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Knowledge, Attitudes, Practices and Barriers regarding sepsis and sepsis management among Emergency nurses and physicians in Palestinian Hospitals.

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Approval form

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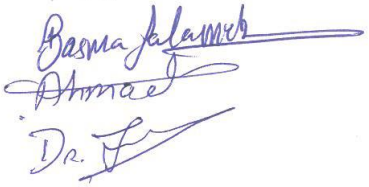
1.	Dr. Basma Salameh	Supervisor	
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Declaration

I certify that this thesis submitted for the degree of master, is the result of my own research, except where otherwise acknowledged, and that this study (or any part of the same) has not been submitted for a higher degree to any other university or institution.

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Ali E. Aboamash

Date: 27/9/2021

Dedication

I dedicate this work to the Almighty Allah for preserving my life, ensure my security in West Bank during COVID-19 pandemic and gave me good Health and strength to be able to do this work.

To my parents for their endless prayers and my family for their encouragement.

To my lovely friends and previous Head nurses Mr. Akram Shahroor and Mr. Ali Ghanem for their patience and support.

To my friends for supporting and encouragement.

To all martyrs and injuries in Palestine.

To every person help me to finish this work.

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Abstract

Background:

Sepsis is a widespread problem that can create clinical and economic difficulties. Fever is one of the first symptoms of sepsis that is usually diagnosed first in emergency departments and in emergency triage rooms to identify appropriate treatment, reduce mortality, and improve patient outcomes. This study was aimed to assess the level of knowledge, attitudes, practices, identify the biggest barriers related to the sepsis and sepsis management among emergency nurses and physicians and examine the association between the knowledge, attitudes, practices and social demographic characteristics among participants.

Methodology:

The study was applied in most Palestinian hospitals from February to June 2021. Quantitative data was collected using self-questionnaire completed by the participant nurses and physicians (n=243) were selected by convenient sample from 17 emergency departments with a response rate 61%. Descriptive and inferential statistic were used to assess the level of emergency nurses and physicians' knowledge attitude practice and identify of biggest barrier. Pilot study was implemented to ensure the clarity and accuracy of items.

Result:

The study results revealed that emergency nurses mean knowledge, attitudes and practices of sepsis and sepsis management, was 49.8%, 30.9%, and 48.3% respectively, and emergency physicians mean knowledge, attitudes and practices of sepsis and sepsis management, was 51.3%, 34.5%, and 50.9% respectively. Emergency nurses and physicians had a poor to moderate level of knowledge and emergency physicians had higher attitudes regarding sepsis and sepsis management than emergency nurses. However, the practices of sepsis and sepsis management were moderate levels among emergency nurses and physicians. It is evident that lack of monitoring equipment is the biggest barrier to providing quality care to patients who present with sepsis toward emergency nurses and physicians.

Conclusion:

Emergency nurses and physicians need consistent sepsis management information by implementation of training, continuous educational programs, development of an approved protocol can improve nurses ‘knowledge, attitudes and practices. That’s important to providing monitoring equipment, staff, and laboratories with diagnostic resources in emergency departments to improve the management of sepsis patients.

Key words: Knowledge, Attitudes, Practices, Barriers, Sepsis and Sepsis management.

List of abbreviations

CDC: Centers for Disease Control and Prevention

MOH: Ministry of Health

WHO: World Health Organization

SIRS: Systemic Inflammatory Response Syndrome

ACCP: American College of Chest Physicians

SCCM: Society of Critical Care Medicine

US: United State

SSA: Sub-Saharan Africa

MODs: Multiple Organs Dysfunction Syndromes

CCC: Clinical Care Compendium

$PACO_2$: Partial Pressure of Carbon Dioxide

mmHg: Millimeters of Mercury

WBCs: White Blood Cells

MAP: Mean Arterial Pressure

mmol: Millimole

L: Litter

SSC: Surviving Sepsis Campaign

NO: Nitric Oxide

°C: Celsius

ICU: Intensive Care Unit

ED: Emergency Department

AAP: American Academy of Pediatrics

SOEM: Section on Emergency Medicine

PERC: Pediatric Emergency Research Canada

SS: Sample Size

MCQ: Multiple Choice Questions

KAP: Knowledge, Attitudes and Practices

AAUP: Arab American University Palestine

SPSS: Statistical Package for the Social Science

No.: Number

N%: Percentage

CE: Continues Education

SD: Standard Deviation

M: Mean

BP: Blood Pressure

RR: Respiratory Rate

SPO_2: Peripheral Capillary Oxygen Saturation

JVP: Jugular Venous Pressure

IV: Intravenous

ER: Emergency Room

LOC: Level of Consciousness

PT: Prothrombin Time

INR: International Normalized Ratio

NS: Normal Saline

RL: Ringer Lactate

UOP: Urine Output

CVP: Central Venous Pressure

CO: Cardiac Output

PAP: Pulmonary Arterial Pressure

ILS: Israeli Shekel

Chapter 1: Introduction

1.1 Background

Sepsis is the extreme reaction of the body to an infection. It is a life-threatening medical emergency. Sepsis occurs when an existing infection triggers a chain reaction in your lungs, urinary tract, skin, or elsewhere in your body (Centers for Disease Control and Prevention, 2017). Sepsis affects neonates, pediatric patients, and adult patients internationally. Sepsis is estimated to affect 31.5 million people worldwide each year, resulting in 5.3 million deaths (Fleischmann et al., 2016). The global burden of sepsis is difficult to estimate, but according to a recent scientific publication, there were 48.9 million cases and 11 million sepsis-related deaths worldwide in 2017, accounting for nearly 20% of all global deaths (Rudd et al., 2020). In 2017, children accounted for nearly half of all global sepsis cases, with an estimated 20 million cases and 2.9 million global deaths in children under the age of five (Rudd et al., 2020). The studies found a significant frequency of septic shock among all sepsis patients, as well as a 50% death rate. The occurrence of the disease is increasing and the mortality rate is increasing rapidly when sepsis is detected and treated late at an early stage (World Health Organization Report, 2017).

The worldwide epidemiological burden of sepsis is also hard to achieve. Every year, more than 30 million people worldwide are projected to be affected, potentially leading to 6 million deaths (Fleischmann et al., 2016). In low-and middle-income nations, the burden of sepsis is most likely the greatest and raises the financial costs of care (Rudd et al., 2018).

Sepsis can progress to septic shock as characterized by vasodilatation related altered fluid volume, increased capillary permeability, and circulating volume mal-distribution in which certain organs (lungs, skin, kidneys) do not receive the blood they need (Dugar et al., 2020). Despite sufficient fluid resuscitation, septic shock is defined as hypotension-related sepsis with the presence of perfusion abnormalities such as, but not limited to, lactic acidosis, decreased urine output, or an abrupt change in mental state (Gyawali et al., 2019).Sepsis may be a clinical manifestation of infection acquired in healthcare facilities or both in the community environment (WHO Report, 2017).

Health-associated diseases acquired in all community environments in healthcare facilities, such as hospitals or emergency departments. Health-related infections are one of the most prevalent types of adverse events that occur during treatment delivery, affecting hundreds of millions of patients globally each year (WHO Report, 2017). Since these infections are frequently resistant to antibiotics, they can easily lead to health conditions and results worsening, Sepsis was first identified as a systemic inflammatory response syndrome (SIRS) that can occur from infectious and non-infectious stimuli and denotes systemic regardless of its cause. When a patient fit any of the four clinical criteria outlined by American College of Chest Physicians / Society of Critical Care Medicine (ACCP / SCCM), it is considered to be sepsis (Levy et al., 2003). Vital indicators (temperature, heart rate, and respiration rate) and leukocyte counts are among the criteria. The number of SIRS criteria represents the mortality rate: meeting three criteria or greater includes 9.5% mortality risk; two criteria or greater are 6.2%; (Tai et al., 2019). Different studies showed that educational experience would greatly increase levels of knowledge about procedures and ratings for early detection of sepsis. A clear assessment of sepsis protocols is needed for proper treatment of this status (Nucera et al., 2018).

Sepsis management consists of interventions using a critical care algorithmic, and specialized diagnostic equipment, aimed at rapid identification of sepsis in the emergency room, followed by rapid treatment of symptoms, while simultaneously finding an etiology for the infection (Mathenge et al., 2015). This recognition and intervention based on knowledge, attitudes, practices. The presence of appropriately used health products and technologies is necessary for hospitals. These include medication, monitoring equipment, and spaces that are used in the management of patients with sepsis.

The cost of treating sepsis exceeds the cost of treating patients with congestive heart failure and acute myocardial infarction. The total cost of sepsis includes not only the initial hospitalization but also the expenditures of post-discharge treatment, such as post-sepsis syndrome and cognitive and functional deficits, which demand considerable amounts of healthcare resources in the long term. Sepsis and its effects on patients and the US healthcare system are contemporary quality-of-life and cost-burden concerns that must be addressed with a greater emphasis (Hajj et al., 2018). Sepsis treatment might include fluid resuscitation, antibiotic therapy, source control treatments, vasoactive medicines, corticosteroids, blood products, and mechanical ventilation as necessary. The cost of each episode of sepsis is determined by the presence or absence of septic shock, as well as patient co-morbidities and other patient-specific variables. Sepsis is notoriously expensive to treat and has been related to an increased risk of readmission (Hajj et al., 2018).

Early sepsis management and therapy shortens hospital stays and lowers the 28-day death rate in patients with sepsis or septic shock (Madsen et al., 2014). Barriers of sepsis management include lack of interest in improving existing procedures, lack of awareness of the guideline, lack of understanding

of the guideline or medical condition, and contradictory instructions in the workplace (Reich et al., 2018). The barrier that remains with nursing personnel and the failure to understand sepsis Include insufficient use of the sepsis screening form at the time of triage, which is a nurse's first point of patient contact (Harley et al., 2019). In order to optimize and maximize outcomes for patients with sepsis, it is important to determine the level of knowledge, the level of expertise, attitude level, level of practice and overcome barriers to implementing treatment bundle with early detection of sepsis (Rahman et al., 2019).

Even though physicians have a good understanding of critical care algorithms, the influence of these algorithms continues to be significantly restricted by monitoring equipment. Different critical care algorithmic approaches require diagnostic equipment, many of which are missing in Sub-Saharan Africa (Mundy et al., 2003). A large health care institution has launched a new nurse training program in response to the sepsis epidemic. The training program provided nurses with the chance to participate in learning experiences that accelerated the development of skills and resources deemed required for the early diagnosis and treatment of sepsis patients (Delaney et al., 2015). Lack of knowledge and training, staff nursing, and difficulties finding sepsis patients in the ED are the main obstacles to sepsis management (Hung et al., 2018). A good level of understanding, attitude and practice with regard to sepsis protocols is therefore necessary for the management of this status to be corrected (Yousefi et al., 2012).

1.2 Problem Statement

Sepsis is a widespread issue that can create clinical and economic difficulties (Clinical Excellence Commission, 2014). In the United States, sepsis is the 10th highest cause of mortality (Melamed &

Sorvillo, 2009). Sepsis is a systematic illness caused by microbial our body's response to an infection that can lead to systemic inflammatory response syndrome (SIRS). Rapid diagnosis and access to proper treatment may decrease mortality and enhance patient outcomes, who are eventually admitted to the hospital (Berthelot et al., 2019).

Sepsis first symptom is a fever that is diagnosed usually first in emergency departments and in the emergency triage rooms. Moreover, sepsis in such a situation needs immediate management to avoid septic shock. The prompt and efficient treatment of sepsis accompanied by good practices and availability of equipment will help in avoiding septic shock's progress, which can lead to organ dysfunction associated with a significant mortality rate (Singer et al., 2016).

Sepsis management consists of a clinical rapid recognition done through healthcare providers' knowledge. Furthermore, while an etiology for the infection has been detected, it should be followed by rapid thinking and management (CDC, 2020).

No previous studies were conducted in Palestine related to this topic. Therefore, the current research project was to assess the level of knowledge, attitudes, practices, identify the biggest barriers related to the sepsis and sepsis management among emergency nurses and physicians and examine the association between the knowledge, attitudes, practices and social demographic characteristics among participants.

1.3 Significance of the Study

Sepsis is a global health condition that has a high mortality rate and, if not detected and treated early, can progress to septic shock and multiple organs dysfunction syndromes (MOD's) (Singer et al.,

2016). The prevention of sepsis-related hospital deaths remains a top aim in health care. Nurses with little knowledge and practice in sepsis care harm patient safety and survival outcomes. Different Studies found that the prognosis of this outcome becomes poor when the equipment unavailable and inadequate knowledge, attitude and practices toward sepsis and sepsis management (Mathenge et al., 2015).

Efficient knowledge, a positive attitude, and best practices in sepsis care by emergency nurses and physicians may help to enhance patient clinical outcomes and lower death or morbidity rates in Palestinian hospitals.

1.4 Research Aim

The main study goal was to assess the level of knowledge, attitudes, practices, identify the biggest barriers regarding to sepsis and sepsis management among emergency nurses and physicians, and examine the association between the knowledge, attitudes, practices and social demographic characteristics among participants.

1.5 Research Objectives

The study aims to:

1- Assess the knowledge of emergency nurses and physicians regarding sepsis and sepsis management in Palestinian hospitals.

2- Assess the attitude of emergency nurses and physicians regarding sepsis and sepsis management in Palestinian hospitals.

3- Assess the practices of emergency nurses and physicians regarding sepsis and sepsis management in Palestinian hospitals.

4- Identify the biggest barriers of emergency nurses and physicians regarding sepsis and sepsis management in Palestinian hospitals.

5- Examine the association between the knowledge of sepsis management and social demographic characteristics for both nurses and physicians in Palestinian hospitals.

6- Examine the association between the attitude of sepsis management and social demographic characteristics for both nurses and physicians in Palestinian hospitals.

7- Examine the association between the practices of sepsis management and social demographic characteristics for both nurses and physicians in Palestinian hospitals.

1.6 Research Question

1- What is the level of knowledge regarding sepsis and sepsis management among emergency nurses and physicians in Palestinian hospitals?

2- What is the level of attitudes regarding sepsis and sepsis management among emergency nurses and physicians in Palestinian hospitals?

3- What is the level of practice regarding sepsis and sepsis management among emergency nurses and physicians in Palestinian hospitals?

4- What is the biggest of barriers regarding sepsis and sepsis management among emergency nurses and physicians in Palestinian hospitals?

5- What is the association between the knowledge of sepsis management and social demographic characteristics in Palestinian hospitals?

6- What is the association between the attitude towards sepsis management and social demographic characteristics in Palestinian hospitals?

7- What is the association between the practices of sepsis management and social demographic characteristics in Palestinian hospitals?

1.7 Conceptual definition

Sepsis: Is a potentially fatal organ failure caused by an unbalanced host reaction to infection (Singer et al., 2016).

Sepsis management: It is an early resuscitation of intravenous fluids and administration of antibiotics (Kim et al., 2019).

Knowledge: Oxford dictionary defined Knowledge as the information, understanding, and skill earned through education and experience, in this instance knowledge pertaining to sepsis management (2010:827).

Attitude: Oxford dictionary Attitude as the way you think, feel, and react about something is referred to as your attitude, in this case, your approach toward sepsis management (2010:80).

Practices: Oxford dictionary defined Practice as doing something on a regular basis as part of your normal routine, in this instance learning about sepsis management (2010:1148).

Barriers: Oxford dictionary defined Barriers as Lack of confidence is a psychological obstacle to success in the management of sepsis (2010).

1.8 Operational definition

Sepsis: Infection (confirmed or suspected) with systemic evidence inflammatory response syndrome (SIRS), will be measured it when consisting of two or more SIRS criteria (Annane et al., 2005):

- Fever to more than 38 degrees Celsius or less than 36 degrees Celsius.
- A heart rhythm that exceeds 90 beats per minute.
- A respiratory rate greater than 20 breaths per minute or a partial pressure of carbon dioxide (PaCO2) less than 32mm Hg.
- Excessive white blood cell count (>12,000/L or < 4.000/L).

Sepsis management: It is an interventions, bundles, guidelines, pathway, care process, Screening and monitoring patients to measure clinical status of sepsis patient if need advance intervention or treatment (Gyawali et al., 2019).

Knowledge: It is a scale adapted from (Mathenge et al., 2015) and (Stamataki et al., 2013) to identify the level of Knowledge regarding sepsis and sepsis management, that is include 17 multiple choice questions.

Attitude: It is a scale is used for identify the level of Attitude regarding sepsis and sepsis management, that is include 9 items based on a5-point Likert Scale as this rate (1=strongly agree; 2= agree; 3= Natural; 4= disagree; strongly disagree) (Mathenge et al., 2015).

Practices: It is a scale is used for identify the level of practices regarding sepsis and sepsis management, that's include 14 items based on a 5-point Likert Scale as this rate (1=strongly agree; 2= agree; 3= Natural; 4= disagree; strongly disagree) (Mathenge et al., 2015).

Barriers: It is a scale is used for identify the level of barriers regarding sepsis and sepsis management, that's include 6 items based on a 5-point Likert Scale as this rate (1=strongly agree; 2= agree; 3= Natural; 4= disagree; strongly disagree) (Mathenge et al., 2015).

Chapter 2: Literature Review

2.1 Introduction

This chapter provides a summary of available research on sepsis linked to emergency nurses' and physicians' knowledge, attitudes, practices, and barriers in sepsis and sepsis management. The researcher chose to widen the scope of the literature study to include additional nations. By extending the literature study to other nations, the researcher was able to collect the most recent and up-to-date data on the subject. Furthermore, the literature research revealed that sepsis management is a development issue in the mentioned nations.

During the review. The review provides pertinent study findings on emergency nurses' and physicians' knowledge, attitudes, practices, and barriers to sepsis management. The goal of the literature study was to learn what is currently known regarding emergency nurses' and physicians' knowledge, attitudes, practices, and barriers in sepsis and sepsis management.

The literature evaluation examined the roles of emergency nurses and physicians in sepsis and sepsis management, as well as the implications of inadequate knowledge in sepsis and sepsis management. Furthermore, the influence of negative and positive attitudes toward sepsis and sepsis management, as well as emergency nurses’ and physicians’ awareness of the sepsis and sepsis management code of conduct, were examined.

2.2 literature review

The research identified key terms and variables in this case knowledge, attitudes, practices and barriers in sepsis and sepsis management among emergency nurses and physicians to perform a literature review. Electronic database such as PubMed was used for relevant articles and journals to perform a literature review.

2.2.1 Research topic definition

Sepsis: is a potentially fatal organ failure caused by an unbalanced host reaction to infection (Singer et al., 2016).

Septic shock: is a form of sepsis in which the underlying circulatory and cellular/metabolic defects are severe enough to increase mortality significantly (Singer et al., 2016). Hospital conditions for septic shock include sepsis and (despite proper volume resuscitation) all of the following:

- Persistent hypotension necessitating the use of vasopressors to keep MAP above or equal to 65 mmHg.
- Lactate concentrations greater than or equal to 2 mmol/L.

Systemic Inflammatory Response Syndrome (SIRS): A therapeutic reaction to a nonspecific provocation that may be contagious or noninfectious in nature. When two or more of the following clinical manifestations are present, SIRS conditions are met (Singer et al., 2016):

- Fever to more than 38 degrees Celsius or less than 36 degrees Celsius.
- A heart rhythm that exceeds 90 beats per minute.

- A respiratory rate greater than 20 breaths per minute or a partial pressure of carbon dioxide (PaCO2) less than 32mm Hg.
- Excessive white blood cell count (>12,000/L or < 4.000/L).

Sever sepsis: Sepsis along with organ dysfunction or tissue hypo-perfusion caused by sepsis. The following are early clinical examples of tissue hypo-perfusion (Hostchkiss et al., 2016):

- Hypotension is defined as a systolic blood pressure of 100 mmHg, a mean arterial pressure (MAP) of 65 mmHg, or a decrease of more than 40 mmHg from the normal reading.
- Lactate concentrations greater than 4 mmol/L.
- Altered mental status.
- Hyperglycemia without diabetes patients.

2.3 Pathophysiology of Sepsis

Sepsis is a nonlinear path physiologic mechanism characterized by the activation and dysregulation of innate immune system pro-inflammatory and anti-inflammatory responses, complement and coagulation processes, metabolic and hormonal alterations, cytopathic hypoxia, and epithelial and microcirculatory dysfunction. Because bacterial agents launch this chain of events in sepsis, shock-induced hypo perfusion and cellular hypoxia, as well as chemicals produced by host cell damage, amplify it. Organ failure in sepsis is now considered to include a variety of inflammatory responses, such as endothelial and micro vascular malfunction, immunological and autonomic dysregulation, and cellular metabolic reprogramming, rather than only decreased tissue oxygen supply. Sepsis is distinguished by the host's damaging "endothelial response," which leads to endotheliopathy and

molecular dysfunction. Complement activation results in the formation of a membrane attack complex, which causes endotheliopathy and the activation of two distinct molecular pathways: inflammatory and micro thrombotic. Hypotension is a common symptom of septic shock. While cardiac instability and hypovolemia lead to hypotension, the main mechanism is lack of vascular smooth muscle reactivity, which causes peripheral vasodilation. In sepsis, vasodilation is primarily mediated by two mechanisms: augmented nitric oxide (NO) and prostacyclin synthesis. End toxin activity with vascular endothelial cells induces a calcium-independent NO synthase, resulting in increased NO levels. Endothelial cells produce prostacyclin in response to endtoxin and inflammatory cytokines (Padilla et al., 2019).

