An-Najah National University

Faculty of Graduate Studies

PHARMACEUTICAL CARE SERVICES IN THE EMERGENCY DEPARTMENT: A PLACE FOR CLINICAL PHARMACISTS

By

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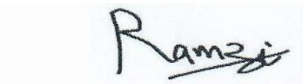
Dr. Ramzi Shawahna	
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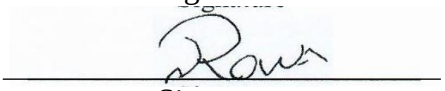
Dr. Rowa' Al-Ramahi	
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Dedication

I gratefully dedicate all of my efforts on my thesis to everyone who has ever taught me a letter, as well as to my family, without their constant encouragement and unconditional love, I would not have been able to finish my graduate studies. Many thanks to my devoted father, mother, wife, daughter and siblings.

Husameddin Bali

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Husameddin Bali

Declaration

I, the undersigned, declare that I submitted the thesis entitled:

PHARMACEUTICAL CARE SERVICES IN THE EMERGENCY DEPARTMENT: A PLACE FOR CLINICAL PHARMACISTS?

I declare that the work provided in this thesis, unless otherwise referenced, is the researcher's own work, and has not been submitted elsewhere for any other degree or qualification.

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PHARMACEUTICAL CARE SERVICES IN THE EMERGENCY DEPARTMENT: A PLACE FOR CLINICAL PHARMACISTS

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Abstract

This study was conducted to assess the views and opinions of the physicians, nurses, and patients about the inclusion of the clinical pharmacists within the multidisciplinary care team in the emergency department.

This study was conducted in a cross-sectional design in different governmental and private hospitals with functional emergency departments in the West Bank of Palestine. The study tool was a questionnaire that was developed based on previous studies. The questionnaire used among the healthcare professionals contained 23 items and the questionnaire used among the patients contained 9 items.

In this study, a total of 321 healthcare professionals and 309 patients were included. The majority of the healthcare professionals and patients agreed that clinical pharmacists can play key roles in improving medication safety, efficacy, cost-effectiveness, and improvements in outcomes of the patients. The pharmacists who were surveyed in this study reported more agreements compared to the physicians and nurses (p-value < 0.001). In addition, younger healthcare professionals rated the roles of the clinical pharmacists in the emergency departments higher that older healthcare professionals (p-value < 0.025). Further more, a significant difference was found in level of education (p=<0.001) health care professionals who held Master and Bachelor's Degrees have reported the highest important roles of clinical pharmacists in emergency departments. There was no significant association between the demographics of the patients and their views and opinions about the inclusion of the clinical pharmacists within the multidisciplinary care team in the emergency department.

Physicians, nurses, and patients valued and appreciated the roles that can be played by clinical pharmacists in the emergency departments. The roles of the clinical pharmacists

in the emergency departments are consistent with the traditional, expanding, and new roles of the clinical pharmacists in hospitalized patient settings. These roles include provision of direct and patient-centered care services. The perceived benefits of inclusion of clinical pharmacists within the multidisciplinary care team in the emergency department include improved medication safety, efficacy, cost-effectiveness, and patient outcomes.

Keywords: Clinical pharmacy, Emergency, Patient-centered care, Pharmacist, Survey

Chapter One

Introduction and Theoretical Background

Historically, emergency medicine has emerged as one of the most complex fields in medicine (Taylor & Young, 2022). This complexity arises from the demand to manage diverse populations of patients with a variety of medical problems and healthcare needs (Greenwood-Ericksen & Kocher, 2019). Therefore, it is essential to call upon healthcare providers from different clinical discipline including primary healthcare practitioners "general practitioners", pediatricians, geriatricians, internal medicine specialists, surgeons, and critical care specialists to care for the patients admitted to the emergency departments (Hooker, Mallow, & Oglesby, 2019). In addition, it is quite common to use high-risk medications in emergency departments. This use is often time sensitive due to the nature and clinical needs of the patients admitted to the emergency departments (Laureau et al., 2021). Therefore, the complexities of the work environment in the emergency departments place these departments on the top high-risk patient care environments (Laureau et al., 2021; Taylor & Young, 2022).

Over the last decades, the roles of clinical pharmacists in emergency departments to help in therapeutic decisions and implement therapeutic care plans have been recognized in mitigating adverse reactions and reducing medication errors (Laureau et al., 2021). It has been argued that the services provided by clinical pharmacists in the emergency department can complement those provided by the other healthcare professionals in the care team including physicians and nurses from different specialties (Morgan et al., 2018).

