Bank of Palestine?

Phase two:

1) Is the trauma triage educational programme effective in improving the knowledge and skill scores of the emergency nurses in public hospitals in the West Bank of Palestine?

1.6 Research Hypothesis

1.6.1 Null hypothesis

The null hypothesis of the study was divided into two phases.

Phase one:

H_0: There is no significant association between the knowledge and skill scores on trauma triage in the West Bank of Palestine.

H_0: There is no significant association between the emergency nurses' socio-demographic characteristics and occupation background information factors with the knowledge score on trauma triage in the West Bank of Palestine.

H_0: There is no significant association between the emergency nurses' socio-demographic characteristics and occupation background information factors with the skill score on trauma triage in the West Bank of Palestine.

Phase two:

H_0: There is no significant difference in the knowledge scores of the emergency nurses within the experimental and control groups at the pre-, post-, and 3-month follow-up of programme.

H_0: There is no significant difference in the skill scores of the emergency nurses within the experimental and control groups at the pre-, post-, and 3-month follow-up of programme.

H_0: There is no significant difference in the knowledge scores of the emergency nurses between the experimental and control groups at the pre-, post-, and 3-month follow-up of programme.

H_0: There is no significant difference in the skill scores of the emergency nurses between the experimental and control groups at the pre-, post-, and 3-month follow-up of programme.

1.6.2 Alternative Hypothesis

The alternative hypothesis of the study was divided into two phases.

Phase one:

H1: There is a significant association between the knowledge and skill scores on trauma triage in the West Bank of Palestine.

H2: There is a significant association between the emergency nurses' socio-demographic characteristics and occupation background information factors with the knowledge score on trauma triage in the West Bank of Palestine.

H3: There is a significant association between the emergency nurses' socio-demographic characteristics and occupation background information factors with the skill score on trauma triage in the West Bank of Palestine.

Phase two:

H1: There is a significant difference in the knowledge scores of the emergency nurses within the experimental and control groups at the pre-, post-, and 3-month follow-up of programme.

H2: There is a significant difference in the skill scores of the emergency nurses within the experimental and control groups at the pre-, post-, and 3-month follow-up of programme.

H3: There is a significant difference in the knowledge scores of the emergency nurses between the experimental and control groups at the pre-, post-, and 3-month follow-up of programme.

H4: There is a significant difference in the skill scores of the emergency nurses between the experimental and control groups at the pre-, post-, and 3-month follow-up of programme.

1.7 Definition

1.7.1 Conceptual Definition

A) Triage – is a guide to effective management by arranging patients on the basis of their emergency medical care needs (Vassallo et al., 2017). Moreover, triage requires an assessment to identify emergency department patients in need of immediate care (Mohammed, 2017).

B) Trauma – is the leading cause of death among people of all ages and is also defined as any injury that has the potential for serious or worse disability, death from various causes such as a fall, motorcycle or car crash, stabbing, wound, or gunshot (Savic et al., 2017). Also, trauma is covering non-traumatic health problems.

C) Trauma Triage – is a complex dynamic method of prioritizing the sorting of injuries and trauma assessment based on the severity of injury and urgency with which treatment is required (Christian, 2019). Furthermore, the main triage takes place at the accident scene and secondary triage at the accident clearing station at the site of a major incident (Christian, 2019).

D) Emergency Nurse – is a specialisation in the field of clinical nursing and focuses on the care of patients with medical emergencies and surgical emergencies, i.e. those who require prompt medical care to avoid long-term disability or death (Wolf et al., 2016). Furthermore, a common duty for registered nurses is to carry out emergency triage, often using a specially designed triage scale in their assessment (Wolf et al., 2016).

E) Knowledge – is learned through experience or education, facts, data, and skills. It is also characterised by the understanding of the reality of the situation experienced (Elbaz, 2018).

F) Skill – is an ability and capability gained through deliberate, organised, and sustained effort to carry out complex tasks or job functions involving ideas (cognitive skills), items (technical skills), and/or individuals (interpersonal skills) smoothly and adaptatively (Bryson, 2017).

G) Advanced Trauma Life Support (ATLS) – is a training programme established by the American College of Surgeons for medical providers in the management of acute trauma cases (Abu-Zidan, 2016).

H) American College of Surgeons (ACS) Committee on Trauma (COT) – are a group of medical staff and their trauma projects to develop and implement programmes that support injury prevention and ensure improved patient outcomes throughout the care continuum. Such programmes include advocacy, training, trauma centre and trauma system services, development of best practices, assessment of outcomes, and continuous improvement of quality (Brenner et al., 2018).

I) Expertise - expert skill or knowledge in a particular field.

1.7.2 Operational Definition

A) Trauma Patient – is an individual who is treated for a minor, serious, life-threatening physical injury of different ages and sex in emergency departments.

B) Emergency Nurse – is a skilled nurse in the treatment of patients with medical emergency injuries. They will also be included in this research and this research will test the knowledge and skills of their trauma triage.

C) Trauma Triage – refers to the trauma assessment of the patient based on the severity of the injury, which gives emergency nurses immediate intervention to protect injured patients from complications. Moreover, this study explores trauma triage through the knowledge and skill of emergency nurses.

D) Knowledge Score – based on the results of the questionnaire, the level of information, understanding, and awareness about education and experience of emergency nurses trauma triage can be graded as high, moderate or low in this study.

E) Skill Score – based on the results of the assessment, education, and experience of emergency nurses trauma triage can be assessed as high, moderate, or low.

F) Socio-Demographics – the characteristics of the socio-demographics used in this study comprise age, gender, marital status, and education. This research used these factors to assess how they influenced emergency nurses and whether there is an association between these factors and the knowledge and skills of emergency nurses.

G) Work Experience – is the experience gained by emergency nurses working in the department of emergency. It is divided into four categories in this research.

H) Advanced Trauma Life Support (ATLS) – is a course that involves lectures, group discussion, videos, scenarios, simulation, and practice. It provides emergency nurses with the ability to improve their knowledge and skills of trauma triage.

1.8 Chapter Summary

Trauma is currently the ninth largest cause of death in all age groups and is expected to rise to the seventh major cause of death by 2030 as a result of increased treatment errors. Furthermore, the number of trauma patients presenting to the hospitals has risen from 1.5 in 2015, to 5 and 8 million in 2017 and 2020, respectively. Additionally, injuries rank fifth among the world's leading causes of moderate and severe disability.

The trauma care system involves triage, which is connected with a substantial advantage for mortality. However, trauma triage in hospitals is commonly one of the weakest parts of the healthcare system in countries with low income.

The knowledge and skills of nurses are used to organise trauma patients in the most satisfactory order for assessment and treatment. For successful trauma triaging, there is a need to raise the level of knowledge and skills among nurses to conduct a quick assessment and appropriate determination of the patient's situation

In low-income countries shortages of nurses and rising numbers of trauma patients are weakening the trauma triage system, leading to inaccurate trauma triage among nurses. Incorrect trauma triage among nurses can result in complications that worsen the trauma patients, thereby requiring longer treatment times, and, in the worst case, greater mortality adequate treatment plans are not implemented.

The content of the ATLS includes early assessment, management of airways, stabilisation, and transport of multiple trauma patients. The advantage of the ATLS includes a learning, teamwork, cooperative, and synchronised approach to trauma treatment as trauma nurses exchange knowledge and skill with doctors on trauma triage. The lack of knowledge and skills of the emergency nurses about the ATLS programme is due to the limited previous research outcomes. A lack of knowledge and skill concerning the ATLS among emergency nurses could potentially have an adverse effect on the outcomes of the patients in trauma cases.

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