2.4 Knowledge, attitudes, practices toward Sepsis and Sepsis management

A Greek study conducted in Greek tertiary hospitals were interviewed to evaluate nurses' knowledge regarding sepsis among 835 registered nurses (Stamataku et al., 2014). All participants completed a self-administered questionnaire that included a section for basic demographic characteristics of study participants and a second section with closed responses to assess nurses' knowledge of sepsis assessment and management. The outcomes are displayed in accordance with the following criteria:

Knowledge of systemic inflammatory response syndrome

The first set of questions tested participants' knowledge of the clinical characteristics of the systemic inflammatory response. Temperatures greater than 38oC or lower than 36oC were consistent with a systemic inflammatory response, according to 83.5% of research participants. Furthermore, 81.3% of those polled correctly recognized white blood cell count as a component of systemic inflammation. Similar correct answers were given for tachycardia and tachypnea by 49.9% and 46.3%, respectively.

The right responses for tachycardia and tachypnea were given by 49.9% and 46.3%, respectively. It is worth noting that substantial differences in tachycardia 65.6% vs. 45.4%and tachypnea 57.9% vs. 43.6%were found between nurses depending on educational level university vs. college, as well as elevated white blood cell count as systemic inflammatory symptoms 86.9% vs. 79.8%, respectively. Furthermore, there were substantial disparities in tachycardia amongst nurses based on their working units' ICU vs. non-ICU workers 60.7% vs. 47.7%.

Awareness of sepsis

79.4% nurses said that blood pressure less than 70 mmHg indicates septic shock. Furthermore, 70.9% correctly identified a reduction in urine output as a sign of severe sepsis, and 43.5% correctly identified a reduction in oxygen saturation as a sign of severe sepsis. However, the percentage of right responses about the significance of high plasma glucose and serum ferritin was low; 23.2% and 9.0%, respectively. It is worth noting that there were considerable disparities in the role of mean arterial blood pressure amongst nurses depending on their working environments ICU vs. non-ICU personnel: 85.5% vs. 78.1%.

Knowledge of sepsis

Approximately 57.2% of survey participants confessed to following current recommendations for the diagnosis and management of sepsis patients in their clinical practice. The overwhelming majority of participants 96.2% agreed that communication with other hospital employees regarding the sepsis patient should be immediate and accurate. In addition, 88.5% of nurses stated that antibiotic therapy started as soon as sepsis is identified. It's also worth mentioning that 54.6% of survey participants indicated they identified a septic patient based on the patient's degree of awareness. The majority of

nurses 85.7% agreed that diarrhea and vomiting are early warning indicators of sepsis. Furthermore, the majority of the participating nurses 96.5% stressed the relevance of current sepsis guidelines teaching programs. Higher-educated nurses, on the other hand, apply the new sepsis recommendations in everyday practice less than lower-educated nurses41.8% vs. 60.9%. It's worth mentioning that 90.4% of non-ICU professionals vs. 84.7% of ICU people agree that active engagement of nurses in medical care team conversations concerning sepsis is crucial. Furthermore, 96.2% of non-ICU workers vs. 93.1% of ICU professionals agree that it is vital to provide direct and exact information regarding sepsis to the rest of the medical team.

Descriptive study was conducted to investigate nurses' knowledge of sepsis prevention at neonatal care units in Hilla City hospitals (Hasan et al., 2020). A non-probability "purposive sample" of (50) neonatal care nurses was used. According to the study findings, 58% of female nurses between the ages of (21-25) graduated with a Diploma degree. The majority 70% had a good understanding of the nurses at Hilla City Hospital. Furthermore, education, years of employment, years of experience, and training course have all played a role in nurses' knowledge.

Cross-sectional, quasi-experimental study was conducted to study levels of knowledge and attitudes in management of sepsis among nurses and physicians employed at Fatebenefratelli hospital, Milano, North-Italy (Nucera et al., 2018). Physicians and nurses from the Intensive Care Unit ICU and non-ICU hospital wards were recruited. Participants in the research were asked to educational seminars and to submit a questionnaire based on the recommendations of the 2016 Surviving Sepsis Campaign after 6 months. Nurses and physicians reported "excellent" (> 75%) awareness of procedures that raise the risk of sepsis, "pretty" (50-75%) knowledge, attitudes, and behavior toward blood culture

techniques, and "poor" (50%) understanding of early detection, methods, and scores for diagnosis and management of sepsis.

Cross sectional study was conducted in an 860- bed tertiary teaching hospital in Malaysia to evaluate emergency clinician knowledge and attitudes on identification and management of SIRS and sepsis in a tertiary teaching hospital (Rahman et al., 2019). A validated questionnaire on SIRS/sepsis detection and management knowledge and attitude was delivered to 120 emergency workers. Overall, the findings demonstrated that emergency nurses and assistant medical officers had a reasonable understanding of numerous critical aspects of SIRS/sepsis detection and management. Because they concentrate inadequate focus on detecting patients with SIRS and sepsis, the majority of emergency staff has indifferent opinions. According to the current study, assistant medical officers and bachelor's degree holders with more than 5 years of emergency experience had the best knowledge of clinical criteria and SIRS/sepsis management. Positive attitudes are significantly correlated with an increase in knowledge of SIRS and sepsis.

Descriptive cross-sectional survey was conducted in a western Canadian city to assess emergency department registered nurses' knowledge of sepsis as well as their perspectives on caring for sepsis patients (Storozuk et al., 2019). An invitation email and three follow-up emails, each with an embedded survey link, were sent to all 758 registered nurses. During the 11-week data collecting period. The majority of nurses failed to answer questions about sepsis-related systemic inflammatory response syndrome characteristics, as well as sepsis definitions, general knowledge, and therapy. Nurses acknowledged a dearth of understanding and voiced a wish for further sepsis education. The challenges in delivering sepsis-associated treatment were attributed to perceived severe workloads

and clinical consequences connected to the patient's state.

Prospective, observational study was conducted in the Netherlands to explore the factors that impact ED nurses' knowledge and awareness of SIRS criteria and sepsis (van den Hengel et al., 2016). A validated questionnaire was employed. Our poll included 216 ED nurses from 11 different institutions, with a maximum potential score of 29, the average total score was 15.9. ED nurses at hospitals with a level 3 intensive care unit (ICU) outperformed those in facilities with a level 1 or 2 ICU. A higher score was connected with recent sepsis education completion. Employees in low-level ICU hospitals who claimed recent schooling performed no worse than their peers in ICU level 3. Compared to their younger counterparts, ED nurses over the age of 50 performed significantly worse.

Cross-sectional study was conducted in North America to describe pediatric emergency physicians' practice patterns in the recognition and management of sepsis in children, as well as to identify perceived priorities for future research and education. (Thompson & Macias, 2015). A web-based study of pediatric emergency doctors from around North America. Members of the AAP-SOEM and Pediatric Emergency Research Canada, two national Pediatric Emergency Medicine organizations, were asked to take part in the study (PERC). Overall results discovered Tachycardia, mental status abnormalities, and abnormal temperature were the top clinical measures for diagnosing sepsis, whereas white blood cell count, lactate, and band count were the top laboratory findings. The favored resuscitation fluid was normal saline 85.5%. Dopamine was the first-line vasoactive treatment for cold 57.1% and warm 42.2% shock, with epinephrine 18.5% and nor epinephrine 25.1% as second-line medications (cold and warm, respectively). As the presentation got more elaborate, steroid administration got increasingly challenging. Future priorities were described as local ED-specific

clinical pathways, national ED-specific guidelines, and the identification of clinical biomarkers.

Quasi-experimental interventional study was conducted in Shariati Hospital in Isfahan, Iran, to evaluate the effects of a sepsis education program on the knowledge, attitude, and practice of nurses in intensive care units (Yousefi et al., 2012). 64 ICU nurses with a minimum of one year of experience the individuals were picked at random and divided into two groups: test and control. A questionnaire developed by the researchers was used to measure participants' knowledge, attitude, and practice before to, immediately following, and three weeks after a one-day session. The mean knowledge, attitude, and practice scores of the groups were then compared. When compared to the baseline, there were substantial gains in mean knowledge, attitude, and practice scores in the test group immediately and three weeks following the course. Before, immediately after, and three weeks after the intervention, the mean knowledge scores in the test group were 64.5, 84.9, and 85.2, respectively. 73, 79.7, and 83.3 were the matching attitude values. Before, immediately after, and three weeks after the intervention, the mean practice scores were 81.8, 90.5, and 91.3, respectively. The mean knowledge scores of the control group before, immediately after, and three weeks after the educational course were 63.7, 63.9, and 63.5, respectively. The mean attitude ratings for the specified periods were 72.8, 73.3, and 73.2, respectively. In practice, the corresponding values were 82.1, 82.9, and 82.7.

KAP surveys study was conducted in Eldoret, Kenya to explore sepsis toward intervention practices among HCP’s (Mathenge et al, 2015). The participants were nurses, clinical officers and physicians working in the ICU, emergency and medicine departments. The study showed crystalloid fluids were the most common of fluid that used in the resuscitation of sepsis patients. 80% from the participants

uses drop count tool in the medicine and emergency departments. The most common of sepsis was respiratory tract infections and the most common antibiotics were Ceftriaxone /Flagyl toward sepsis management. 43% of participants reported requesting blood culture as the first inspection in patients with sepsis. Invasive catheters were mostly unavailable in the medicine and ICU departments. The most common barriers to sepsis management included shortage of staff, lack of antibiotics and advance patient presentation.

2.5 Barriers toward Sepsis and Sepsis management

The adverse effect of emergency department crowding on compliance with the resuscitation bundle in the management of severe sepsis and septic shock, (Shin et al., 2013). Is one of many studies undertaken at Samsung Medical Center to investigate the impact of ED crowding on the implementation of tasks in the early resuscitation bundle during acute treatment of patients with severe sepsis and septic shock, as suggested by the Surviving Sepsis Campaign guidelines. Data was acquired ahead of time (a 1,960 bed, university-affiliated, tertiary referral hospital with 70,000 annual ED visits in Seoul, South Korea). The trial included a total of 770 patients. There were 276 eligible patients in the low crowding group, 250 in the intermediate crowding group, and 244 in the high crowding group. The three groups' compliance rates vary dramatically 31.9% in the low crowding group, 24.4% in the intermediate crowding group, and 16.4% in the high crowding group. In a multivariate model, the high crowding group was associated with reduced compliance.

A study was conducted to assess the availability and functionality of resources and manpower for early detection and prompt management of sepsis in children at tertiary pediatric centers in Nigeria (Nwankwor et al., 2019).31 surveys were completed in 59 Federal Medical Centers and tertiary

hospitals in Nigeria. 26 of these were teaching hospitals while 5 were Federal Medical Centers. Result was showed the majority of hospitals (97%) reported adequate triage systems, only 60% follow some form of sepsis management protocols. There were no national consensus protocols for pediatric sepsis management. Over half of the respondents identified a poor access to healthcare services, failure to diagnose sepsis at referring institutions, lack of parental education, a lack of a definitive protocol and a lack of medical equipment for managing pediatric sepsis.

Cross-sectional study was conducted in a 60 bedded Emergency Department of an urban tertiary care teaching hospital in lower-middle-income country to assess knowledge, attitudes, practices, and perceived barriers of emergency healthcare providers regarding the management of sepsis and septic shock (Madiha Ismail et al., 2020).The research involved a total of 53 healthcare practitioners. The sepsis bundle was properly identified by 42 (79%) of the participants. Staff scarcity (62%) was the most prevalent obstacle to compliance with the sepsis bundle, followed by delayed patient presentation (58%) and overcrowding (42%). Furthermore, participants (60%) believed that greater staffing would enhance septic patient care, followed by sepsis awareness programs (23%) and a reduction in ED crowding (11%). The most prevalent impediments to sepsis care in this context were identified as staff shortages, delayed patient presentation, and ED congestion.

A study was conducted during 2014 to February 2015 that are aimed to create an educational sepsis-training program for ED nurses in emergency room setting (Davis-Patrick et al., 2017). 269 patient files were analyzed for data relevant to a sepsis diagnosis. According to the data, the ED nurse implemented the sepsis order in 19.4% (n = 103) of sepsis patients. The program featured a 2-hour instructional session on the signs and symptoms of sepsis, as well as guidelines from the Surviving

Sepsis Campaign and the Emergency Nurses' Association. Formative input on module content and the program assessment instrument was supplied by the professional practice director. The information was effective in training ED nurses on the signs and symptoms of early sepsis, according to director input. The ED director has now made completion of the training module and posttest mandatory for all ED nurses. The study has the potential to enhance emergency department staff detection of early sepsis as well as patient outcomes.

2.6 Summary

The available literature review suggests that knowledge, attitude, practices and barriers of emergency nurses and physicians in sepsis management. Nurses and physicians have a critical role in promoting evidence-based sepsis treatment approaches that maintain optimal care continuity. All nurses and physicians in all positions and situations may display sepsis management leadership by initiating appropriate and prompt sepsis treatment procedures utilizing their knowledge, skills, and judgment. Nurses' knowledge, attitudes, and practices influence sepsis management toward patients. Several difficulties have been mentioned, including a lack of understanding in sepsis management, impediments to sepsis management, inadequate procedures, and a negative attitude toward sepsis management.

2.7 Conclusion

An overview of the literature on the knowledge, attitude, practices, and barriers of emergency nurses and physicians in sepsis management was presented in this chapter on the difference of levels and feedbacks in different setting and there are many barriers that affect in the sepsis management like

educational training program, advance equipment's, overcrowding and shortage nurses. The following chapter goes over the research methodology used in this study.

Chapter 3: Research Methodology

3.1 Introduction

This chapter presents an overview of the research methodology that used for this study. It includes: Research design, Study sample, Setting of the study, Duration of the study, Source of data, Inclusion and Exclusion criteria, Sample size, Sample and Sampling process, Pilot study, Validity, Reliability, Data collection, Variables (Study measures), Ethical consideration, Analysis plan and Limitation of the study.

A sample of (243) Emergency Nurses and Physicians divided to 172 (70.8%) emergency nurses and 71 (29.2%) physicians, convenience sampling used, definition as recruited (every emergency nurse and physician whose age is (21years or more) and whose working in ED's.

3.2 Research design

The research design is defined as a process plan for how you intend to conduct the research. (Mouton, 2011). A quantitative, descriptive study was conducted to determine the level of knowledge, attitudes, practices, and Barriers of emergency nurses, and Physician's regarding Sepsis and Sepsis management in ED's in Palestine. Quantitative research is defined as an official, objective, and organized procedure for describing variables, examining their relationships, and testing cause and effect relationships among variables (Burns & Grove 2011). The descriptive study can provide information about the natural world based on status, behavior, attitude, and relationships (Brink, Van der Walt & Van Rensburg, 2012). The research design enabled the researcher to describe the data gathered. The researcher applied the research design by aiming at gathering data about knowledge,

attitudes, practices, and barriers of nurses in sepsis and sepsis management, describing it, as well as identifying barriers that lead to poor practices among emergency nurses' and Physicians' regarding sepsis and sepsis management. From here the recommendations for future practice.

3.3 Population

A research population is defined as a group of subjects or departments who share specific characteristics and meet the inclusion criteria, and from whom data can be collected (Burns & Grove 2005; Polit& Beck 2014; Rebar & Macnee 2011; Schneider & Fisher 2013). In this study, the target population was all nurses working in ED's at MOH in Palestine. The total population in these hospitals is 258 emergency nurses and 128 emergency Physicians.

3.4 Sample size

The sample size depended on response rate of both nurses and physicians working in the emergency department. Based on Raosoft online sample calculator the minimal sample size was 164, according this formula description:

$$SS = \frac{Z^2 * (p) * (1-p)}{c^2}$$

Where:

Z = Z value (e.g.,1.96 for 95% confidence level)

P = percentage picking a choice, expressed as decimal

(.5 used for sample size needed)

C = confidence interval, expressed as decimal

(e.g., .05 = ±5)

3.5 Setting of the study

The study conducted in emergency departments that's covered south, west and north of Palestine. (Alrazi Hospital, Jenin Hospital, Turkish Hospital, Alwatani Hospital, Specialized Arab Hospital, Rafidia Hospital, Thabet-Thabet Hospital, Al-Issra Hospital, Darwish Nazzal Hospital, Salfit Hospital, Palestine Medical Complex, Arab Rehabilitation Hospital, Beit Jala Hospital, Alkhalil Hospital, Al-Ahly Hospital, Jericho Hospital and An-Najah National University Hospital).These hospitals affiliated with the MOH and all of these hospitals have multiple departments provide emergency care for patients all over the West Bank.

3.6 Duration of the study

Ethical approval for this study was obtained on 6th Jan 2021. Protocol approval period: 6th Jan 2021 to 6th Jan 2022. Data was collected in the month of (February to May 2021) as indicated in the proposal. Data was analyzed in (6/2021). The final thesis was submitted for examination in (9/2021).

3.7 Instrumentation

Information was obtained from the nurses and physicians working in ED at government and private hospital in Palestine by Convenience sampling , aged from 21 year or more , through the survey was adapted from (Mathenge et al., 2015) ,(Stamataki et al., 2013) and was developed it (Appendix [1]). The original instrument was designed to assess the level of knowledge, attitudes, practices and

identify the biggest barriers regarding sepsis and sepsis Management among emergency nurses and physicians in Palestine across the Palestinian MOH. The compilation of the survey was done through literature review, consultation with supervisor and experts in the field of general medicine and specialist in internal medicine.

The survey consisted of 16 multiple choice questions for each question has a correct answer, depending on the international references (Appendix [1]) and 30 closed ended questions. It consisted of a Likert scale of strongly agree (1) or Always, agree (2) or Frequently, Natural (3) or Occasionally, disagree (4) or Rarely and Strongly Disagree or Never (5) to choose from, which provided greater uniformity of responses as such data was easily processed. A Likert scale is a type of psychometric response scale that is used in surveys to determine participants' level of agreement with certain statements (Brink, Van der Walt & Van Rensburg, 2012). The time frame to complete the questionnaire was (15-20) Minutes as observed during the pilot study.

The questionnaire consisted of 3 sections (Appendix [1]):

Section one (social demographic Data)

This includes:

- Gender.
- Age.
- Educational level.
- Years of experience in the emergency departments (ED's).
- Years of experience as a nurse/physician.

- Sepsis training and continual education.
- If follow a specific protocol/Guidelines in sepsis management.
- Percentage of shifts to deal with sepsis patients at the emergency department (ED).

Section Two

Includes questions on Knowledge, Attitudes, and Practices (KAP variables) related sepsis management. The survey consisted of Multiple-Choice Questions (MCQ) to assess participants 'overall knowledge was categorized based on (Seid et al., 2018) cut points, as **good** if the score was between 80 and 100%, **moderate** if the score was between 50 and 79%, and **poor** if the score was less than 50%. Also consisted of closed-ended questions based on Likert scale of strongly agree (1) or Always, agree (2) or Frequently, Natural (3) or occasionally, disagree (4) or rarely, and strongly disagree (5) or Never. A Likert scale is psychometric response scale used in survey to obtain participants degree of agreement with set statements and most correct answer (Brink, Van der Walt & Van Rensburg, 2012).

Section Three

Includes closed-ended questions on Barriers related sepsis management based on Likert scale.

The questions included in (Appendices):

- Questions that assess knowledge: 2.1.1 to 2.1.17.
- Questions that assess attitude: 2.2.1 to 2.2.9.
- Questions that assess Practices: 2.3.1 to 2.3.14.
- Questions that identify Barriers: 2.4.1 to 2.4.6.

3.8 Inclusion criteria

- Emergency Nurses and physicians are working in emergency department (ED) at governmental and private hospitals in Palestine.
- Aged from 21 years or more.
- Who have educational level such as Bachelor's degree, Master, PhD, High diploma, Diploma and other?
- Emergency nurses and physicians that have emergency department experience at least 6 months or greater than it.

3.9 Exclusion criteria

- Nurses and physician that are not working in emergency department (ED) at governmental and private hospitals in Palestine.
- Nursing students.
- Part-time Job.
- Aged less than 21 years.
- Emergency nurses and physicians that have emergency department experience less than 6 months and whose newly transfer from other departments to emergency rooms.
- New employees.

3.10 Sample and Sampling

There is one type of sampling design: non-probability. When using non-probability sampling, the researcher chooses participants based on who is most appropriate and representative of the population

of interest. Convenience sampling was used in this study, which is a type of non-probability sampling strategy that is also used in quantitative approaches. The choice of this type of sampling within the study was based on its ease of access to participants; however, the disadvantage of this sampling is that it limits the ability to generalize. Using this method, the researcher selects the necessary sample while keeping in mind the need to include certain criteria and elements within the study. As a result, gathering data from those affected by the problem was critical. As a result, eligible emergency nurses and physicians were invited to participate in this study.

3.11 Pilot Study

A pilot study conducted on 10 Emergency nurses and 10 emergency physicians, they filled the questionnaire before starting the whole data collection as a pre-test to point out weaknesses in wording, predicted response rate, determined the real time needed to fill the questionnaire and identified areas of vagueness and to test the validity and suitability of the questionnaire. The questionnaires evaluated by 2 internal medicine specialists assess the validity of the questionnaire, comments and modifications applied as needed. The filling of the questionnaires takes the same of recommended time, but 15-20 minutes in emergency department is too much for nurses to leave their patients due to high number of items in questionnaire and the workload, so recommended to fill it in the holiday or in the break shift.

3.12 Validity

After constructing the questionnaire, it reviewed by experts, to judge face and content validity, and to get feedback and comments.

3.13 Reliability

The reliability of the questionnaire tested immediately after data cleaning and pilot study and statistically by Cronbach Alpha test with accepted reliability coefficient not less than 0.7. The reliability improved by standardization of the instrument and its implementation, design of questionnaire manual and data collection collected by the researcher himself.