Historically, the roles of pharmacists in hospitals were mainly focused on procurement of medications, preparation of doses, dispensing of medications, and delivery of the prepared medication doses to the patient bedside (Al-Jumaili, Hussain, & Sorofman, 2013; Hecq, 2016). With the transitions of the pharmacy profession over the last few decades, the roles of the clinical pharmacists have evolved to focus on providing more patient-centered care services including optimizing medication therapy, promotion of the wellbeing of the patients, and prevention of diseases (Morgan et al., 2018). As experts in medications, clinical pharmacists are in key position to use their expertise and skills in

collaboration with the other healthcare professionals in the care team to optimize the therapeutic use of medications (Hughes, Roth, & Laurel, 2010; Morgan et al., 2018). Contributions of the clinical pharmacists in providing patient-centered care services and improving the outcomes of the patients have been well-documented (Morgan et al., 2018). These contributions were often translated in terms of reducing costs of the therapy, medication errors, adverse events, hospital admission rates, and mortality (Mekonnen, McLachlan, & Brien, 2016a; Roman, Edwards, Dooley, & Mitra, 2018). Therefore, clinical pharmacists have recently been highly valued as care team members in the emergency departments in different healthcare systems around the world (Hughes et al., 2010; Mekonnen et al., 2016a; Morgan et al., 2018; Roman et al., 2018).

1.1 Historical perspectives of inclusion of clinical pharmacists into emergency departments

Clinical pharmacists were reportedly included in the emergency departments in 1970s (Elenbaas, Waeckerle, & McNabney, 1977). The initial roles of the clinical pharmacists that were introduced into the emergency departments included distribution of medications and using their pharmacological and therapeutic knowledge for providing cognitive and consultative services (Elenbaas et al., 1977; Morgan et al., 2018). When the physicians and nurses were surveyed for their views and opinions about the inclusion of clinical pharmacists in the emergency department in a single center, the majority of physicians and nurses supported the inclusion of clinical pharmacists into the care team and agree that pharmacists should provide care services to patients after receiving diagnosis by the physicians (Elenbaas et al., 1977). Later, these roles evolved to providing consultations to clinicians related to the use of medication therapy in resuscitations (Morgan et al., 2018).

With the advancements in clinical sciences and practice, the roles of clinical pharmacists in the emergency departments have also evolved and expanded to provide more patient-centered care services. These patient-centered care services include providing bedside assessments of the patients in collaboration with the fellow care team members and providing pharmacotherapeutic recommendations that are patient- and disease-specific (Hughes et al., 2010; Mekonnen et al., 2016a; Roman et al., 2018).

1.2 Support and recognition by other organizations

Educational materials were developed by the Section of Clinical Specialists and Scientists Advisory Group on Emergency Care of the American Society of Health-System Pharmacists to enable the clinical pharmacists to provide clinical pharmacy services within the emergency department. The resolution “Support for Clinical Pharmacists as Part of the Emergency Medicine Team” was approved by the American College of Emergency Physicians in 2014. As a result, the roles of clinical pharmacists within the emergency departments were recognized. Now, clinical pharmacists are known to promote the safe, efficient, and effective use of medications within the emergency department. Therefore, many emergency departments in different healthcare systems employ dedicated clinical pharmacists.

In 2017, the American College of Medical Toxicology issued a statement that clinical pharmacists in the emergency departments are essential and integral to the multidisciplinary care team providing care to adults and pediatrics in the emergency department (Farmer, Hayes, Rao, Farrell, & Nelson, 2018). The American College of Medical Toxicology highlighted the advantages of inclusion of clinical pharmacists in the emergency departments including optimizing pharmacotherapy, ensuring safety, cost effectiveness, and supporting other members of the care team in the emergency departments.

1.3 Evolution and expansion of the roles of clinical pharmacists in emergency departments

In current clinical practice, clinical pharmacists in emergency departments play central roles in caring for patients in the different emergency departments and in different healthcare systems around the world (Hughes et al., 2010; Mekonnen et al., 2016a; Morgan et al., 2018; Roman et al., 2018; Sinopoulou et al., 2021; Witsil, Aazami, Murtaza, Hays, & Fairbanks, 2010). Today, clinical pharmacists practice and provide patient-centered care services in large tertiary care centers, community care centers, small care centers, and other emergency care centers in rural areas.

As per the recent guidelines, the roles of the clinical pharmacists in the emergency departments and provision of emergency pharmacy services should be tailored to meet the needs of the care centers or institutions and as per the established best practices by the

American Society of Health System Pharmacists (Ortmann et al., 2021). The roles of clinical pharmacists in the emergency departments are summarized in the sections below.

1.3.1 Bedside activities

Clinical pharmacists in emergency departments are included in the resuscitation teams in the emergency departments and provide bedside services to patients admitted for sepsis, stroke, myocardial infarction, cardiopulmonary arrest, burn resuscitation, and/or cardiopulmonary arrest, among others.