Table 3.13.1: Reliabilities estimates for domains after pilot study:

Domains	Items	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items
Knowledge	15 items	.508	.500
Attitude	10 items	.780	.932
Practice	15 items	.765	.936

The reliability test was calculated for three domains (Knowledge, Attitude and Practices) after finished the collection of data from all participants and analyzed by SPSS, it showed that Cronbach 's Alpha equal (0.5) for the Knowledge questions and (0.7) for the total Attitude and Practice questions. Because of limited number of studies sample the pilot participants were add to the study sample.

3.14 Data Collection

Burns and Grove (2011) define data collection as the identification of subject and the precise, systemic collecting of data related to the research aim or the specific objectives, or research questions. Utilized a self-developed validated Close-ended and MCQ survey (Appendices [1]) to

collect data. The timeline for collecting data was (from 9th February to 10th May 2021) as indicated in the study time frame. Collected the data with the help of a qualified health care provider as a field worker. Distribution of Surveys to identified participants for the main study was by hand. The researcher and fieldworker in ED waited for the participants to complete the surveys when were they work-off and break period, that's at nearly ended of morning and beginning of evening shifts after informed me previously by coordination, which improved the response rate. (243) surveys that were distributed and (243) were returned. Therefore, the response rate was (66.67%) for emergency nurses and (55.46%) for physicians according target of population.

3.15 Variables (Study measures)

Dependent variable	Independent variable
Knowledge of sepsis management	Age
Attitude of sepsis management	Gender
Practices of sepsis management	Educational level
Barriers of sepsis management	Years' experience in hospital
	Years' experience in ED's
	Training and continual education about sepsis management
	Protocols /Guidelines about sepsis management
	The percentage of shifts that participants dealt with sepsis patients in ED

3.16 Ethical consideration

Ethical reviewing and approval for this study was taken by the Health Research Ethics Committee of the AAUP, from the Palestinian MOH and of the hospitals administrators where the study conducted.

Also, Helsinki committee for ethical approval has decided to approve the research study, by Palestinian health research council.

3.17 Analysis Plan

In this study, statistical analysis of the collected data was conducted using the statistical package for the social science (SPSS) version 23. SPSS is a software package will be used for conducting statistical analysis, manipulating data and generating tables and graphs by using descriptive and inferential statistics such as frequency tables, relative frequencies, graphically illustrated by will be use bar charts. Means and standard deviations will be use to summarize data. So, the Surveys result was entered directly into the database and then data cleaning was conducted. This enabled the identification existence of potentially statistically significant correlations between the relevant variables.

Chapter Four: Results

4.1 Introduction

The current thesis project aimed to assess the level of the knowledge of emergency nurses and physicians regarding sepsis management in Palestinian hospitals, the attitude of emergency nurses and physicians regarding sepsis and sepsis management in Palestinian hospitals, the practices of emergency nurses and physicians regarding sepsis management in Palestinian hospitals. Moreover, the identify of biggest barriers from point of view of emergency nurses and physicians regarding sepsis and sepsis management in Palestinian hospitals.

Finally, the association between the knowledge, attitude, and practices of sepsis and sepsis management and social demographic characteristics for both nurses and physicians were examined.

4.2 Demographic and characteristics of the study participants

Looking at the personal characteristics of the participants in the study, we find that the majority (78.6%) of them were males, in the age group between 21-30 years (58.8%), and 179(73.7%) held a university bachelor's degree. These characteristics, although they were slightly variant among nurses and physicians, but this disparity was not statistically significant except in terms of educational level ($p<0.001$).

As for the experiences of the participants, the majority (139, 57.2%) of the participating nurses and physicians (58.7% & 53.5%) had less than three years of experience in the emergency room, and a few of them (7%) had more than ten years of experience in the emergency department, while their work experience was generally less than 5 years for half of the participants, and there was no statistically significant difference ($p >0.05$) between nurses and physicians due to years of experience.

As for continuing education and training about dealing with sepsis cases, the results, unfortunately, showed that up to 60% of nurses and physicians did not receive any kind of training or education related to those sepsis cases, and few of them received information either through workshops in the emergency department (25.5%), courses (10.3%) or through online electronic sources (7%).

As for the existence of international protocols or guidelines adopted in emergency departments, the results have reflected, unfortunately, the absence of such protocols or guidelines adopted to deal with sepsis cases, but very few physicians (2.8%) answered that they use such protocols or guidelines received from international institutions such as the CDC or others despite the fact that a relatively high number of physicians and nurses indicated that the rate of dealing with these cases reaches more than 30%.

Table 1: Demographic and characteristics of the study participants

			Group			
		Total No. (N%)	**Nurse No. (N%)**	**Physician No. (N%)**	***X²***	***Sig.***
Gender	Male	191(78.6%)	134(77.9%)	57(80.3%)	.168	.681
	Female	52(21.4%)	38(22.1%)	14(19.7%)		
Age (years)	21-29	143(58.8%)	103(59.9%)	40(56.3%)	2.58	.460
	30-39	82(33.7%)	54(31.4%)	28(39.4%)		
	40-49	17(7.0%)	14(8.1%)	3(4.2%)		
	≥50	1(0.4%)	1(0.6%)	0(0.0%)		
Educational level	Diploma	38(15.6%)	38(22.1%)	0(0.0%)	41.5	<.001
	Bachelor's Degree	179(73.7%)	113(65.7%)	66(93.0%)		
	High Diploma	5(2.1%)	5(2.9%)	0(0.0%)		

	Master Degree	16(6.6%)	16(9.3%)	0(0.0%)		
	Palestinian Board	5(2.1%)	0(0.0%)	5(7.0%)		
ED Experience	< 3 Years	139(57.2%)	101(58.7%)	38(53.5%)	10.5	.015
	3 to<5 Years	55(22.6%)	31(18.0%)	24(33.8%)		
	5 to<10 Years	32(13.2%)	24(14.0%)	8(11.3%)		
	≥ 10 Years	17(7.0%)	16(9.3%)	1(1.4%)		
Work experience	< 5 Years	137(56.4%)	91(52.9%)	46(64.8%)	4.11	.249
	5 to<10years	68(28.0%)	50(29.1%)	18(25.4%)		
	10 to <15 Years	28(11.5%)	22(12.8%)	6(8.5%)		
	≥ 15 Years	10(4.1%)	9(5.2%)	1(1.4%)		
Sepsis training & CE	Emergency Workshop	62(25.5%)	42(24.4%)	20(28.2%)	3.91	.418
	Sepsis in Primary Care Course	25(10.3%)	16(9.3%)	9(12.7%)		
	Online Education	17(7.0%)	12(7.0%)	5(7.0%)		
	Residency Program	1(0.4%)	0(0.0%)	1(1.4%)		
	None	138(56.8%)	102(59.3%)	36(50.7%)		
Follow a specific sepsis Management Protocol/Guide line	CDC Guidelines	3(1.2%)	0(0.0%)	3(4.2%)	17.4	.001
	Surviving Sepsis Campaign (SSC)	2(0.8%)	0(0.0%)	2(2.8%)		
	Sofa Score	2(0.8%)	0(0.0%)	2(2.8%)		
	No	236(97.1%)	172(100.0%)	64(90.1%)		
Deal with sepsis patients at ED (%)	< 10%	91(37.4%)	67(39.0%)	24(33.8%)	6.31	.177
	10-30%	79(32.5%)	58(33.7%)	21(29.6%)		
	31-50%	56(23.0%)	33(19.2%)	23(32.4%)		
	51-70%	13(5.3%)	10(5.8%)	3 (4.2%)		
	>70%	4(1.6%)	4(2.3%)	0(0.0%)		

ED: Emergency Department

4.3 The level of knowledge about sepsis and sepsis management among nurses and physicians

Histogram in figure 1 reflects that the level of knowledge about sepsis between both nurses and physicians is, unfortunately, weak, as the average knowledge rate for nurses is 49.8, while for physicians is 51.3 out of 100, and this small difference between their knowledge level did not make any statistically significant difference (p= 0.43).

It turned out that nearly 70% of the nurses had a knowledge level rate of between 36 to 63 out of 100, while the 70 % of physicians had a knowledge level rate of between 36 to 63 out of 100, and this reflects that the participants had a weak level of knowledge about sepsis and sepsis management.

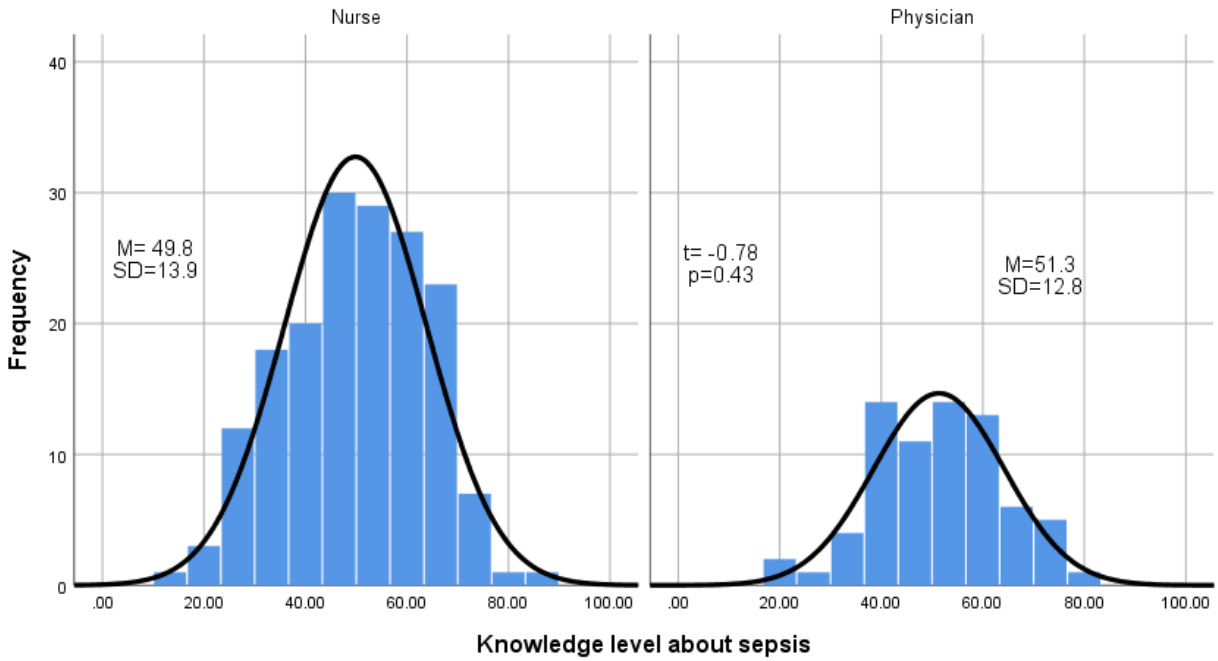


Figure 1: knowledge level about sepsis and sepsis management among nurses and physicians

Table 2 and figure 2 reflects that majority of both nurses and physicians had poor (47.7%) to moderate (51.0%) knowledge level about sepsis while just (1.2 %) of them had good knowledge level about sepsis. The average knowledge rate (poor, moderate, & good) for nurses (48.8%, 50.0% & 1.2%) is slightly lower than average knowledge level of physicians (45.1%, 53.5% & 1.4%), and this small difference between their knowledge level did not make any statistically significant difference (p= 0.86).

Table 2: The level of knowledge about sepsis and sepsis management among nurses and physicians

		Total No. (N%)	**Nurse (n=172)**	**Physician (n=71)**	***X²***	***Sig.***
Knowledge	**Poor**	116(47.7%)	84(48.8%)	32(45.1%)	0.29	0.86
	Moderate	124(51.0%)	86(50.0%)	38(53.5%)		
	Good	3(1.2%)	2(1.2%)	1(1.4%)		

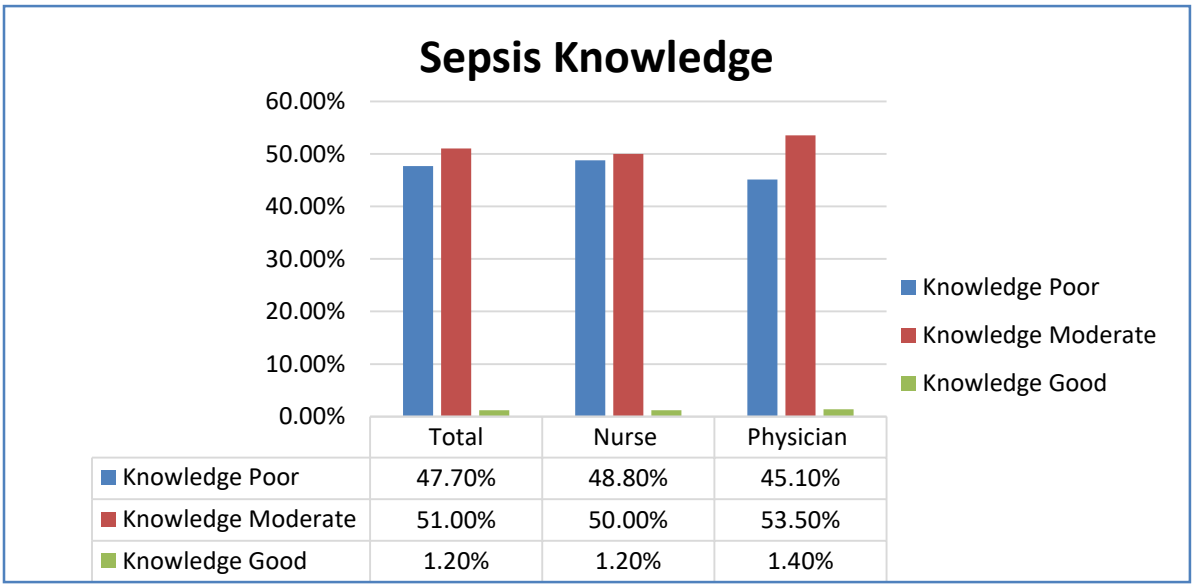


Figure 2: The level of knowledge about sepsis and sepsis management among nurses and physicians

4.3.1 Knowledge related to definition and cause of sepsis among nurses and physicians

When the participants were asked about the most common route that cause infection, 41.6% (40.1% nurses&45.1% physicians) of them answered correctly that the respiratory system is the most common cause of infectious, as well as 60.9% (58.7% nurses & 66.2% physicians) of them knew the definition of systemic inflammatory response and 67.9% (65.7% nurses &73.2% physicians) of them know the correct definition of Sepsis: the presence of infection with 2 SIRS criteria. There were no statistically significant differences between nurses and physicians related knowledge level of definition and cause of sepsis (p values > 0.05).

Table 3: Knowledge related to definition and cause of sepsis among nurses and physicians

			Group	
		Total No. (N%)	**Nurse No. (N%)**	**Physician No. (N%)**
Most common cause of infection in septic patients	**Respiratory ***	**101(41.6%)**	**69(40.1%)**	**32(45.1%)**
	CNS	11(4.5%)	8(4.7%)	3(4.2%)
	Intra-abdominal	17(7.0%)	15(8.7%)	2(2.8%)
	MS & skin	9(3.7%)	5(2.9%)	4(5.6%)
	Urinary	105(43.2%)	75(43.6%)	30(42.3%)
Definition of systemic inflammatory response	**All of the above***	**148(60.9%)**	**101(58.7%)**	**47(66.2%)**
	Temperature >38°C or <36°C	44(18.1%)	34(19.8%)	10(14.1%)
	Tachycardia	21(8.6%)	17(9.9%)	4(5.6%)
	Tachypnea	6(2.5%)	4(2.3%)	2(2.8%)
	WBC >12,000 or < 4,000/mm3	24(9.9%)	16(9.3%)	8(11.3%)
Sepsis definition: the presence of infection with 2 SIRS criteria.	**TRUE***	**165(67.9%)**	**113(65.7%)**	**52(73.2%)**
	FALSE	78(32.1%)	59(34.3%)	19(26.8%)

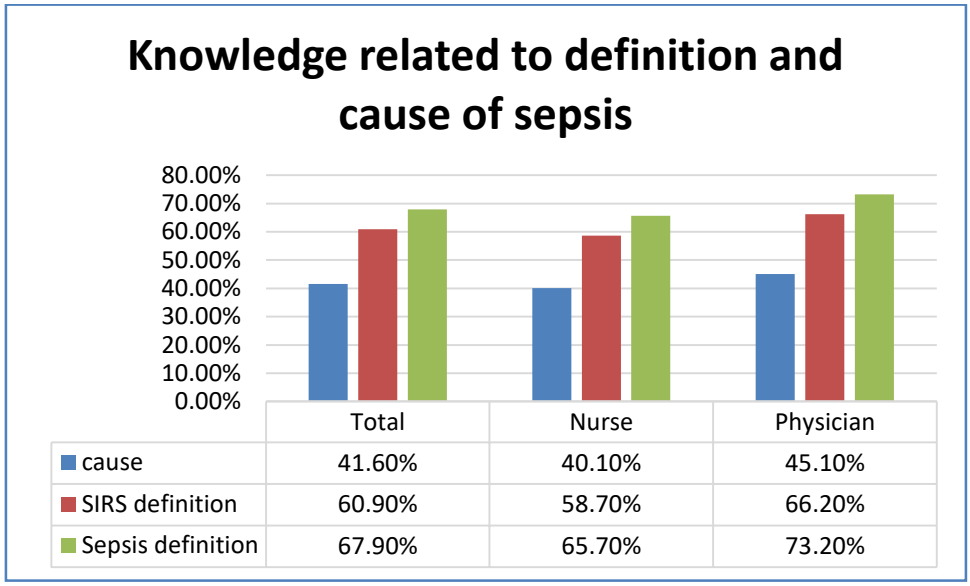


Figure 3: Knowledge related to definition and cause of sepsis among nurses and physicians

4.3.2 Nurses and physicians' knowledge level related to monitoring lactate, scoring and hemodynamic parameters for sepsis

When the participants were asked about the monitoring of sepsis, 33.3% (34.9% nurses &29.6% physicians) of them answered correctly that the time elapses before a lactate test is performed is 31-60 minutes for those patients with symptoms suggest sepsis, as well as 39.1% (39.0% nurses &39.4% physicians) of them knew that lactate threshold 4 indicates that your patients are in sepsis and 51.0% (47.1% nurses & 60.6% physicians) of them know that at least once every 30 minutes in the ED the BP, RR, SPO2, JVP and mental status of a septic patient should be measured. This low level of knowledge is expected as 41% (48.8% nurses & 23.9% physicians) stated that the scoring assessing system for sepsis is not used in daily practice in their working place. Moreover, there were no statistically significant differences between nurses and physicians related knowledge level of monitoring lactate, scoring and hemodynamic parameters of sepsis (p values > 0.05).

Table 4: Knowledge related to monitoring lactate, scoring and hemodynamic parameters of sepsis among nurses and physicians

			Group	
		Total No. (N%)	**Nurse No. (N%)**	**Physician No. (N%)**
Patient with symptoms suggest sepsis. the time (minutes)elapses before a lactate test are performed is:	0-30	69(28.4%)	50(29.1%)	19(26.8%)
	31– 60*	**81(33.3%)**	**60(34.9%)**	**21(29.6%)**
	61– 120	49(20.2%)	30(17.4%)	19(26.8%)
	121– 180	11(4.5%)	7(4.1%)	4(5.6%)
	181– 240	2(0.8%)	2(1.2%)	0 (0.0%)
	Not typically performed	31(12.8%)	23(13.4%)	8(11.3%)
The lactate threshold which indicates that your patients are septic is:	**4 mmol/L***	**95(39.1%)**	**67(39.0%)**	**28(39.4%)**
	< 2 mmol/L	20(8.2%)	16(9.3%)	4(5.6%)
	2 mmol/L	77(31.7%)	56(32.6%)	21(29.6%)
	< 4 mmol/L	51 (21.0%)	33(19.2%)	18(25.4%)
How often in the ED in taking the BP, RR, SPO2, JVP and mental status of a septic patient. At least once every:	**30 minutes***	**124(51.0%)**	**81(47.1%)**	**43(60.6%)**
	1 hour	85(35.0%)	63(36.6%)	22(31.0%)
	2 hours	16(6.6%)	14(8.1%)	2(2.8%)
	3 hours	18(7.4%)	14(8.1%)	4(5.6%)
The scoring assessing system for sepsis is used in daily practice in my working place.	False	142(58.4%)	88(51.2%)	54(76.1%)
	True	101(41.6%)	84(48.8%)	17(23.9%)

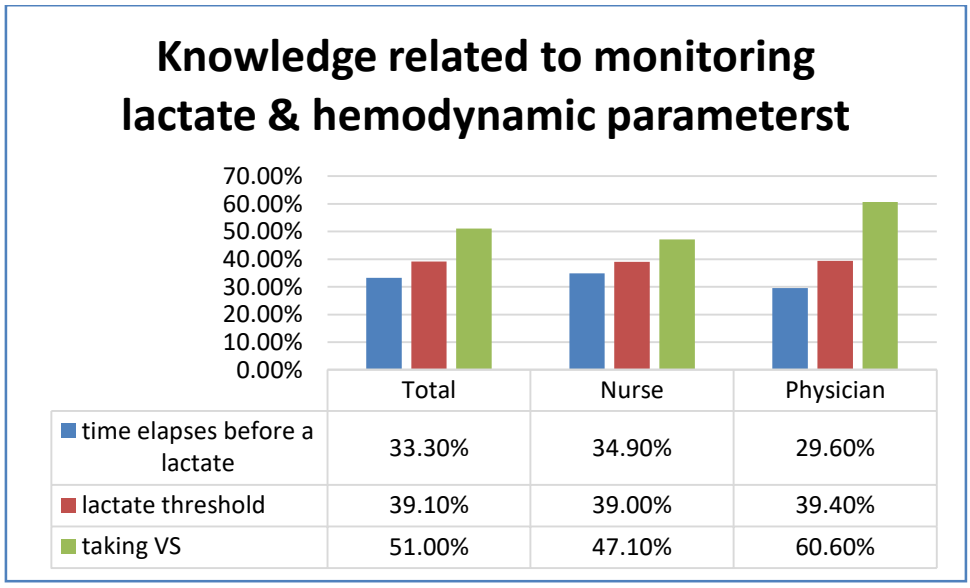


Figure 4: Knowledge related to monitoring lactate, scoring and hemodynamic parameters

4.3.3 Knowledge related to sepsis and sepsis management

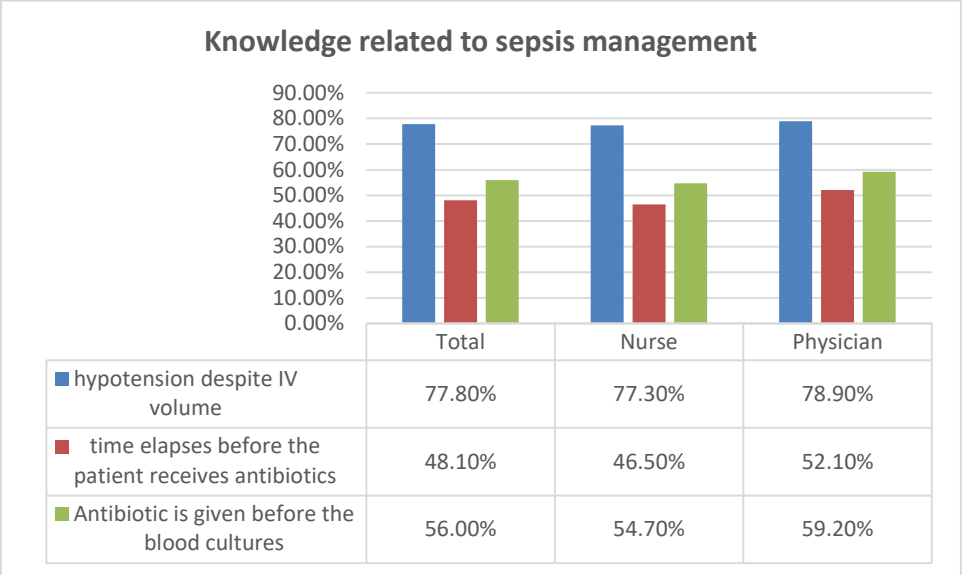
Out of total participants, 77.8% (77.3% nurses & 78.9% physicians) of them answered correctly that the patients in septic shock may had hypotension despite IV volume restoration with fluids, as well as 48.1% (46.5% nurses & 52.1% physicians) of them knew that within 31-60 minutes the patient should receive antibiotics if he has symptoms suggestive sepsis in the ER.

Furthermore, 56.0% (54.7% nurses & 59.2% physicians) of them know that blood cultures are collected before given Antibiotic. Although the level of knowledge related to relate to sepsis management is higher relatively than knowledge related to other aspects as causes, monitoring but it is still below the acceptable level.

There were no statistically significant differences between nurses and physicians related knowledge level of sepsis management of sepsis (*p* values > 0.05).

Table 5: Knowledge related to sepsis and sepsis management among nurses and physicians

			Group	
		Total No. (N%)	**Nurse No. (N%)**	**Physician No. (N%)**
Septic shock patients have hypotension despite IV fluids volume restoration.	**True***	**189(77.8%)**	**133(77.3%)**	**56(78.9%)**
	False	54(22.2%)	39(22.7%)	15(21.1%)
In patient with symptoms suggestive sepsis, the ER time (minutes)elapses before the he receives antibiotics is:	0-30	70(28.8%)	52(30.2%)	18(25.4%)
	31 – 60*	**117(48.1%)**	**80(46.5%)**	**37(52.1%)**
	61– 120	44(18.1%)	31(18.0%)	13(18.3%)
	121 – 180	8(3.3%)	6(3.5%)	2(2.8%)
	181– 240	4(1.6%)	3(1.7%)	1(1.4%)
Antibiotic is given before the blood cultures are collected	**False***	**136 (56.0%)**	**94(54.7%)**	**42(59.2%)**
	True	107(44.0%)	78(45.3%)	29(40.8%)



	Total	Nurse	Physician
hypotension despite IV volume	77.80%	77.30%	78.90%
time elapses before the patient receives antibiotics	48.10%	46.50%	52.10%
Antibiotic is given before the blood cultures	56.00%	54.70%	59.20%

Figure 5: Knowledge related to sepsis and sepsis management

4.3.4 Knowledge related to early detection and diagnosis of sepsis and sepsis management among nurses and physicians

Regarding the knowledge related to early detection and diagnosis of sepsis among nurses and physicians, 43.2% (39.0% nurses & 53.5% physicians) of them answered correctly that fall in MAP < 70mmHg increases the suspicion of sepsis, as well as 62.1% (59.9% nurses & 67.6% physicians) of them knew that vomiting, diarrhea, gastroparesis, ileum may be an early sign of organ dysfunction.

Furthermore, nurses and physicians' participants considered patient has septic syndrome, when the patient developed LOC alters (58.8% [59.9% nurses & 56.3% physicians]), hyperglycemia (>7.7 mmol/L) in the absence of diabetes (46.5% [42.9% nurses & 52.1% physicians]).

Also, 48.6% (47.7% nurses & 50.7% physicians) of nurses and physicians considered WBC count of 4*109/L doesn't meet diagnostic criteria for sepsis, and 67.9% (70.3% nurses & 62.0% physicians) expected that the level of SPO2 on sepsis patients are less than 90%.

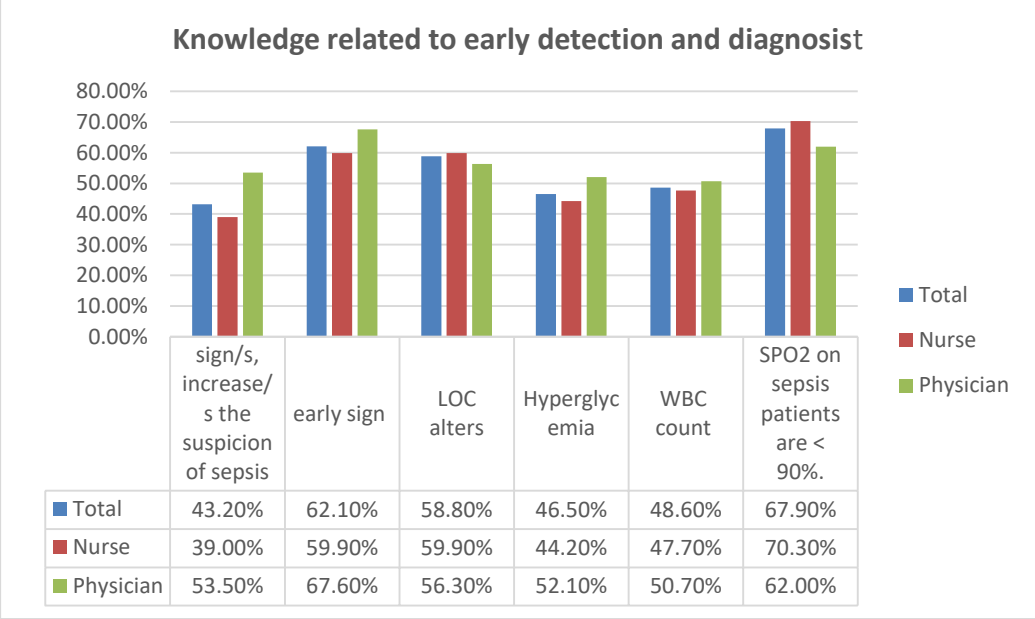
There were no statistically significant differences between nurses and physicians related knowledge level of early detection and diagnosis of sepsis of sepsis (p values > 0.05).

Table 6: Knowledge related to early detection and diagnosis of sepsis among nurses and physicians

			Group	
		Total No. (N%)	**Nurse No. (N%)**	**Physician No. (N%)**
Which sign/s, increase/s the suspicion of sepsis?	**Fall in MAP <70mmHg***	**105(43.2%)**	**67(39.0%)**	**38(53.5%)**
	Blood glucose >120 mg	36(14.8%)	27(15.7%)	9(12.7%)
	Increased Fe & S. ferritin	14(5.8%)	12(7.0%)	2(2.8%)
	Oxygen saturation's fall	24(9.9%)	20(11.6%)	4(5.6%)
	Reduction of hourly UOP	64(26.3%)	46(26.7%)	18(25.4%)
Vomiting, diarrhea, gastroparesis, ileum may be an early sign of organ dysfunction.	**True***	**151(62.1%)**	**103(59.9%)**	**48(67.6%)**
	False	92(37.9%)	69(40.1%)	23(32.4%)
I consider patient has the septic syndrome, when the LOC alters.	**True***	**143(58.8%)**	**103(59.9%)**	**40(56.3%)**
	False	100(41.2%)	69(40.1%)	31(43.7%)
Hyperglycemia (>7.7 mmol/L) in the absence of diabetes meets the diagnostic criteria for sepsis.	**True***	**113(46.5%)**	**76(44.2%)**	**37(52.1%)**
	False	130(53.5%)	96(55.8%)	34(47.9%)
WBC count of 4*109/L meets diagnostic criteria for sepsis.	**False***	**118(48.6%)**	**82(47.7%)**	**36(50.7%)**
	True	125(51.4%)	90(52.3%)	35(49.3%)
	True*	**165(67.9%)**	**121(70.3%)**	**44(62.0%)**

The level of SPO2 on sepsis patients are < 90%.	False	78(32.1%)	51(29.7%)	27(38.0%)

WBC: White cell count; **ED**: Emergency Department; *= True answer



	sign/s, increase/ s the suspicion of sepsis	early sign	LOC alters	Hyperglyc emia	WBC count	SPO2 on sepsis patients are < 90%.
Total	43.20%	62.10%	58.80%	46.50%	48.60%	67.90%
Nurse	39.00%	59.90%	59.90%	44.20%	47.70%	70.30%
Physician	53.50%	67.60%	56.30%	52.10%	50.70%	62.00%

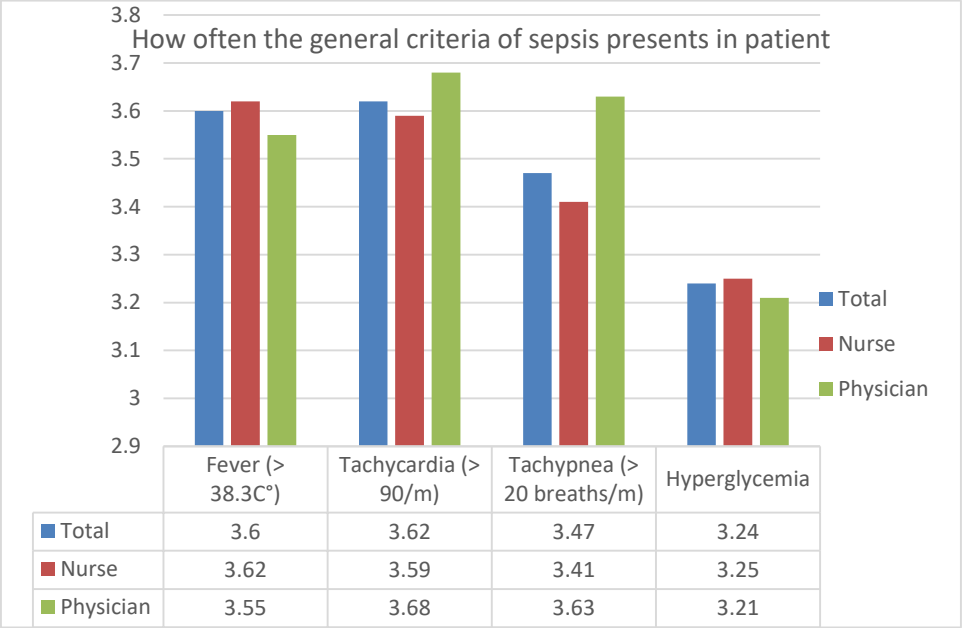
Figure 6: Knowledge related to early detection and diagnosis of sepsis among nurses and physicians

4.3.5 General diagnostic criteria for sepsis

The results showed that the highest symptom appeared on the patients with whom the study participants dealt with is tachycardia (mean= 3.62), then high temperature (mean= 3.60), and then tachypnea (mean=3.47), while high blood sugar (hyperglycemia) was relatively less apparent (mean= 3.24) comparing with the previous symptoms.

Table 7: The frequencies of general diagnostic criteria for sepsis (symptoms or signs found in your patients who have sepsis)

			Group	
		Total No. (N%)	**Nurse No. (N%)**	**Physician No. (N%)**
Fever (> 38.3C°)	Never	17(7.0%)	16(9.3%)	1(1.4%)
	Rarely	22(9.1%)	16(9.3%)	6(8.5%)
	Occasionally	49(20.2%)	27(15.7%)	22(31.0%)
	Frequently	109(44.9%)	72(41.9%)	37(52.1%)
	Always	46(18.9%)	41(23.8%)	5(7.0%)
Mean (SD)		***3.60 (1.10)***	***3.62(1.21)***	***3.55(.80)***
Tachycardia (> 90/m)	Never	5(2.1%)	4(2.3%)	1(1.4%)
	Rarely	24(9.9%)	20(11.6%)	4(5.6%)
	Occasionally	65(26.7%)	46(26.7%)	19(26.8%)
	Frequently	114(46.9%)	74(43.0%)	40(56.3%)
	Always	35(14.4%)	28(16.3%)	7(9.9%)
Mean (SD)		***3.62(.92)***	***3.59(.97)***	***3.68(.78)***
Tachypnea (> 20 breaths/m)	Never	15(6.2%)	15(8.7%)	0(0.0%)
	Rarely	24(9.9%)	20(11.6%)	4(5.6%)
	Occasionally	71(29.2%)	46(26.7%)	25(35.2%)
	Frequently	97(39.9%)	62(36.0%)	35(49.3%)
	Always	36(14.8%)	29(16.9%)	7(9.9%)
Mean (SD)		***3.47(1.05)***	***3.41(1.15)***	***3.63(.74)***
Hyperglycemia	Never	14(5.8%)	12(7.0%)	2(2.8%)
	Rarely	48(19.8%)	34(19.8%)	14(19.7%)
	Occasionally	75(30.9%)	46(26.7%)	29(40.8%)
	Frequently	78(32.1%)	59(34.3%)	19(26.8%)
	Always	28(11.5%)	21(12.2%)	7(9.9%)
Mean (SD)		***3.24(1.07)***	***3.25(1.11)***	***3.21(.97)***



	Fever (> 38.3C°)	Tachycardia (> 90/m)	Tachypnea (> 20 breaths/m)	Hyperglycemia
Total	3.6	3.62	3.47	3.24
Nurse	3.62	3.59	3.41	3.25
Physician	3.55	3.68	3.63	3.21

Figure 7: The frequencies of general diagnostic criteria for sepsis found in patients

4.3.6 Participants' demographics variables and their level of Knowledge related to sepsis and sepsis management

Although there were some small differences in the means of knowledge level about sepsis and sepsis management, none of the demographic and characteristics variables of both nurses and physicians had any statistically significant (*p* values> 0.05) relationship with their level of knowledge about sepsis and sepsis management.

Table 8: Participants' demographics variables and their level of Knowledge related to sepsis and sepsis management

			Knowledge			
Variable	**Categories**	**N**	**Mean**	**SD**	**F/ t**	**Sig.**
Group	Nurse	172	7.47	2.09	t = -.78	.43
	Physician	71	7.70	1.93		
Gender	Male	191	7.57	2.08	t =.47	.63
	Female	52	7.42	1.93		
Age (years)	21-29 years	143	7.55	1.96	F=1.01	.38
	30-39	82	7.55	2.05		
	40-49	17	7.65	2.71		

	≥50	1	4.00	.		
Educational level	Diploma	38	7.16	2.33	F=1.29	.27
	Bachelor's Degree	179	7.64	2.00		
	High Diploma	5	6.00	1.87		
	Master Degree	16	7.69	1.99		
	Palestinian Board	5	8.20	1.10		
ED Experience	< 3 years	139	7.76	1.91	F=1.93 1	.125
	3 to<5 years	55	7.29	2.26		
	5 to<10 years	32	6.91	1.82		
	≥ 10 years	17	7.76	2.63		
Work experience	< 5 years	137	7.59	1.93	F=.336	.799
	5 to<10years	68	7.37	2.06		
	10 to <15 years	28	7.79	2.60		
	≥ 15 years	10	7.40	2.01		
Sepsis training & CE	Emergency workshop	62	7.58	2.14	F=.779	.540
	Sepsis in primary care course	25	7.20	1.44		
	Online education	17	6.88	2.45		
	Residency program	1	7.00	.		
	None	138	7.67	2.05		
Follow a specific Management sepsis Protocol/ Guidelines	CDC guidelines	3	7.00	1.73	F=.387	.762
	SSC	2	6.50	2.12		
	SOFA Score	2	8.50	0.71		
	No	236	7.55	2.06		
Deal with sepsis patients at the ED (%)	< 10% of shifts	91	7.70	2.02	F=1.36 9	.245
	10-30% of shifts	79	7.27	2.06		
	31-50% of shifts	56	7.59	2.05		
	51-70% of shifts	13	8.31	2.10		
	>70% of shifts	4	6.25	1.71		

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Except for the emergency practical experience of nurses and physicians (p= 0.046), Linear regression analysis revealed that neither demographic nor attitudes or practice of the nurses and physicians 'participants can predict their level of knowledge about sepsis and sepsis management (they did not have statistically significant relationship with the level of information of the nurses and physicians' sepsis and sepsis management). See table 9.

Table 9: Linear regression for predictors' variables of emergency participants' demographics variables and their level of Knowledge related to sepsis and sepsis management

				95.0% CI for B	
	B	**t**	**Sig.**	**Lower Bound**	**Upper Bound**
(Constant)	5.316	2.81	.005	1.592	9.040
Gender	-.176	-.540	.590	-.818	.466
Age	-.090	-.304	.761	-.675	.495
Group	.271	.876	.382	-.339	.882
Educational level	.090	.499	.618	-.265	.444
ED experience	-.437	-2.01	.046	-.865	-.009
Work experience	.487	1.67	.095	-.085	1.059
Sepsis training & CE	.017	.215	.830	-.143	.178
Follow a specific sepsis Management Protocol / Guidelines	.213	.582	.561	-.508	.933
percentage have deal with sepsis patients at the ED	-.037	-.269	.788	-.312	.237
Attitudes	-.010	-.369	.713	-.061	.042
Practice	.030	1.62	.105	-.006	.066

a Dependent Variable: Knowledge

4.4 Attitudes regarding sepsis and sepsis management among emergency Nurses and physicians

Physicians showed a relatively higher attitude towards sepsis and sepsis management than their counterparts of nurses, where the average of physicians' attitudes was 34.5/45, while the nurses had 30.9/45, as shown in Figure 8.

Furthermore, Figure 8 also shows that approximately 70% of physicians have attitudes between 29.4-39.6/45, meaning that most physicians (70%) have attitudes between medium and high toward sepsis and sepsis management.

On the other hand, the attitudes among the nurses were between 23-38.8/45, meaning that nearly 70% of them had moderate attitudes toward sepsis and sepsis management.

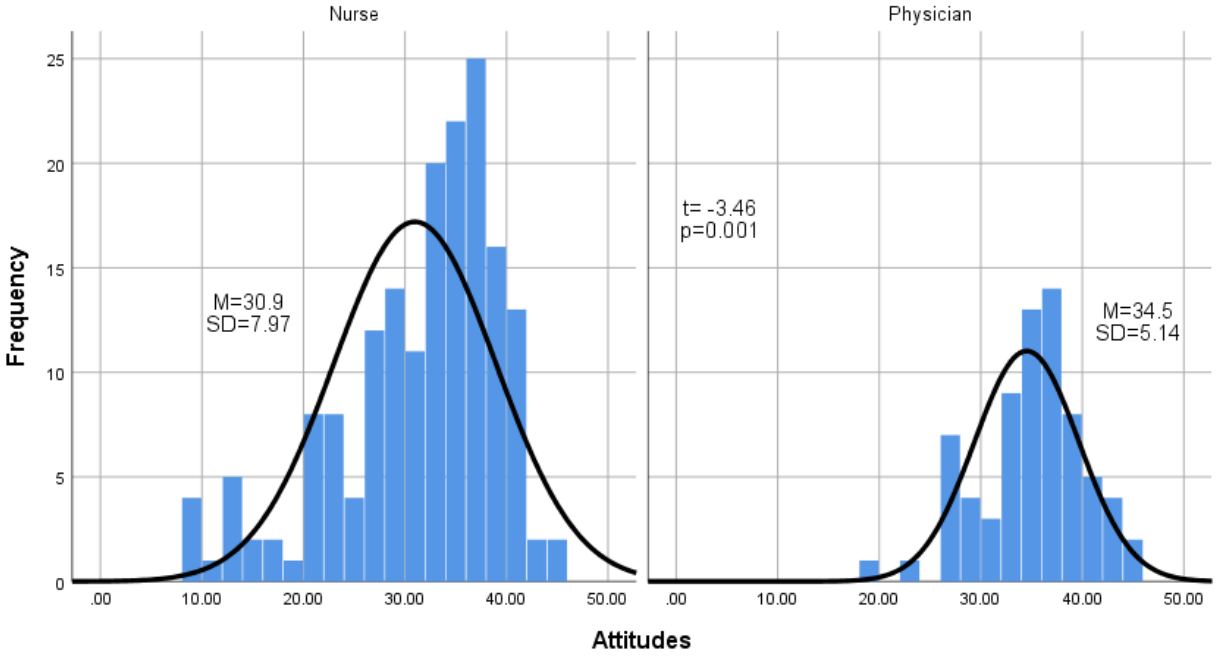

Figure 8: Attitudes regarding sepsis and sepsis management

4.4.1 Level of Attitudes regarding sepsis and sepsis management among emergency Nurses and physicians

Although the attitudes of both nurses and physicians were high, the physicians had a relative higher attitudes towards regarding early screening and intervention that will improve outcome for sepsis patients (4.03/5), IVF's is a positive factor (3.97/5), laboratory tests (blood culture bottles) & drugs (3.93/5), and educational training about sepsis should be implemented in the hospital (3.9/5) Compare with their attitudes towards antibiotics is most important (3.56/5) and Adequate & in good advanced machines, and Equipment (3.72/5).