The services provided by the clinical pharmacists in the emergency departments include:

- Providing direct bedside care services while using high-risk medications (during sedation or intubation)
- Providing pharmacotherapy consultations including provision of drug information, selection of medications, deciding on the optimal doses based on the patient factors like weight, age, accessible routes of administration, renal, and hepatic functions
- Providing and advising on medication therapy monitoring
- Analyzing and decisions to avoid drug interactions
- Providing advice on drug incompatibilities, mixing, preparation, and administration of medications
- Analysis and decisions to avoid medication errors and adverse drug reactions
- Reporting medication errors and adverse drug events
- Providing patient counseling and education
- Providing recommendations to avoid toxicity by medications and treating drug related toxicities
- Providing counseling and recommendations to meet disease-state targets (for example while using anticoagulant therapy or anaphylaxis)
- Activities related to antimicrobial stewardship including microbiological cultures, sensitivity, and susceptibility testing
- Review and verification of medication orders
- Procurement and preparation of medications (including advising on storage, distribution, and preparation of the related policies)
- Providing recommendations on medication administration
- Providing recommendations on vaccine administration

- Providing recommendations on emergency preparedness
- Taking medication history from the patients
- Overseeing pharmacy technicians, trainees, and trainee students

1.3.2 Training and education

Clinical pharmacists in emergency departments can also provide training and education services. The training and education activities include:

- Updating medication therapy information and guidelines
- Providing education to the emergency department care team on the optimal use of medications
- Providing education to the residents, trainees, and students through lectures, conferences, seminars, and during rotations
- Participation in planning and implementation of post-graduate and continuing education in emergency pharmacy courses and residence programs
- Participation in interdisciplinary care team simulations, education, and training

1.3.3 Improvement of performance

The clinical pharmacists in the emergency departments can improve performance within the emergency department. The related activities include:

- Development of guidelines, protocols, and processes
- Development and management of the hospital's medications formulary
- Optimization of the medication dispensing cabinet
- Optimizing workflows of medication procurement
- Launching initiatives to improve medication safety
- Active participation in audit and analysis committees like root cause analysis, failure mode and effect analysis
- Improving adherence to the institutional and regulatory medication use policies

1.3.4 Scholarly activities

Clinical pharmacists in emergency departments can also actively participate in the scholarly activities in the emergency department including:

- Participation in the clinical research activities in the emergency department

- Identifying patients to be recruited and included in clinical trials and drug studies in the emergency department
- Active participation in the different research committees in the emergency department
- Participation in preparation and submission of research grant applications
- Participation in quality improvement projects conducted at the emergency departments
- Participation in writing and dissemination of research activities in the form of research articles, book chapters, books, conference papers, care reports, and other forms of scholarly publications

1.4 Opportunities for clinical pharmacists in emergency departments

In many healthcare systems, the roles of clinical pharmacists in emergency departments have been recognized. These healthcare systems include those in the United States, United Kingdom, Canada, France, Spain, and Australia (Elenbaas et al., 1977; Morgan et al., 2018; Roman et al., 2018; Sinopoulou et al., 2021; Witsil et al., 2010).The roles and potentials of clinical pharmacists within the emergency department were recognized in some Arab countries including Qatar, Saudi Arabia, and United Arab Emirates (Abdelaziz et al., 2016; Abualenain & Bakhsh, 2018; Abushanab et al., 2023; Alshaya et al., 2021; Fahmy, Rasool, & Abdu, 2013).

It has been noted that clinical pharmacy programs within emergency departments have witnessed a steady rise over the last years. Since 2003, there has been a growing trend in the number of emergency departments with dedicated clinical pharmacists (Morgan et al., 2018). More recent surveys have reported that the majority of emergency departments in the United States receive clinical pharmacy services (Farmer et al., 2018; Morgan et al., 2018; Roman et al., 2018; Sinopoulou et al., 2021). However, these services differ in terms of types of services offered and coverage time.

1.5 Training of emergency department clinical pharmacists

As the roles and duties of the clinical pharmacists in the emergency departments have increased over the last decades, training and educational requirements have also increased. Beyond the academic degree requirements, emergency department clinical

pharmacists are now increasingly required to attend advanced training and obtain specialized certifications. These certification programs were created to reflect knowledge in a variety of specialties. Today, clinical pharmacists can become board-certified through the Board of Pharmacy Specialties after completing the certification requirements. In addition, clinical pharmacists are often required to complete general and specialty post-graduate residency training programs (Hu & Myres, 2020). These training and residency programs often address the unique cognitive needs and equip the trainees with the skills required to practice in the field. The residence and training programs are often designed to provide in-depth knowledge of the different disease and medical conditions encountered in the emergency departments, treatments, workflow and standard practices in the emergency departments, collaboration with interdisciplinary care team in the emergency departments, performing time-sensitive medication tasks including efficient and quick dilution or preparation of medications, and development of treatment goals for the patients admitted to the emergency departments (Ortmann et al., 2021).