On the other hand, the nurses had a relative higher attitude towards regarding early screening and intervention that will improve outcome for sepsis patients (3.55/5), antibiotics is most important (3.51/5), and educational training about sepsis should be implemented in the hospital (3.49/5)

compare with their attitudes towards feel confident in dealing with sepsis patient (3.35/5) and Confident in recognizing early laboratory diagnostics test for sepsis (3.38/5). For more details, see table 10 and figure 9.

Table 10: Level of Attitudes regarding sepsis and sepsis management among emergency Nurses and physicians

		Strongly Disagree No. (N%)	Disagree No. (N%)	Natural No. (N%)	Agree No. (N%)	Strongly Agree No. (N%)
IVF's is a positive factor	Nurse	14(8.1%)	25(14.5%)	30(17.4%)	79(45.9%)	24(14.0%)
	Physician	1(1.4%)	3(4.2%)	12(16.9%)	36(50.7%)	19(26.8%)
	Total	15(6.2%)	28(11.5%)	42(17.3%)	115(48.3%)	43(17.7%)
Antibiotics is most important	Nurse	14(8.1%)	16(9.3%)	41(23.8%)	70(40.7%)	31(18.0%)
	Physician	1(1.4%)	4(5.6%)	33(46.5%)	20(28.2%)	13(18.3%)
	Total	15(6.2%)	20(8.2%)	74(30.5%)	90(37.0%)	44(18.1%)
Adequate & in good advanced machines, & Equipment	Nurse	13(7.6%)	22(12.8%)	50(29.1%)	58(33.7%)	29(16.9%)
	Physician	0(0.0%)	5(7.0%)	20(28.2%)	36(50.7%)	10(14.1%)
	Total	13 (5.3%)	27(11.1%)	70(28.8%)	94(38.7%)	39(16.0%)
laboratory tests (blood culture bottles) & drugs	Nurse	13(7.6%)	21(12.2%)	45(26.2%)	62(36.0%)	31(18.0%)
	Physician	0(0.0%)	5(7.0%)	11(15.5%)	39(54.9%)	16(22.5%)
	Total	13(5.3%)	26(10.7%)	56(23.0%)	101(41.6%)	47(19.3%)
Feel confident in dealing with sepsis patient	Nurse	14(8.1%)	19(11.0%)	54(31.4%)	62(36.0%)	23(13.4%)
	Physician	1(1.4%)	3(4.2%)	20(28.2%)	32(45.1%)	15(21.1%)
	Total	15(6.2%)	22(9.1%)	74(30.5%)	94(38.7%)	38(15.6%)
Confident in recognizing S&S of sepsis	Nurse	16(9.3%)	12(7.0%)	51(29.7%)	72(41.9%)	21(12.2%)
	Physician	2(2.8%)	2(2.8%)	21(29.6%)	29(40.8%)	17(23.9%)
	Total	18(7.4%)	14(5.8%)	72(29.6%)	101(41.6%)	38(15.6%)
Confident in recognizing early laboratory diagnostics test for sepsis	Nurse	12(7.0%)	22(12.8%)	43(25.0%)	78(45.3%)	17(9.9%)
	Physician	2(2.8%)	2(2.8%)	20(28.2%)	31(43.7%)	16(22.5%)
	Total	14(5.8%)	24(9.9%)	63(25.9%)	109(44.9%)	33(13.6%)
Educational training about sepsis should be	Nurse	13(7.6%)	16(9.3%)	44(25.6%)	71(41.3%)	28(16.3%)
	Physician	0(0.0%)	3(4.2%)	18(25.4%)	33(46.5%)	17(23.9%)
	Total	13(5.3%)	19(7.8%)	62(25.5%)	104(42.8%)	45(18.5%)

implemented in the hospital						
Early screening & intervention will improve outcome for sepsis patients	Nurse	20(11.6%)	15(8.7%)	35(20.3%)	55(32.0%)	47(27.3%)
	Physician	2(2.8%)	1(1.4%)	13(18.3%)	32(45.1%)	23(32.4%)
	Total	22(9.1%)	16(6.6%)	48(19.8%)	87(35.8%)	70(28.8%)

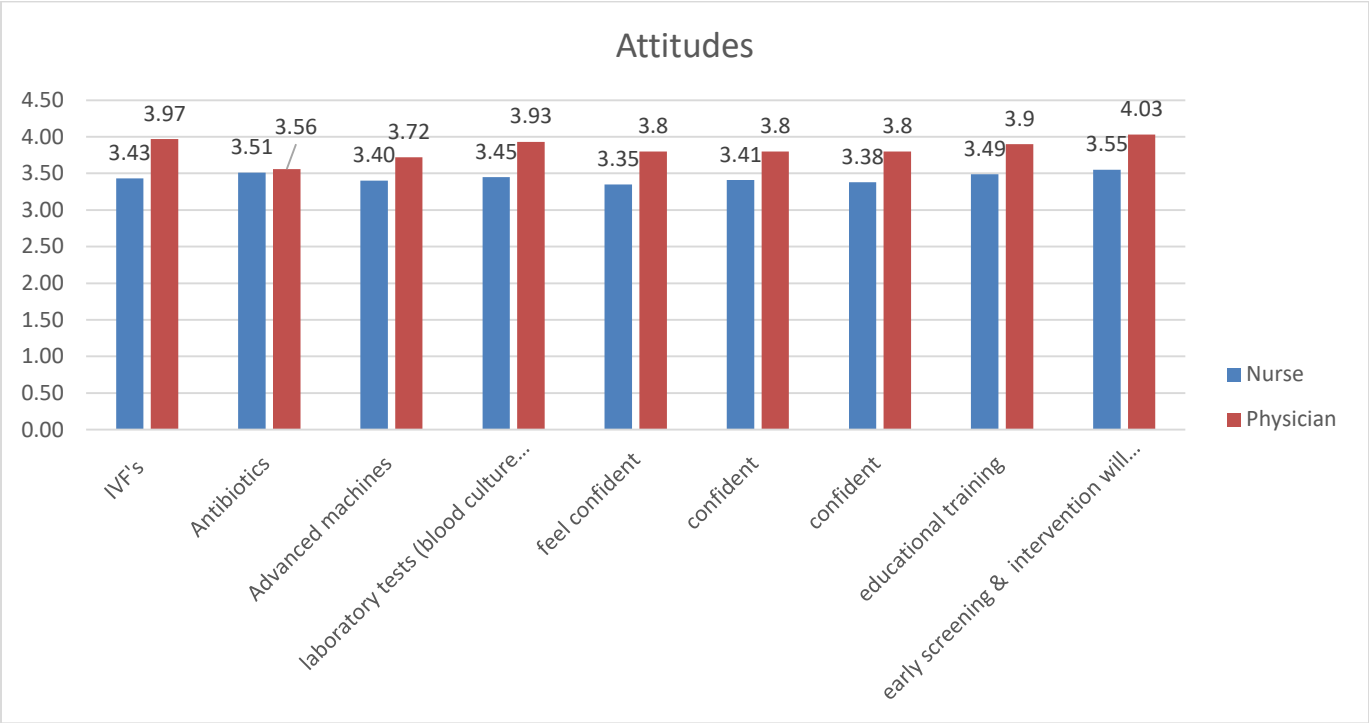

Figure 9: Attitudes regarding sepsis and sepsis management among emergency Nurses and physicians

4.4.2 Participants' demographics variables and their level of Attitudes related to sepsis and sepsis management

Although there were some small differences in the means of Attitudes level about sepsis and sepsis management, some demographic and characteristics variables of both nurses and physicians had

statistically significant (*p* values< 0.05) relationship with their level of attitude about sepsis and sepsis management.

Group Categories, ED Experience, work experience and sepsis training had statistically significant (*p* values < 0.05) relationship with their level of attitude about sepsis and sepsis management. see Table 11.

Table 11: Participants' demographics variables and their level of Attitudes related to sepsis and sepsis management

			Attitudes			
Variable	**Categories**	**N**	**Mean**	**SD**	**F/ t**	**Sig.**
Group	Nurse	172	30.9	7.97	-3.462	.001
	Physician	71	34.5	5.14		
Gender	Male	191	31.8	7.59	-.474	.636
	Female	52	32.4	6.86		
Age (years)	21-29 years	143	31.9	7.17	.716	.543
	30-39	82	32.3	7.60		
	40-49	17	30.3	8.88		
	≥50	1	40.0	.		
Educational level	Diploma	38	30.8	6.68	2.002	.095
	Bachelor's Degree	179	31.7	7.76		
	High Diploma	5	33.2	3.56		
	Master Degree	16	35.6	5.56		
	Palestinian Board	5	37.6	2.30		
ED Experience	< 3 years	139	32.0	6.68	2.701	.046
	3 to<5 years	55	33.6	6.08		
	5 to<10 years	32	30.8	9.85		
	≥ 10 years	17	28.2	10.44		
Work experience	< 5 years	137	32.7	6.14	7.888	<.001
	5 to<10years	68	30.9	8.44		
	10 to <15 years	28	34.3	6.266		
	≥ 15 years	10	22.5	11.50		
Sepsis training & CE	Emergency workshop	62	32.2	7.39	4.638	.001
	Sepsis in primary care course	25	29.4	10.51		
	Online education	17	25.9	10.69		
	Residency program	1	36.0	.		
	None	138	33.0	5.78		
	CDC guidelines	3	40.3	3.51	1.841	.140

Follow a specific Management sepsis Protocol/ Guidelines	SSC	2	30.5	6.36		
	SOFA Score	2	38.5	4.94		
	No	236	31.8	7.43		
Deal with sepsis patients at the ED (%)	< 10% of shifts	91	33.5	6.59	2.159	.074
	10-30% of shifts	79	31.4	6.86		
	31-50% of shifts	56	30.1	8.14		
	51-70% of shifts	13	31.9	10.81		
	>70% of shifts	4	34.2	9.17		

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Post hoc multiple comparison revealed that participants with ED experience of 10 years or more had the lowest mean attitudes compared with other participants and did the significance (*p* value .046).

Post hoc multiple comparison revealed that participants with work experience of 15 years or more had the lowest mean attitudes compared with other participants and did the significance.

Post hoc multiple comparison revealed that participants who gained online information had the lowest mean attitudes (25.9) compared with other participants who gained workshop emergency (32.2) and non-training (33) did the significance. See table 11.

Age (p=0.040), occupation (p=0.016), and the percentage of dealing with septic cases (p= 0.009) and practices level with septic cases (p<0.001), through the linear regression analysis, were the predictors of the level of attitudes of nurses and physicians' participants towards sepsis and sepsis management. As for the rest of the demographics and knowledge variables, they had no predictive power as they had no statistical significance. See table 12.

Table 12: Linear regression for predictors' variables of attitudes regarding sepsis and sepsis management among emergency Nurses and physicians

				95.0% CI for B	
	B	**T**	**Sig.**	**Lower Bound**	**Upper Bound**
(Constant)	10.676	2.226	.027	1.225	20.127
Gender	.797	.972	.332	-.819	2.413
Age	1.533	2.067	.040	.072	2.995
Group (nurse vs. physician)	1.870	2.419	.016	.347	3.394

Educational level	.389	.858	.392	-.504	1.281
ED experience	-.261	-.473	.637	-1.350	.827
Work experience	-.784	-1.068	.287	-2.232	.663
Sepsis training & CE	-.206	-1.004	.316	-.609	.198
Follow a specific sepsis Management Protocol / Guidelines	-1.042	-1.132	.259	-2.855	.772
percentage have deal with sepsis patients at the ED	-.915	-2.646	.009	-1.596	-.234
Practice	.483	14.169	<.001	.416	.550
Knowledge	-.061	-.369	.713	-.388	.266

a Dependent Variable: Attitudes

4.5 Practices regarding sepsis and sepsis management among emergency Nurses and physicians

The rate of practices related to patients with sepsis and sepsis management among nurses and physicians working in emergency departments was moderate, as it reached 48.3 out of 70 among the nurses, while among the physicians it was 51 out of 70.

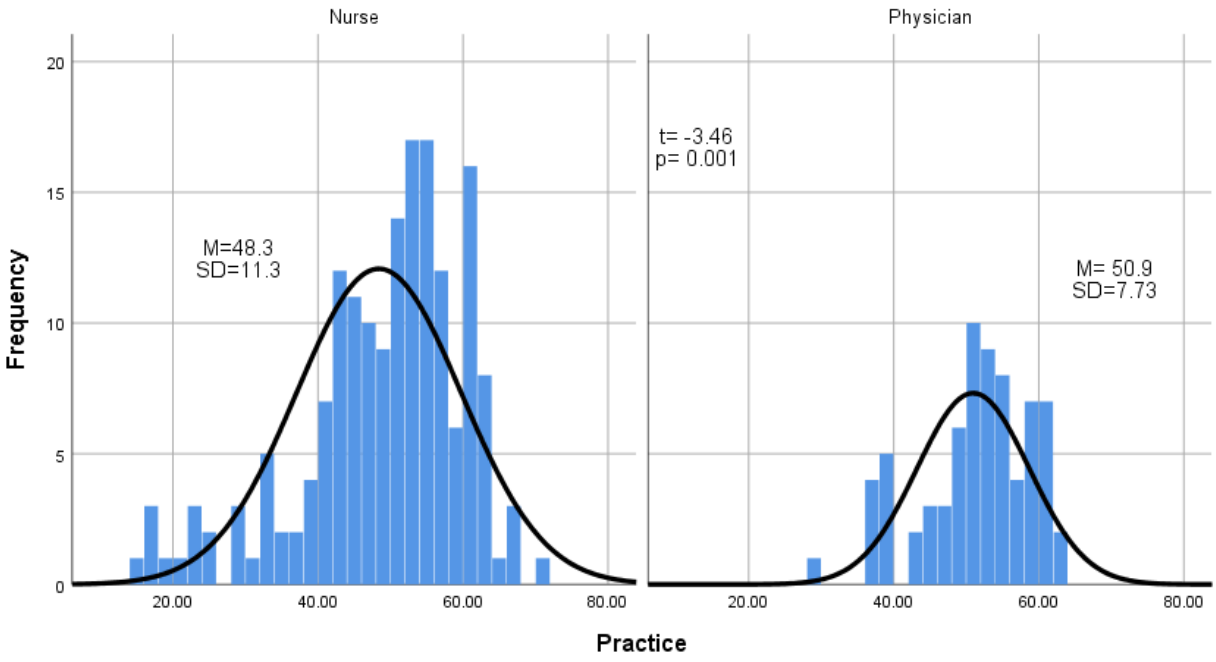

Figure 10: Practice regarding sepsis and sepsis management among emergency Nurses and physicians

Figure 10 shows that the rate of practices for patients with sepsis and sepsis management among nurses and physicians working in emergency departments was between 3 and 4 out of 5, meaning that it was moderate in extent that it was between 60% and 70%.

Physicians had higher practices averages than practices averages of nurses, except for the questions related to the use of urinalysis or microscopy for leukocytosis as a first test for patient presents in emergency department with symptoms suggestive of sepsis, follow the Urinalysis per week from (0-5 times) at Emergency department, and the use of Ceftriaxone /Flagyl as a broad-spectrum antibiotic to treatment a patient presents to your department with sepsis, where the answers of both nurses and physicians were very close between them.

Table 13: Level of Practices regarding sepsis and sepsis management among Palestinian's emergency Nurses and physicians

		Strongly Disagree No. (N%)	**Disagree No. (N%)**	**Natural No. (N%)**	**Agree No. (N%)**	**Strongly Agree No. (N%)**
I use these following available laboratory investigations for sepsis/suspected patient: Blood Sugar, Blood gas analysis, Bilirubin, PT/ INR, Serum Lactate, Other coagulation tests						
	Nurse	22(12.8%)	19(11.0%)	33(19.2%)	74(43.0%)	24(14.0%)
	Physician	2(2.8%)	7(9.9%)	12(16.9%)	41(57.7%)	9(12.7%)
	Total	24(9.9%)	26(10.7%)	45(18.5%)	115(47.3%)	33(13.6%)
I use Urinalysis or microscopy for leukocytosis as a first test for patient presents to your department with symptoms suggestive of sepsis						
	Nurse	9(5.2%)	22(12.8%)	48(27.9%)	69(40.1%)	24(14.0%)
	Physician	3(4.2%)	10(14.1%)	26(36.6%)	24(33.8%)	8(11.3%)
	Total	12(4.9%)	32(13.2%)	74(30.5%)	93 (38.3%)	32(13.2%)
I follow the Urinalysis per week from (0-5 times) at Emergency department						
	Nurse	21(12.2%)	24(14.0%)	56(32.6%)	56(32.6%)	15(8.7%)
	Physician	7(9.9%)	12(16.9%)	27 (38.0%)	20(28.2%)	5(7.0%)
	Total	28(11.5%)	36(14.8%)	83(34.2%)	76(31.3%)	20(8.2%)
I use Ceftriaxone /Flagyl as a broad-spectrum antibiotic to treatment a patient presents to your department with sepsis.						
	Nurse	10(5.8%)	19(11.0%)	43(25.0%)	73(42.4%)	27(15.7%)

	Physician	3 (4.2%)	13(18.3%)	19 (26.8%)	29(40.8%)	7(9.9%)
	Total	13(5.3%)	32(13.2%)	62(25.5%)	102(42.0%)	34(14.0%)
According the previous questions are these antibiotics available?						
	Nurse	6(3.5%)	15(8.7%)	44 (25.6%)	74(43.0%)	33(19.2%)
	Physician	0(0.0%)	3(4.2%)	17(23.9%)	35(49.3%)	16(22.5%)
	Total	6(2.5%)	18(7.4%)	61(25.1%)	109(44.9%)	49(20.2%)
I use these indicators of inflammation to diagnose sepsis in your patients: WBC count >12000, WBC <4000, > 10% immature forms, CRP, and Plasma pro-calcitonin						
	Nurse	9(5.2%)	21(12.2%)	39(22.7%)	73(42.4%)	30(17.4%)
	Physician	0(0.0%)	6(8.5%)	16(22.5%)	42(59.2%)	7(9.9%)
	Total	9(3.7%)	27(11.1%)	55(22.6%)	115(47.3%)	37(15.2%)
I use Crystalloid solutions (e.g., NS 0.9, & RL or Hartmann's Solution), as a most common type of rehydration fluid in your Department.						
	Nurse	9(5.2%)	22(12.8%)	45(26.2%)	67(39%)	29(16.9%)
	Physician	1(1.4%)	3(4.2%)	15(21.1%)	31(43.7%)	21(29.6%)
	Total	10(4.1%)	25(10.3%)	60(24.7%)	98(40.3%)	50(20.6%)
I use Drop count when I follow the rate of flow of the IV fluid during start infusion.						
	Nurse	10(5.8%)	22(12.8%)	51(29.7%)	65(37.8%)	24(14.0%)
	Physician	3(4.2%)	8(11.3%)	22(31.0%)	32(45.1%)	6(8.5%)
	Total	13(5.3%)	30(12.3%)	73(30.0%)	97(39.9%)	30(12.3%)
I follow orthostatic BP when appropriate fluid resuscitation has been achieved for sepsis patient						
	Nurse	14(8.1%)	22(12.8%)	50(29.1%)	63(36.6%)	23(13.4%)
	Physician	3(4.2%)	7(9.9%)	21(29.6%)	29(40.8%)	11(15.5%)
	Total	17(7.0%)	29(11.9%)	71(29.2%)	92(37.9%)	34(14.0%)
I use urinary catheters to monitor UOP for severely septic patients.						
	Nurse	12(7.0%)	13(7.6%)	45(26.2%)	63(36.6%)	39(22.7%)
	Physician	0(0.0%)	3(4.2%)	14(19.7%)	33(46.5%)	21(29.6%)
	Total	12(4.9%)	16(6.6%)	59(24.3%)	96(39.5%)	60(24.7%)
I use this equipment that can monitor of sepsis patient: Body temperature, Noninvasive or Invasive BP, Oxygen saturation, CVP, CO, PAP, and End-tidal CO_2						
	Nurse	9(5.2%)	22(12.8%)	44(25.6%)	70(40.7%)	27(15.7%)
	Physician	0(0.0%)	5(7.0%)	20(28.2%)	29(40.8%)	17(23.9%)
	Total	9(3.7%)	27(11.1%)	64(26.3%)	99(40.7%)	44(18.1%)
Are these diagnostic tests available used when working for the patient with sepsis? X-Ray, Ultrasonography, and Echocardiography						
	Nurse	17(9.9%)	16(9.3%)	44(25.6%)	69(40.1%)	26(15.1%)
	Physician	2(2.8%)	5(7.0%)	16(22.5%)	38(53.5%)	10(14.1%)
	Total	19(7.8%)	21(8.6%)	60(24.7%)	107(44.0%)	36(14.8%)
I use these vasopressors, when working with severe sepsis progresses to septic shock: Norepinephrine, Epinephrine, Vasopressin, & Dopamine						
	Nurse	16(9.3%)	16(9.3%)	49(28.5%)	54(31.4%)	37(21.5%)
	Physician	0(0.0%)	6(8.5%)	13(18.3%)	36(50.7%)	16(22.5%)
	Total	16(6.6%)	22(9.1%)	62(25.5%)	90(37.0%)	53(21.8%)
I following Decreased UOP as a leader to begin an infusion of vasopressors.						

	Nurse	6(3.5%)	26(15.1%)	41(23.8%)	65(37.8%)	34(19.8%)
	Physician	4(5.6%)	5(7.0%)	20(28.2%)	27(38.0%)	15(21.1%)
	Total	10(4.1%)	31(12.8%)	61(25.1%)	92(37.9%)	49(20.2%)

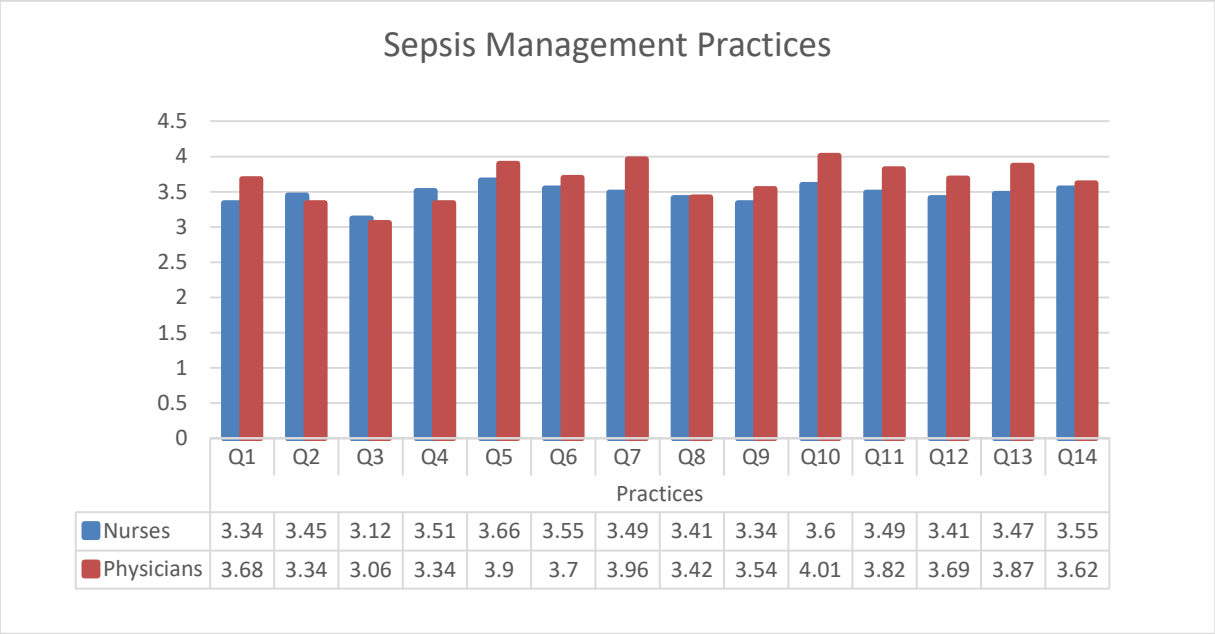

Figure 11: Practice regarding sepsis and sepsis management among emergency Nurses and physicians.

4.5.1 Participants' demographics variables and their level of Practices related to sepsis and sepsis management

Although there were some small differences in the means of Practices level about sepsis and sepsis management, some demographic and characteristics variables of both nurses and physicians had statistically significant (*p* values< 0.05) relationship with their level of Practices about sepsis and sepsis management.

ED Experience, work experience and sepsis training had statistically significant relationship with their level of practices about sepsis and sepsis management. See table 14.

Table 14: Participants' demographics variables and their level of Practice related to sepsis and sepsis management

			Practice			
Variable	**Categories**	**N**	**Mean**	**SD**	**F/ t**	**Sig.**
Group	Nurse	172	48.3	11.36	-1.730	.085
	Physician	71	50.9	7.73		
Gender	Male	191	49.2	10.54	.406	.685
	Female	52	48.6	10.33		
Age (years)	21-29 years	143	49.8	9.32	.603	.614
	30-39	82	48.0	12.10		
	40-49	17	48.1	11.70		
	≥50	1	51.0	.		
Educational level	Diploma	38	48.8	10.79	2.161	.074
	Bachelor's Degree	179	48.4	10.58		
	High Diploma	5	50.0	6.89		
	Master Degree	16	56.1	5.44		
	Palestinian Board	5	52.2	14.04		
ED Experience	< 3 years	139	49.1	10.26	3.307	.021
	3 to<5 years	55	51.1	8.10		
	5 to<10 years	32	49.2	9.40		
	≥ 10 years	17	42.1	17.16		
Work experience	< 5 years	137	50.2	8.90	6.518	<.001
	5 to<10years	68	47.8	11.00		
	10 to <15 years	28	51.4	9.88		
	≥ 15 years	10	36.5	18.44		
Sepsis training & CE	Emergency workshop	62	47.6	10.92	8.656	<.001
	Sepsis in primary care course	25	43.2	14.10		
	Online education	17	41.9	10.29		
	Residency program	1	28.0	.		
	None	138	51.8	8.31		
Follow a specific Management sepsis Protocol/ Guidelines	CDC guidelines	3	54.0	5.29	.524	.667
	SSC	2	48.5	4.94		
	SOFA Score	2	42.0	4.24		
	No	236	49.1	10.58		
Deal with sepsis patients at the ED (%)	< 10% of shifts	91	49.9	9.89	.308	.872
	10-30% of shifts	79	48.2	11.11		
	31-50% of shifts	56	49.0	9.62		
	51-70% of shifts	13	48.7	15.18		
	>70% of shifts	4	50.7	6.80		

SSC: Surviving Sepsis Campaign

Post hoc multiple comparison revealed that participants with ED experience of 3-5 years had higher mean practice (51.1) compared with other participants and did the significance (p=0.021).

Post hoc multiple comparison revealed that participants with work experience of 15 years or more had lowest mean practice (36.5) compared with other participants and did the significance (p value <.001).

Post hoc multiple comparison revealed that participants who non-trained had the highest mean (51.8) practice compared with other participants and did the significance (p value <.001).

The Linear regression analysis test showed that training, continuing education, and attitudes have the ability to predict the practices of nurses and physicians working in emergency departments, as there was statistical significance between these variables with the percentage of practices of sepsis and sepsis management among nurses and physicians working in emergency departments.

As for the rest of the demographic variables and the level of knowledge, they did not have any statistical significance with the level of practices, and therefore they do not have the ability to predict the level of the practices of sepsis and sepsis management among nurses and physicians working in emergency departments. See table 15.

Table 15: Linear regression for predictors' variables of practices regarding sepsis and sepsis management among Palestinian's emergency Nurses and physicians

				95.0% CI for B	
	B	**T**	**Sig.**	**Lower Bound**	**Upper Bound**
(Constant)	7.326	1.072	.285	-6.135	20.787
Gender	-1.342	-1.159	.248	-3.623	.939
Age	-.917	-.868	.386	-2.997	1.164
Group	-.842	-.762	.447	-3.018	1.334
Educational level	.987	1.548	.123	-.270	2.244
ED experience	.889	1.141	.255	-.646	2.423
Work experience	-.771	-.742	.459	-2.818	1.277
Sepsis training & CE	1.023	3.630	<.001	.468	1.579
Follow a specific sepsis Management Protocol / Guidelines	1.147	.881	.379	-1.418	3.712
percentage have deal with sepsis patients at the ED	.889	1.806	.072	-.081	1.859
Knowledge	.380	1.629	.105	-.080	.839
Attitudes	.963	14.169	<.001	.829	1.097

a Dependent Variable: Practice

4.6 Barriers regarding sepsis and sepsis management among emergency nurses and physicians

From the point of view of workers in emergency departments, including nurses and physicians participating in the study, the lack of monitoring equipment was the most obstacle to practices with septic cases (2.49 & 2.44 out of 5).

As for the second and third barriers, in order, from their point of view, it was the lack of antibiotics and then the lack of staff for physicians, while it was the lack of staff and then the lack of lectures for nurses (2.37 & 2.37 vs. 2.41 & 2.40 respectively).

As for the last three barriers, in order, from the nurses' point of view, they were lack of antibiotics (2.37), then lack of information (2.34), and finally work pressure (2.33), while for doctors it was work pressure (2.25), then lack of lectures (2.21) and finally, lack of information (2.11).

Table 16: Barriers regarding sepsis and sepsis management among emergency nurses and physicians

In your opinion		Strongly Agree No. (N%)	Agree No. (N%)	Disagree No. (N%)	Natural No. (N%)	Strongly Disagree No. (N%)
Lack of broad-spectrum antibiotics	Nurse	28(16.3%)	76(44.2%)	20(11.6%)	30(17.4%)	18(10.5%)
	Physician	18(25.4%)	34(47.9%)	7(9.9%)	6(8.5%)	6(8.5%)
	Total	46(18.9%)	110(45.3%)	27(11.1%)	36(14.8%)	24(9.9%)
Workload in the emergency department	Nurse	27(15.7%)	69(40.1%)	22(12.8%)	45(26.2%)	9(5.2%)
	Physician	14(19.7%)	33(46.5%)	3(4.2%)	20(28.2%)	1(1.4%)
	Total	41(16.9%)	102(42.0%)	25(10.3%)	65(26.7%)	10(4.1%)
Shortage of staff	Nurse	28(16.3%)	57(33.1%)	32(18.6%)	47(27.3%)	8(4.7%)
	Physician	17(23.9%)	30(42.3%)	4(5.6%)	19(26.8%)	1(1.4%)
	Total	45(18.5%)	87(35.8%)	36(14.8%)	66(27.2%)	9(3.7%)
Lack of information about the sepsis	Nurse	28(16.3%)	66(38.4%)	24(14.0%)	47(27.3%)	7(4.1%)
	Physician	16(22.5%)	40(56.3%)	3(4.2%)	10(14.1%)	2(2.8%)
	Total	44(18.1%)	106(43.6%)	27(11.1%)	57(23.5%)	9(3.7%)
Inadequate lectures/workshop/conference/seminars/ about sepsis	Nurse	23 (13.4%)	59(34.3%)	32(18.6%)	46(26.7%)	12(7.0%)
	Physician	7(9.9%)	34(47.9%)	3(4.2%)	23(32.4%)	4(5.6%)
	Total	30(12.3%)	93(38.3%)	35(14.4%)	69(28.4%)	16(6.6%)
Lack of monitoring equipment	Nurse	45(26.2%)	72(41.9%)	17(9.9%)	28(16.3%)	10(5.8%)
	Physician	27(38.0%)	30(42.3%)	3(4.2%)	11(15.5%)	0(0.0%)
	Total	72(29.6%)	102(42.0%)	20(8.2%)	39(16.0%)	10(4.1%)

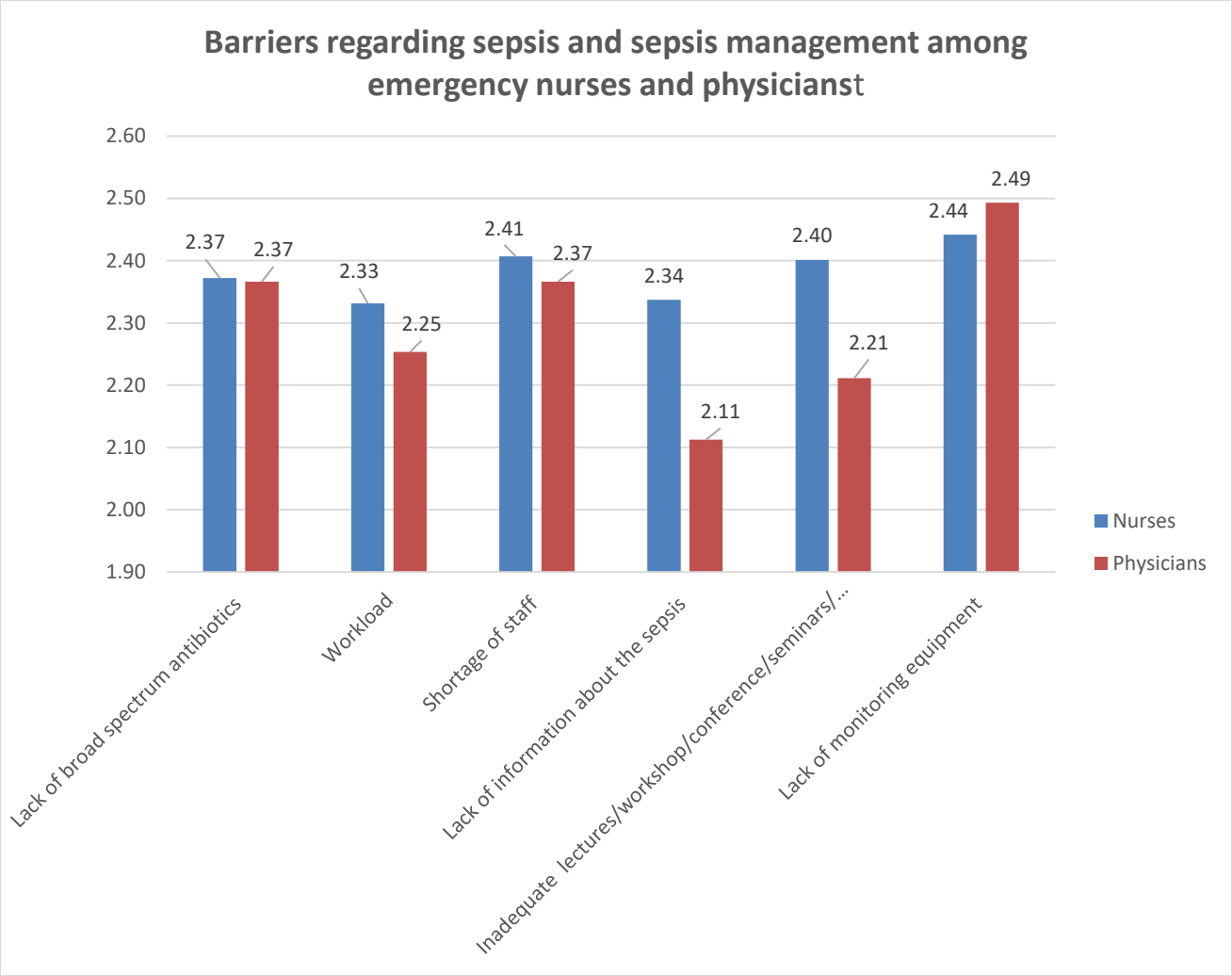

Figure 12: Barriers regarding sepsis and sepsis management among Palestinian's emergency Nurses and physicians

Chapter Five: Discussion

5.1 Introduction

Within this chapter, the study findings discussed in terms of the study aim and objectives along with the study variables, study limitations, future recommendations and the conclusion of the research study.

5.2 Discussion

A descriptive, research design with a quantitative approach was applied to assess the level knowledge, attitudes, practices, identify the biggest barriers related to the sepsis and sepsis management among emergency nurses and physicians and examine the association between the knowledge, attitudes, practices and social demographic characteristics among participants. The population for the study was emergency nurses and physicians working in ED's at Palestinian hospitals in Palestine. The discussion in this chapter is conducted using each individual objective and integrating the study findings reported in Chapter Four.

The discussion is based on the following study objectives:

1-Assess the knowledge of emergency nurses and physicians regarding sepsis and sepsis management in Palestinian hospitals.

2- Assess the attitude of emergency nurses and physicians regarding sepsis and sepsis management in Palestinian hospitals.

3- Assess the practices of emergency nurses and physicians regarding sepsis and sepsis management in Palestinian hospitals.

4- Identify the biggest barriers of emergency nurses and physicians regarding sepsis and sepsis management in Palestinian hospitals.

5- Examine the association between the knowledge of sepsis management and social demographic characteristics for both nurses and physicians.

6- Examine the association between the attitude of sepsis management and social demographic characteristics for both nurses and physicians.

7- Examine the association between the practices of sepsis management and social demographic characteristics for both nurses and physicians.

5.2.1 Discussion the Knowledge level of emergency nurses and physicians regarding sepsis and sepsis management in Palestinian hospitals.

According the current study showed the majority of both nurses and physicians had poor (47.7%) to moderate (51.0%) knowledge level about sepsis while just (1.2 %) of them had good knowledge level about sepsis. The average knowledge rate (poor, moderate, & good) for nurses (48.8%, 50.0% & 1.2%) is slightly lower than average knowledge level of physicians (45.1%, 53.5% & 1.4%). A study published by Hasan in Hilla city (2020), showed the majority of nurses (70%) had a good level at Hilla city hospitals regarding sepsis prevention at neonatal care unit. Therefore, this is not consistent with the current study toward of nurses and physicians working in emergency departments. Another study published by Nucera in North Italy (2018), showed >75% of nurses and physicians had excellent awareness of procedure that raise the risk of sepsis, 50-70% had pretty knowledge toward blood culture technique and 50% had poor understanding of early detection, method and scores for

diagnosis and management of sepsis. Therefore, this is consistent with the current study as a majority of participants had moderate knowledge toward of nurses and physicians working in emergency departments.

5.2.1.1 Discussion the Knowledge related to definition and cause of sepsis among nurses and physicians.

When the participants were asked about the most common route that cause infection, 43.2% of them answered incorrectly that the urinary tract infection is the most common cause of infection. Therefore, this is not consistent with (Ljungström et al., 2017), they told the most common cause of infection was respiratory tract infection. Also, when the participants were asked about definition of SIRS, 60.9% of them answered correctly that the Body temperature >38oC or body temperature <36o C, Tachycardia, Tachypnea and White cell count >12,000/mm3 or < 4,000/mm3, is definition of sepsis. Therefore, this is consistent with the (WHO Report, 2011). In other hand when the participant was asked about sepsis definition is the presence of infection with 2 SIRS criteria, 67.9% of them answered correctly. Therefore, this is consistent with (Chakraborty et al., 2021).

5.2.1.2 Discussion the Knowledge related to monitoring lactate, scoring and hemodynamic parameters of sepsis among nurses and physicians.

When the participants were asked about the time (minutes) elapses before a lactate test is performed, 33.3% of them answered correctly that the 31-60 minutes is the time (minutes) elapses before a lactate test is performed. Therefore, this is consistent with (Levy et al., 2018). Also, when the participants were asked about the lactate threshold toward septic patients, 39.1% of them answered

correctly that the 4mmol/L is the lactate threshold toward septic patients. Therefore, this is consistent with (Belsky et al., 2018). In other hand when the participants were asked about how often do monitoring activities happen in the ED in which you work? These activities can include taking the blood pressure, respiratory rate, SPO2, JVP and mental status of a septic patient, 51% of them answered correctly that at least once every 30-minutes. Therefore, this is consistent with (WHO Report, 2011).

5.2.1.3 Discussion the Knowledge related to sepsis and sepsis management among nurses and physicians.

When the participants were asked about septic shock patients have hypotension despite IV fluids volume restoration, 77.8% of them answered correctly that the septic shock patients have hypotension despite IV fluids volume restoration. Therefore, this is consistent with (Levy MMet al., 2001). Also, when the participants were asked about the ER time (minutes) elapses before the patient with symptoms suggestive sepsis receives antibiotics, 48.1% of them answered correctly that the ER time (minutes) elapses before the patient with symptoms suggestive sepsis receives antibiotics are 31-60 minutes. Therefore, this is consistent with (Filbin et al., 2019). In other hand when the participants were asked about Antibiotic is given before the blood cultures are collected, 56% of them answered correctly that the Antibiotic isn't given before the blood cultures are collected. Therefore, this is consistent with (WHO Report, 2011).

5.2.1.4 Discussion the Knowledge related to early detection and diagnosis of sepsis among nurses and physicians.

When the participants were asked about which sign/s, increase/s the suspicion of sepsis? 43.2% of them answered correctly that the fall MAP < 70mmHg. Therefore, this is consistent with (Benchekroune S et al., 2008). Also, when the participants were asked about the Vomiting, diarrhea, gastroparesis, ileum may be an early sign of organ dysfunction, 62.1% of them answered correctly that the vomiting, diarrhea, gastroparesis, and ileum may be an early sign of organ dysfunction. Therefore, this is consistent with (Parkman H. P et al., 2010). Also, when the participants were asked about, I consider patient has the septic syndrome, when the LOC alters, 58.8% of them answered correctly regarding the previous question. Therefore, this is consistent with (Hotchkiss et al., 2016). In other hand when the participants were asked about Hyperglycemia (>7.7 mmol/L) in the absence of diabetes meets the diagnostic criteria for sepsis, 53.5% of them answered incorrectly that the Hyperglycemia (>7.7 mmol/L) in the absence of diabetes meets the diagnostic criteria for sepsis. Therefore, this is not consistent with (Levy MM et al., 2001). Also, when the participants were asked about WBC count of 4*109/L meets diagnostic criteria for sepsis, 51.4% of them answered incorrectly. Therefore, this is not consistent with (Singer et al., 2016). In other hand when the participants were asked about the level of SPO2 on sepsis patients are < 90%, 67.9% of them answered correctly toward the level of SPO2 on sepsis patients are < 90%. Therefore, this is consistent with (WHO Report, 2011).

5.2.1.5 Discussion the Participants' demographics variables and their level of Knowledge related to sepsis and sepsis management.

According the current study, showed none of the demographic and characteristics variables of both nurses and physicians had any statistically significant (p values> 0.05) relationship with their level of knowledge about sepsis and sepsis management. A Study published by Hasan in Hilla city (2020), showed the educational level and training courses about septicemia had a statistically significance toward the nurses' knowledge regarding prevention of sepsis at Neonate care unit. Therefore, this is not consistent with current study. Another study published by Rahman in Malaysia (2019), showed no statistically significance between the participants' characteristics and knowledge score on sepsis and systemic inflammatory response syndrome. Therefore, this is consistent with current study.

5.2.1.6 Discussion the Linear regression for predictors' variables of emergency participants' demographics variables and their level of Knowledge related to sepsis and sepsis management.

According the current study showed that ED experience only can predict their level of knowledge about sepsis and sepsis management. A study published by Zhang in Western China (2021), showed the score of attitudes and score of practices can predict their level of knowledge about prevention of medical device-related pressure injury (p value< .005). Therefore, this is not consistent with the current study, in other hand the age, work experience and educational level can't predict their level of knowledge prevention of medical device-related pressure injury (p value > .005). Therefore, this is consistent with the current study.

5.2.2 Discussion the attitudes of emergency nurses and physicians regarding sepsis and sepsis management in Palestinian hospitals.

According the previous finding toward the attitude regarding sepsis and sepsis management among emergency nurses and physicians, physicians showed a relatively higher attitude than nurses. And shows that approximately 70% of Physicians have attitude between medium and high toward sepsis and sepsis management. On other hand the attitude among the nurses had moderate attitude toward sepsis and sepsis management. Some study published by Elsous in the Gaza Strip (2017), the finding showed nurses had expressed more positive Attitudes toward collaboration than physicians. Therefore, this is not consistent with the current study.

Although the physicians had a relative higher attitude towards regarding early screening and intervention that will improve outcome for sepsis patients (4.03/5), IVF's is a positive factor (3.97/5), laboratory tests (blood culture bottles) & drugs (3.93/5), and educational training about sepsis should be implemented in the hospital (3.9/5) Compare with their attitudes towards antibiotics is most important (3.56/5) and Adequate & in good advanced machines, and Equipment (3.72/5). On the other hand, the nurses had a relative higher attitude towards regarding early screening and intervention that will improve outcome for sepsis patients (3.55/5), antibiotics is most important (3.51/5), and educational training about sepsis should be implemented in the hospital (3.49/5) compare with their attitudes towards feel confident in dealing with sepsis patient (3.35/5) and Confident in recognizing early laboratory diagnostics test for sepsis (3.38/5). Another study published by Nucera in North Italy (2018), showed nurses and physicians reported "excellent" (> 75%) awareness of procedures that raise the risk of sepsis, "pretty" (50-75%) attitudes toward blood culture

techniques, and "poor" (50%) understanding of early detection, methods, and scores for diagnosis and management of sepsis. Therefore, this is not consistent with the current study as an early screening, intervention and blood culture bottle-lab test are the high attitude toward physicians. Also, this is not consistent with the current study as an early screening and intervention are the high attitude toward nurses. Another study published by Yousefi in Iran (2012), showed high attitude toward ICU nurses regarding sepsis education program. Therefore, this is consistent with the current study as an educational training is one of high attitude toward the nurses and physicians.

Another study published by Morita in Japan (2002), showed that physicians had positive attitudes toward IVF regarding terminal dehydration. Therefore, this is consistent with the current study as an IVF positive factor is one of high attitude toward physicians regarding sepsis and sepsis management. Another study published by Nair in India (2019), showed the poor attitude toward the nurses regarding antibiotic uses for viral infection. Therefore, this is not consistent with the current study as an Antibiotic is highest important toward emergency nurses regarding sepsis and sepsis management.

5.2.2.1 Discussion the Participants' demographics variables and their level of Attitudes related to sepsis and sepsis management.

According the participants demographics variables and their level of Attitudes related sepsis and sepsis management, showed group categories, ED experience, work experience and sepsis training had statistically significant (p values < 0.05) relationship with their level of attitude about sepsis and sepsis management. A study published by Elsous in Gaza Strip (2017), showed significant differences in the attitude toward collaboration between physicians and nurses ($p < 0.001$) moreover the nurses mean scored higher than physicians so, that's indicates of nurses' attitudes toward the nurse – physicians' collaboration were more significant than physicians. Therefore, this is not consistent with

the current study as a group category had statistically significant (p values < 0.05) relationship with their level of attitude about sepsis and sepsis management toward emergency physicians.

Another study published by Zhang in Western China (2021), post hoc test results showed a significant relationship between attitudes of ICU nurses with 16 to 20 years of work experience and those with 11 to 15 years of work experience (P<.001) and 25 years of work experience (P<.001); attitude scores were higher in subjects with 16 to 20 years of work experience. Therefore, this is not consistent with the current study as a work experience had significant relationship with their level of attitude about sepsis and sepsis management, but 15years or more had the lowest mean attitudes compared with other participants and did the significance. Another study published by Suryanto in Indonesia (2016), showed Positive Attitude between nurses and physicians is critical in emergency workshop because it has a direct impact on the quality, safety, accountability, and responsibility of care. Therefore, this is not consistent with the current study as a sepsis training had significant relationship with their level of attitude about sepsis and sepsis management, but that participants who gained online information had the lowest mean attitudes (25.9) compared with other participants who gained workshop emergency (32.2) and non-training (33) did the significance. Another study published by Durgun in Turkey (2018), showed no significant relationship between emergency nurses' attitude and the ED experience regarding patient safety (p <.005). Therefore, this is not consistent with the current study as an ED experience had significant relationship with their level of attitude about sepsis and sepsis management toward the emergency nurses and physicians.

5.2.2.2 Discussion the Linear regression for predictors' variables of attitudes regarding sepsis and sepsis management among emergency Nurses and physicians.

According the current study finding showed Age (p=0.040), occupation (p=0.016), and the percentage of dealing with septic cases (p= 0.009) and practices level with septic cases (p<0.001), through the linear regression analysis, were the predictors of the level of attitudes of nurses and physicians' participants towards sepsis and sepsis management. As for the rest of the demographics and knowledge variables, they had no predictive power as they had no statistical significance. A study published by Zhang in Western China (2021), showed the score the knowledge and Practice had statistical significance according the linear regression analysis to investigate the effect of demographic characteristics on ICU nurses' attitude about prevention of medical device–related pressure injury. Therefore, this is consistent with the current study as a practices level with septic cases (p<0.001), had significant relationship with their level of attitude about sepsis and sepsis management toward the emergency nurses and physicians. But not consistent with the current study as a Knowledge had no statistical significance with their level of attitude about sepsis and sepsis management toward the emergency nurses and physicians. About Age in the same Western China study there is consistent with the current study as an Age had no statistical significance with their level of attitude about sepsis and sepsis management toward the emergency nurses and physicians.

5.2.3 Discussion the practices of emergency nurses and physicians regarding sepsis and sepsis management in Palestinian hospitals.

According the current study finding showed the highest practice toward emergency nurses are the Available of Antibiotic (Ceftriaxone/Flagyl) the mean was 3.66 /5. Also, the current study showed the

highest practice toward emergency physicians are use the urinary Catheters to monitor UOP for severely septic patients, the mean was 4.01/5. A study published by Mathenge in Kenya (2015), was showed Crystalloid fluids were the most common resuscitations fluid for sepsis management, 80% of the healthcare providers utilized the drop count method and 50% at the ICU using IVF pumps most antibiotic uses Ceftriaxone/Flagyl. Therefore, this is not consistent with the current study as a highest practice toward emergency nurses regarding sepsis and sepsis management were Available of Antibiotic (Ceftriaxone/Flagyl) and the highest practice toward emergency physicians regarding sepsis and sepsis management were the use the urinary Catheters to monitor UOP for severely septic patients.

5.2.3.1 Discussion the Participants' demographics variables and their level of Practices related to sepsis and sepsis management.

According the participants demographics variables and their level of Practice related sepsis and sepsis management, showed ED Experience, work experience and sepsis training had statistically significant relationship ($p<.005$) with their level of practices about sepsis and sepsis management. A study published by Suryani in Indonesia (2019), showed that training had a significant relationship with emergency nurse's practice. Therefore, this is consistent with the current study. Another study published by Gruda in Kosovo (2017), showed the work experience toward management of hospital-acquired infections had a significant relationship with the emergency nurse's practice. Therefore, this is consistent with the current study. Another study published by Nofal in Saudi Arabia (2018), Showed more than 5-years of ED experience had a significant relationship with the emergency nurses and physicians' knowledge than practice and attitude. Therefore, this is not consistent with the current study.

5.2.3.2 Discussion the Linear regression for predictors' variables of Practice regarding sepsis and sepsis management among emergency Nurses and physicians

The Linear regression analysis test showed that training, continuing education, and attitudes have the ability to predict the practices of nurses and physicians working in emergency departments. A study published by Zhang in Western China (2021), showed the attitudes have the ability to predict the practices of nurses in ICU on preventing medical device–related pressure injury. Therefore, this is consistent with the current study. Another study published by Schoen in Alabama (2009), showed the intensity of utilize the internet courses was not expected the physicians' practices. Therefore, this is not consistent with the current study toward of nurses and physicians working in emergency departments.

5.2.4 Discussion the barriers of emergency nurses and physicians regarding sepsis and sepsis management in Palestinian hospitals.

According the chapter four was showed the most barriers of emergency nurses regarding the sepsis and sepsis management in Palestinian hospitals respectively; are lack of monitoring equipment (2.44), shortage of staff (2.41), inadequate lectures / workshop / conference / seminars /about the sepsis (2.40), lack of information about the sepsis (2.34) and workload in the ED (2.33). A study published by Shin in South Korea (2013), was showed the high crowding in the ED had adverse effects to low compliance rate with resuscitation bundle in the management of sever sepsis and septic shock, therefore, this is consistent with the study according the compliance rate as an adverse effect, is 6th most barriers of emergency nurses regarding sepsis and sepsis management in Palestinian hospitals and 3rd most barriers of emergency physicians regarding sepsis and sepsis management in Palestinian

hospitals. Another study published by Nwankwor in Nigeria (2019), was showed the majority of hospitals (97%) reported adequate triage systems, only 60% follow some form of sepsis management protocols. There were no national consensus protocols for pediatric sepsis management. Over half of the respondents identified a poor access to healthcare services, failure to diagnose sepsis at referring institutions, lack of parental education, a lack of a definitive protocol and a lack of medical equipment for managing pediatric sepsis. Therefore, this is consistent with the study according there was no national consensus protocols for pediatric sepsis management, 1st and 3rdmost barriers of emergency nurses regarding sepsis and sepsis management in Palestinian hospitals and 1st and 4th most barriers of emergency physicians regarding sepsis and sepsis management in Palestinian hospitals. Another study published by Madiha Ismail in Urban (2020), showed Staff scarcity (62%) was the most prevalent obstacle to compliance with the sepsis bundle, followed by delayed patient presentation (58%) and overcrowding (42%). Therefore, this is consistent with the study according 2nd and 6th most barriers of emergency nurses regarding sepsis and sepsis management in Palestinian hospitals and 2nd and 3rd most barriers of emergency physicians regarding sepsis and sepsis management in Palestinian hospitals. Another study published by Davis Patrick (2020), established educational sepsis-training program for ED nurses in emergency room setting. The program featured a 2-hour instructional session on the signs and symptoms of sepsis, as well as guidelines from the Surviving Sepsis Campaign and the Emergency Nurses' Association. Formative input on module content and the program assessment instrument was supplied by the professional practice director. The information was effective in training ED nurses on the signs and symptoms of early sepsis, according to director input. The ED director has now made completion of the training module and posttest mandatory for all ED nurses. The study has the potential to enhance emergency department staff detection of early

sepsis as well as patient outcomes, Therefore, this is consistent with the study according the education sepsis-training program, 3rd and 5th most barriers of emergency nurses regarding sepsis and sepsis management in Palestinian hospitals and 5th and 6th most barriers of emergency physicians regarding sepsis and sepsis management in Palestinian hospitals.

Another study published by Seok (2020), was showed A combination of insufficient diagnostic criteria for sepsis and time constraints to provide broad-spectrum antimicrobial therapy continues to be an impediment to antimicrobial stewardship. Efforts such as selecting appropriate empirical antibiotics and deciding whether or not to discontinue antibiotics may help to improve a sepsis patient's prognosis. Therefore, this is consistent with the study according 1st and 2nd most barriers of emergency nurses and physicians regarding sepsis and sepsis management in Palestinian hospitals. Another study published by Mathenge in Kenya (2015), was showed the most common barriers regarding sepsis management are advanced patient presentation, lack of antibiotics, and lack of sufficient staff. Therefore, this is consistent with the study based on lack of antibiotics and lack of sufficient staff as a 2ndand 4thmost barriers of emergency nurses regarding sepsis and sepsis management in Palestinian hospitals and 2ndmost barriers of emergency Physicians regarding sepsis and sepsis management in Palestinian hospitals.

Chapter Six: Conclusion, Recommendations, Limitations and Budget of the study

6.1 Conclusion

Based on the findings, it is evident that lack of monitoring equipment is the biggest barrier to providing quality care to patients who present with sepsis toward emergency nurses and physicians. The study further revealed that 56.8% of the emergency nurses and physicians did not attend sepsis training and continuing education related to sepsis and sepsis management. Relating to Specific protocols / Guidelines in sepsis and sepsis management, 97.1% of the emergency nurses and physicians did not receive any specific protocols / Guidelines. Therefore, it can be concluded that emergency nurses and physicians had a poor to moderate level of knowledge and emergency physicians had higher attitudes regarding sepsis and sepsis management than emergency nurses. However, the practices of sepsis and sepsis management were moderate levels among emergency nurses and physicians.

6.2 Recommendations of this study

- Dissemination of current recommendations about sepsis and management of sepsis among emergency nurses and physicians in order to avoid mistakes and sometimes risky attitudes, Practices, common therapeutic errors and the lack of emergency department resources.
- Implementation of training and continuous education program for emergency nurses and physicians by using the latest guidelines regarding the proper management of sepsis. This may be an effective method to change the emergency nurses' and physicians' knowledge and practices toward the management of sepsis.

- Consider providing monitoring equipment, staff, and laboratories with diagnostic resources in emergency departments to improve the management of sepsis patients.
- The MOH and decision-makers should be recommended to formulate unique protocols / Guidelines for dealing with sepsis patients in Palestinian hospitals.

6.2.1 Recommendations for future research

- The role of policymakers, healthcare providers, and quality, patient safety, and infection control departments in sepsis and sepsis management in Palestinian hospitals.
- The perceptions and knowledge against definition, causes of infection, diagnostic criteria, scores, and hemodynamic parameters and early detection regard to sepsis and sepsis management.
- The impact of a shortage of staff on sepsis and sepsis management.
- The impact of training programs on emergency nurses and physician's knowledge, attitudes and practices regarding sepsis and sepsis management.

6.3 Limitation of the study

The limitation of this study was the limited information, insufficient and inappropriate data registry related to insufficient time and workload toward participants, Limited resources like literature, and guidelines/protocols, the lack of funds spent on scientific research, and Transportation.

Finally, Corona pandemic and the difficulty of meeting nursing and Physicians in hospitals.

6.4 Budget

The research budget was formatted as a list or a table of equipment / consumables:

Table 6.4.1 The research budget.

Total cost for study			
Expense description	**Number of units**	**Cost of each unit**	**Total cost**
Transportation	35visits	50 ILS	1750 ILS
Data analysis/Software	243 survey	5 ILS	1215 ILS
Survey copies	250 copy	1 ILS	250ILS
Thesis book copies	4 copies	50 ILS	200 ILS
Total			3415 ILS

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Appendix

Annex (1): Questioner (sepsis survey)

SEPSIS SURVEY

RESEARCH STUDY: KNOWLEDGE, ATTITUDES, PRACTICES, AND BARRIERS REGARDING SEPSIS AND SEPSIS MANAGEMENT AMONG EMERGENCY NURSES AND PHYSICIANS IN PALESTINIAN HOSPITALS.

Section 1: Demographics Data.

Please answer the following questions regarding your current information about your demographics.

1. Gender:

1.1. Male:	
1.2. Female:	

2. Age:

2.1. 21-29:	
2.2. 30-39:	
2.3. 40-49:	
2.4. ≥50:	

3. Which of the following best describes you?

a. Physician

b. Nurse

4. Educational level:

3.1. Bachelor's Degree	
3.2. Master Degree	
3.3. Doctor of Philosophy (PhD)	

3.5. Diploma	
3.4. High Diploma	
3.5. Other:	

5. How many years of experience in the Emergency Department?

< 3 years	
3 to<5 years	
5 to<10 years	
≥ 10 years	

6. Work experience as a (Nurse / physician) by year:

< 5 years	
5 to<10years	
10 to <15 years	
≥ 15 years	

7. Sepsis training and continual education:

Emergency workshop	
Online education	
Sepsis in primary care course	
Non	
Other:	

8. Do you follow a specific Protocol / Guidelines in sepsis Management?

Yes, please mention…….	
No	

9. What percentage of all your shifts do you have to deal with sepsis patients at the Emergency Department?

< 10% of shifts	
10-30% of shifts	
31-50% of shifts	
51-70% of shifts	
>70% of shifts	

Section 2: Variables

Circle the correct answer for the questions/statements below:

2.1. KNOWLEDGE

Level of knowledge regarding sepsis and sepsis management among Palestinian's emergency Nurses and physicians.

1. **The most common cause of infection in the majority of your septic patients is ……., (Please circle one option)**

    a) Respiratory tract infections
    b) Urinary tract infections
    c) Intra-abdominal infections
    d) Central nervous system infections
    e) Musculoskeletal and skin infections
    f) Other (Please specify_____)

2. **Suppose a patient present to your ED with symptoms suggestive of sepsis. From the time the patient arrives at your door, the time elapses before the patient receives antibiotics is ……. (Please circle one option)**

    a) 0-30 minutes
    b) 31 minutes – 60 minutes
    c) 61 minutes – 120 minutes
    d) 121 minutes – 180 minutes
    e) 181 minutes – 240 minutes

3. **Suppose a patient present to your ED with symptoms suggestive of sepsis. From the time the patient arrives at your door, the time elapses before a lactate test is performed is ……. (Please circle one option)**

    a) 0-30 minutes
    b) 31 minutes – 60 minutes
    c) 61 minutes – 120 minutes
    d) 121 minutes – 180 minutes
    e) 181 minutes – 240 minutes
    f) Not typically performed

4. **the lactate threshold which indicates that your patients are septic is:**

    a) 4 mmol/L
    b) 2 mmol/L
    c) < 4 mmol/L
    d) < 2 mmol/L

5. **How often do monitoring activities happen in the ED in which you work? These activities can include taking the blood pressure, respiratory rate, SPO2, JVP and mental status of a septic patient. (Please circle option)**

    a) At least once every 30 minutes
    b) At least once every 1 hour
    c) At least once every 2 hours
    d) At least once every 3 hours

6. **Which of the following is/are in the definition of systemic inflammatory response?**

    a) Body temperature >38oC or body temperature <36o C
    b) Tachycardia
    c) Tachypnoea
    d) White cell count >12,000/mm^3 or < 4,000/mm^3
    e) All of the above

7. Patients in septic shock have hypotension despite intravascular volume restoration with fluids.

a) True
b) False

8. Which of the following sign/s, increase/s the suspicion of a patient in sepsis?

a) The fall in of mean arterial pressure <70mmHg
b) Blood glucose >120 mg / dL in non-diabetic patient
c) Reduction of hourly urine excretion
d) Increased Fe and serum ferritin
e) Oxygen saturation's fall

9. Signs such as vomiting, diarrhea, gastroparesis, ileum may be an early sign of organ dysfunction

a) True
b) False

10. I consider that my patient has the septic syndrome, when the level of consciousness alters

a) True
b) False

11. The scoring assessing system for sepsis is used in daily practice in my working place

a) True
b) False

12. It doesn't matter, if Antibiotic is given before the blood cultures are collected?

a) True
b) False

13. Hyperglycemia (blood glucose level greater than 7.7 mmol/L) in the absence of diabetes meets the diagnostic criteria for sepsis.

a) True
b) False

14. A white blood cell count of $4*10^9$/L meets diagnostic criteria for sepsis.

a) True
b) False

15. Sepsis definition: the presence of infection with 2 SIRS criteria.

a) True
b) False

16. The level of SPO_2 on sepsis patients are < 90%.

a) True
b) False

17. In addition to suspected or confirmed infection, the following are general diagnostic criteria for sepsis. How often are these presenting symptoms or signs found in your patients who have sepsis? (Please check one option)

	Never	**Rarely**	**Occasionally**	**Frequently**	**Always**
Fever (more than 38.3C)					
Tachycardia (more than 90/minutes)					
Tachypnea (more than 20 breaths/minute)					
Hyperglycemia					

2.2. ATTITUDES

Marking key for the questions/statements below by Likert scale:

5= Strongly Agree	4= Agree	3= Natural	2= Disagree	1= Strongly Disagree

Level of Attitudes regarding sepsis and sepsis management among Palestinian's emergency Nurses and physicians.

VARIABLE –ATTITUDES	Strongly Disagree (1)	Disagree (2)	Natural (3)	Agree (4)	Strongly Agree (5)
(2.2.1) I think that constant availability of **IVFs** to be a positive factor that aided in the management of patients with sepsis.					
(2.2.2) I think *ANTIBIOTIC SPECIFIC RESPONSES* (such as: Constant availability of antibiotics, and Availability of quality antibiotics), are the most important changes that can happen in this Department to allow you to take the best care of your septic patients.					
(2.2.3) I think *EQUIPMENT SPECIFIC RESPONSE* (such as: Advanced machines, and Equipment adequate and in good condition e.g., syringe pump), are the most important changes that can happen in this Department to allow you to take the best care of your septic patients.					
(2.2.4) I think *LAB SPECIFIC RESPONSES* (such as: Availability of laboratory tests and drugs, and Availability of blood culture bottles), are the most important changes that can happen in this Department to allow you to take the best care of your septic patients.					
(2.2.5) I think that I feel confident in dealing with patient's sepsis.					

(2.2.6) I think that I am confident in recognizing signs and symptoms of sepsis.					
(2.2.7) I think that I am confident in recognizing early laboratory diagnostics test for sepsis.					
(2.2.8) I think that an educational training about sepsis should be implemented in the hospital.					
(2.2.9) I think that early screening and intervention will improve outcome for sepsis patients.					

2.3. PRACTICES

Level of Practices regarding sepsis and sepsis management among Palestinian's emergency Nurses and physicians.

VARIABLE – PRACTICES	**Strongly Disagree (1)**	**Disagree (2)**	**Natural (3)**	**Agree (3)**	**Strongly Agree (4)**
(2.3.1) I use these following available laboratory investigations for sepsis patient or with symptoms suggestive of sepsis: *** Blood Sugar** *** Blood gas analysis** *** Bilirubin** *** Prothrombin time/ INR** *** Serum Lactate** *** Other coagulation tests**					
(2.3.2) I use *Urinalysis or microscopy for leukocytosis* as a first examination or test for patient presents to your department with symptoms suggestive of sepsis.					
(2.3.3) I follow the Urinalysis per week from (0-5 times) at Emergency department.					
(2.3.4) I use *Ceftriaxone /Flagyl* as a broad-spectrum antibiotic to treatment a patient presents to your department with sepsis.					
(2.3.5) according the previous questions are these antibiotics available?					
(2.3.6) I use these indicators of inflammation to diagnose sepsis in your patients. * **Leukocytosis (WBC count >12000)**					

* **Leukopenia (WBC <4000)** * **More than 10% immature forms** * **Plasma C-Reactive protein** * **Plasma pro-calcitonin.**					
(2.3.7) I use *Crystalloid solutions* (e.g., Normal Saline, and Ringer's Lactate or Hartmann's Solution), as a most common type of rehydration fluid in your Department.					
(2.3.8) I use Drop count when I follow the rate of flow of the IV fluid during start infusion.					
(2.3.9) I follow Orthostatic blood pressure when appropriate fluid resuscitation has been achieved for sepsis patient.					
(2.3.10) I use urinary catheters when want to monitor urinary output for severely septic patients.					
(2.3.11) I use this equipment that can monitor of sepsis patient: * **Body temperature** * **Noninvasive blood pressure** * **Invasive blood pressure** * **Oxygen saturation** * **Central venous pressure** * **Cardiac output** * **Pulmonary arterial pressure** * **End-tidal carbon dioxide**					
(2.3.12) Are these diagnostic tests available used when working for the patient with sepsis? * **X-Ray** ***Ultrasonography** ***Echocardiography**					
(2.3.13) I use these vasopressors, when working with severe sepsis progresses to septic shock: *** Norepinephrine** *** Epinephrine** *** Vasopressin** *** Dopamine**					
(2.3.14) I following Decreased urine output as a variable can be lead you to begin an infusion of vasopressors.					

2.4. BARRIERS

Barriers regarding sepsis and sepsis management among Palestinian's emergency Nurses and physicians.

VARIABLE–BARRIERS	**Strongly Disagree (1)**	**Disagree (2)**	**Natural (3)**	**Agree (4)**	**Strongly Agree (5)**
(2.4.1) In your opinion, *Lack of broad-spectrum antibiotics* are the biggest barriers to providing quality care to patients who present with sepsis.					
(2.4.2) In your opinion, *Workload in the emergency department* is the biggest barriers to providing quality care to patients who present with sepsis.					
(2.4.3) In your opinion, *shortage of staff* is the biggest barriers to providing quality care to patients who present with sepsis.					
(2.4.4) In your opinion, *lack of information about the sepsis* is the biggest barriers to providing quality care to patients who present with sepsis.					
(2.4.5) In your opinion, *inadequate lectures/workshop/conference/seminars/ about sepsis* are the biggest barriers to providing quality care to patients who present with sepsis.					
(2.4.6) In your opinion, *lack of monitoring equipment* is the biggest barriers to providing quality care to patients who present with sepsis.					

THANK YOU FOR YOUR PARTICIPATION!!

Annex (2): Consent form

نموذج طلب موافقة على المشاركة في بحث علمي

اسم الباحث: على أبو عماش.

عنوان البحث: المعرفة، المواقف، الممارسات، والعوائق المتعلقة بإدارة الأنتان بين ممرضين وأطباء الطوارئ في المستشفيات الفلسطينية.

المشرفين على البحث: د. بسمة سلامة (مشرفاً اكاديمياً).

مكان إجراء البحث: مستشفيات الضفة الفلسطينية.

ملخص البحث: نقوم بهذه الدراسة جزءا لمتطلبات التخرج من برنامج ماجستير تمريض الطوارئ في الجامعة العربية الأمريكية وهي دراسة علمية لمعرفة مستوى المعرفة، المواقف، الممارسات، والعوائق المتعلقة بإدارة الأنتان بين ممرضين وأطباء الطوارئ في المستشفيات الفلسطينية.

معلومات عن العينة المنتقاة والفترة الزمنية المقدرة لاستكمال الاستبيان:

تم اختيار فئة ممرضين الطوارئ والأطباء لاجراء هذا البحث العلمي عليهم وستبدأ الدراسة من لحظة استلام المشارك/ة الاستبيان المخصص لذلك لحين الأنتهاء من تعبئتهما يستغرق فترة من (10-15) دقيقة.

المخاطر المتوقعة والخصوصية:

ليست هنالك اي مخاطر للدراسة سواء نفسية ام جسدية. سيتم حفظ خصوصيتك/ي كمشارك/ة بالدراسة وسوف يتم التكتم على هويتك ولن يطلب اسم المشارك/ة من ضمن الأستبيان. سوف يتم التعامل مع العينة والمعلومات الخاصة بك بطريقة سرية، ويحق لك الانسحاب من البحث متى شئت من دون أن يؤثر ذلك عليك.

المنافع المتوقعة:

تتطلع هذه الدراسة للوصول الى دراسة تحديد مستوى المعرفة .المواقف والممارسات المتعلقة بإدارة الإنتان . بالإضافة إلى ذلك، ستحدد الدراسة العوائق الرئيسية التي ستوفر المعرفة والأدوات التي تعتبر ضرورية لتحديد ورعاية المرضى الذين يعانون من الأنتان في وقت مبكر وتقليل معدلات الوفيات .أيضًا، ستفحص الدراسة العلاقة بين الخصائص الديموغرافية الاجتماعية التي قد تؤثر على المعرفة والمواقف والممارسة والحواجز بين كل من الممرضات والأطباء.

طريقة التواصل مع الباحث:

إذا كانت لديك اي سؤال او استسفار عن الدراسة يمكنك التواصل مع الباحث (علي أبو عماش) بكل رحابة وفي اي وقت عن طريق (ال هاتف0595700357) أو البريد الإلكتروني (aliammash937@gmail.com).

توقيع المشارك/ة في البحث:

لقد حصلت على شرح مفصل عن الدراسة وأهدافها وإجراءاتها، ومنافعها، والمخاطر المحتملة. ولقد فهمت كافة المعلومات التي قدمت لي وتمت الإجابة على كل أسئلتي. لذا فأنني أوافق وبمحض ارادتي على المشاركة في هذه الدراسة.

التوقيع: .....

التاريخ: .....

Annex (3): IRB Approval

المجلس الفلسطيني للبحث الصحي

Palestinian Health Research Council

تعزيز النظام الصحي الفلسطيني من خلال مأسسة استخدام المعلومات البحثية في صنع القرار

Developing the Palestinian health system through institutionalizing the use of information in decision making

Helsinki Committee

For Ethical Approval

Date: 2021\02\01 **Number:** PHRC/HC/805/21

Name: Basma Salameh الاسم:

We would like to inform you that the committee had discussed the proposal of your study about: نفيدكم علماً بأن اللجنة قد ناقشت مقترح دراستكم حول:

Knowledge, Attitudes, Practices and Barriers regarding sepsis management among emergency nurses and physicians in Palestinian hospitals.

The committee has decided to approve the above mentioned research. Approval number PHRC/HC/805/21 in its meeting on 2021\02\01 و قد قررت الموافقة على البحث المذكور عاليه بالرقم والتاريخ المذكوران عاليه

Signature

Member **Member**

Chairman

Genral Conditions:-

1. Valid for 2 years from the date of approval.
2. It is necessary to notify the committee of any change in the approved study protocol.
3. The committee appreciates receiving a copy of your final research when completed.

Specific Conditions:-

E-Mail:pal.phrc@gmail.com

Gaza - Palestine غزة - فلسطين

شارع النصر - مفترق العيون

Annex (4): Facilitate the task

State of Palestine
Ministry of Health - Nablus
General Directorate of Education in Health

دولة فلسطين
وزارة الصحة– نابلس
الإدارة العامة للتعليم الصحي

Ref.: .....
Date:.....

الرقم: ٢٠٢١/٢٧/١٣٦
التاريخ: ٢٠٢١/٠٢/٠٨

الأخ مدير عام الادارة العامة للمستشفيات المحترم ،،،
الأخ مدير مجمع فلسطين الطبي المحترم،،،
تحية واحترام،،،

الموضـــوع: تسهيل مهمة بحث

لاحقاً لموافقة معالي وزيرة الصحة، يرجى تسهيل مهمة الطالب: **علي ابو عماش**، دراسات عليا تمريض/ الجامعة العربية الامريكية، لعمل بحث بعنوان:

"المعرفة، المواقف، الممارسات، والعوائق المتعلقة بادارة الانتان بين ممرضي وأطباء الطوارئ في المستشفيات الحكومية"

وذلك بالسماح له بالحصول على المعلومات من خلال تعبئة استبانة من قبل الممرضين والاطباء (بعد اخذ موافقتهم)، مع العلم ان مشرفة الدراسة د. بسمة سلامة، وذلك في:

- **جميع مستشفيات وزارة الصحة**

على ان يتم الالتزام بجميع تعليمات واجراءات الوقاية والسلامة الصادرة عن وزارة الصحة بخصوص جائحة كورونا، وتحت طائلة المسؤولية.

وتقبلوا فائق الاحترام،،،

د. عبد الله القواسمي
مدير التعليم الصحي والبحث العلمي

نسخة: مشرفة الدراسة المحترمة/ الجامعة الأمريكية

P.O .Box: 14
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ص.ب. 14
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Arab American University
Faculty of Graduate Studies

الجامعة العربية الأمريكية
كلية الدراسات العليا

التاريخ 21/01/2021

حضرة د. عبد الله القواسمي المحترم

رئيس وحدة التعليم الصحي والبحث العلمي

تحية طيبة وبعد،

الموضوع: "تسهيل مهمة بحث لطلاب الدراسات العليا – تخصص ماجستير تمريض الطوارئ"

تهديكم الجامعة العربية الأمريكية أطيب تحياتها وبالإشارة إلى الموضوع أعلاه، وتماشيا مع سياسة دائرة التمريض في **كلية العلوم الطبية المساندة/الجامعة العربية الأمريكية** المتعلقة بتعزيز التعاون بين المؤسسات **ووزارة الصحة الفلسطينية الموقرة** بإتاحة فرص الإثراء العلمي للطلبة والخريجين في المؤسسات الوطنية وإسهامها في تنمية قدراتهم وخبراتهم ونرجو من حضرتكم التكرم بالإيعاز للجهات المعنية لتسهيل مهمة الطالب **علي أبو عماش** في الدراسات العليا حسب المجموعة المبينة أدناه لاستكمال بحثه العلمي بعنوان:" **المعرفة، المواقف، الممارسات، والعوائق المتعلقة بادراه الأنتان بين ممرضين وأطباء الطوارئ في المستشفيات الفلسطينية**" في مستشفيات وزارة الصحة.وذلك لأغراض البحث العلمي حيث سيكون الهدف من الدراسة :"تقييم مستوى المعرفة ,المواقف ,الممارسات,والعوائق المتعلقة بادراه الأنتان بين ممرضين وأطباء الطوارئ في المستشفيات الفلسطينية". عن طريق استمارة يتم تعبئتها الكترونيا من قبل الممرضين والأطباء في مستشفيات وزارة الصحة على أن تبدأ مهمتهم البحثية يوم الأحد بتاريخ 2021/1/21 وتنتهي يوم الاثنين 2021/3/31 تحت إشراف (د. بسمة سلامة).

كما نود التنويه بأن الطالب علي أبو عماش سوف يقوم بجمع الاستمارات من تمريض الطوارئ والأطباء وتعبئتها الكترونيا وذلك بعد الحصول على موافقة رسمية من حضرتكم وأيضا **نتعهد بعدم ذكر أسماء المستشفيات أو أنها تابعة لوزارة الصحة في حال تم نشر البحث.**

مع فائق الشكر والتقدير،،،

د. أشرف الميمي

عميد كلية الدراسات العليا

كلية الدراسات العليا
FACULTY OF GRADUATE STUDIES

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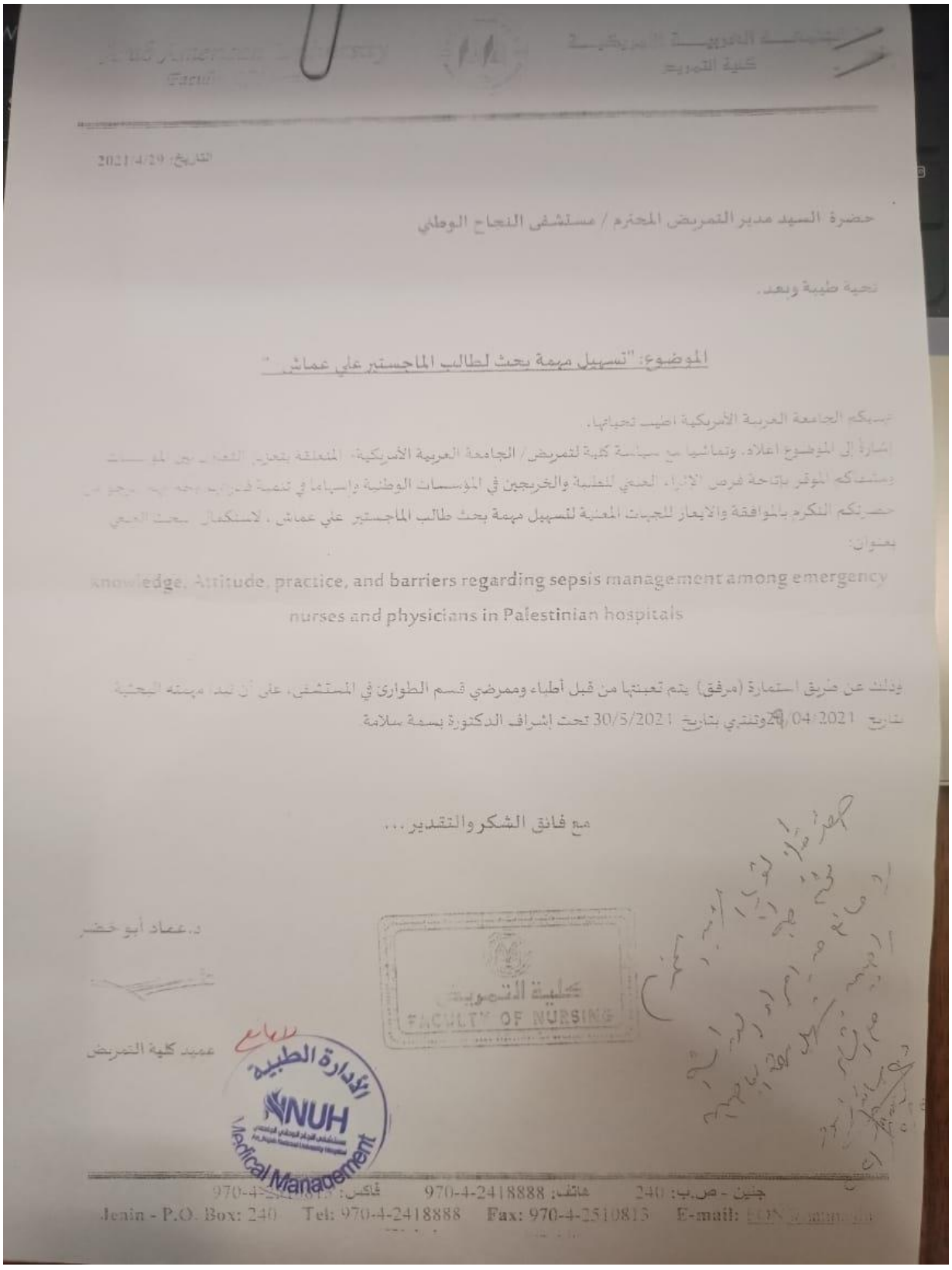

كلية التمريض

التاريخ: 2021/4/29

حضرة السيد مدير التمريض المحترم / مستشفى النجاح الوطني

تحية طيبة وبعد،

الموضوع: "تسهيل مهمة بحث لطالب الماجستير علي عماش "

تهديكم الجامعة العربية الأمريكية اطيب تحياتها.

إشارة إلى الموضوع اعلاه، وتماشيا مع سياسة كلية التمريض / الجامعة العربية الأمريكية، المتعلقة بتعزيز التعاون بين المؤسسات ومشاركة المؤتمر باتاحة فرص الاثراء العلمي للطلبة والخريجين في المؤسسات الوطنية وايمانا في تنمية قدراتهم البحثية يرجى من حضرتكم التكرم بالموافقة والايعاز للجهات المعنية لتسهيل مهمة بحث طالب الماجستير علي عماش ، لاستكمال بحثه العلمي بعنوان:

Knowledge, Attitude, practice, and barriers regarding sepsis management among emergency nurses and physicians in Palestinian hospitals

وذلك عن طريق استمارة (مرفق) يتم تعبئتها من قبل أطباء وممرضي قسم الطوارئ في المستشفى، على أن تبدأ مهمته البحثية بتاريخ 2021/04/29 وتنتهي بتاريخ 30/5/2021 تحت إشراف الدكتورة بسمة سلامة

مع فائق الشكر والتقدير...

د. عماد ابو خضر

عميد كلية التمريض

كلية التمريض
FACULTY OF NURSING

الإدارة الطبية
NUH
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Jenin - P.O. Box: 240 Tel: 970-4-2418888 Fax: 970-4-2510815 E-mail:

دراسة المعرفة والسلوكيات والممارسات والعوائق المتعلقة بادارة الأنتان بين ممرضي وأطباء الطوارئ في المستشفيات الفلسطينية.

الإنتان مشكلة واسعة الانتشار يمكن أن تخلق صعوبات إكلينيكية واقتصادية. تعتبر الحمى من الأعراض الأولى للإنتان التي يتم تشخيصها عادةً أولاً في أقسام الطوارئ وفي غرف الفرز في حالات الطوارئ للتعرف على العلاج المناسب وتقليل الوفيات وتعزيز نتائج المرضى.

هدفت هذه الدراسة الى تقيم المعرفة والسلوكيات والممارسات والعوائق المتعلقة بادارة الأنتان بين ممرضي وأطباء الطوارئ. طبقت الدراسة على معظم المستشفيات الفلسطينية في الفترة ما بين فبراير الى يونيو 2021 م. تم جمع البيانات الكمية باستخدام الاستبيان الذاتي الذي تم إكماله من قبل الممرضات والأطباء المشاركين (العدد = 243) وتم اختيارهم من خلال عينة ملائمة من 17 قسم طوارئ بمعدل استجابة 61٪. تم استخدام الوصف الأحصائي والاستنتاجي لفحص مستولى المعرفة والسلوكيات والممارسات والعوائق لممرضي وأطباء الطوارئ. تم تنفيذ دراسة تجريبية للتأكد من وضوح وصحة محاور الدراسة وبنودها. أظهرت نتائج الدراسة أن معدل المعرفة والمواقف والممارسات الخاصة بإدارة الإنتان والإنتان بين ممرضات الطوارئ كان 49.8٪ و30.9٪ و48.3٪ على التوالي، وأن معدل المعرفة والمواقف والممارسات الخاصة بإدارة الإنتان والإنتان بين أطباء الطوارئ كان 51.3 ٪ و34.5٪ و50.9٪ على التوالي. كان لدى ممرضات وأطباء الطوارئ مستوى ضعيف إلى متوسط من المعرفة وكان لدى أطباء الطوارئ مواقف أعلى فيما يتعلق بإدارة الإنتان والإنتان من ممرضات الطوارئ. ومع ذلك، كانت ممارسات تعفن الدم وإدارة تعفن الدم مستويات معتدلة بين ممرضات وأطباء الطوارئ. من الواضح أن نقص معدات المراقبة هو أكبر عائق أمام تقديم رعاية جيدة للمرضى الذين يعانون من تعفن الدم تجاه ممرضات وأطباء الطوارئ. يحتاج ممرضو وأطباء الطوارئ إلى معلومات متسقة لإدارة الإنتان من خلال تنفيذ التدريب، والبرامج التعليمية المستمرة، وتطوير بروتوكول معتمد يمكن أن يحسن معرفة الممرضات، والمواقف، والممارسات. وبينت النتائج أن المميزات الشخصية للممرضين والأطباء المشاركين ليس لها تاثيرعلى معرفتهم في التعامل مع مرضى الأنتان، بل لها تأثيرعلى سلوكهم وممارساتهم في التعامل مع مرضى الأنتان. ومن المهم تزويد معدات المراقبة والموظفين والمختبرات بموارد التشخيص في أقسام الطوارئ لتحسين إدارة مرضى الإنتان.