Today, there are many accredited specialty pharmacy residency programs. Residents are trained in emergency clinical pharmacy services in the first post-graduate year of the residency program. However, this training is usually non-specialized and comes as elective. This has led to many clinical pharmacists seeking training in emergency clinical pharmacy services. Some of the emergency clinical pharmacy programs entail performing shadows of the clinical staff within the emergency departments, a thorough understanding of the job duties and roles of the clinical pharmacists in the emergency department, daily operations in the emergency department, and guidelines and policies of the hospital (Aldridge, Park, Bounthavong, & Morreale, 2009). The “Patient Care Impact Program (PCIP): Introducing an Emergency Pharmacist to Your Institution” was developed and published by the American Society of Health-System Pharmacists to provide experiential mentorship and training at the time of introducing clinical pharmacy services in the emergency departments (Witsil et al., 2010).

1.6 Contributions of emergency department clinical pharmacists

In this section, the contributions of the emergency department clinical pharmacists practicing in different healthcare systems are outlined.

1.6.1 The impact of the clinical services and consultations

Previous studies have reported that the clinical services and consultations provided by the emergency department clinical pharmacists improved patient outcomes as measured by disease-state specific measures, adherence to the organizational, national, and international guidelines of clinical practice and care, rationale use of medications, re-admission of patients to the emergency departments or hospitals, infection control, and antimicrobial stewardship (Acquisto et al., 2020; Choi & Kim, 2019; Roman et al., 2018). The clinical services and consultations provided by the emergency department clinical pharmacists resulted in the outcomes summarized below:

- For patients admitted to the emergency department for acute myocardial infarction, the services and consultations provided by the emergency department clinical pharmacists reduced the door-to-cardiac catheterization laboratory time of 13.1 minutes and door-to-balloon time of 11.5 minutes.
- For patients admitted to the emergency department for acute ischemic stroke, the services and consultations provided by the emergency department clinical pharmacists reduced the door-to-recombinant tissue plasminogen activator time of 20 minutes.
- For patients admitted to the emergency department for sepsis, the services and consultations provided by the emergency department clinical pharmacists reduced the time to administration of effective antibiotic of 44 minutes, increased the proportion of the patients receiving empiric antibiotics by 23.6%, reduced the time to review culture report by 1 day, and reduced inappropriate antibiotic use by 30%.
- For patients admitted to the emergency department for seizures, the services and consultations provided by the emergency department clinical pharmacists increased the proportion of epileptic patients receiving optimal phenytoin dosing by 32%.
- For patients admitted to the emergency department with risk of infections or re-infections, the services and consultations provided by the emergency department clinical pharmacists increased the proportion of patients receiving influenza vaccine by 4-fold.
- For patients admitted to the emergency department who needed rapid sequence intubation, the services and consultations provided by the emergency department

clinical pharmacists decreased the time to sedation post-intubation by 19 minutes and to analgesia post-intubation by 23 minutes .

- For patients admitted to the emergency department, the services and consultations provided by the emergency department clinical pharmacists reduced discharge prescription errors, reduced re-admission to the emergency department by 50%, improved education of patients of their diseases and medications, improved adherence to medications use, and improved other patient outcomes .
- For patients admitted to the emergency department, the services and consultations provided by the emergency department clinical pharmacists reduced unplanned admissions by 12%.

1.6.2 Promoting medication safety

Because the emergency department is often one of the most busy and crowded department of any hospital, medication errors are often frequent in these settings. The medication errors in the emergency departments can occur during clinical decision making, prescription, transcription, preparation, dilution, dispensing, or administration (Choi & Kim, 2019). Many previous studies have shown that inclusion of clinical pharmacists within the multidisciplinary emergency care team can reduce medication errors by increasing interception of errors before they occur (Choi & Kim, 2019; Mekonnen, McLachlan, & Brien, 2016b). Because they are experts in medications, emergency department clinical pharmacists are in key position to review medication orders, intercept errors, and prevent them for reaching the patients. A previous study showed that emergency department clinical pharmacists could intercept 364 medication errors in 1000 hours (Patanwala et al., 2012). Another study has reported that emergency department clinical pharmacists intercepted 504 medication errors in 800 hours (Rothschild et al., 2010). The majority of errors were intercepted by the emergency department clinical pharmacists during reviews of medication orders and consultative activities.

1.6.3 Reducing costs

The benefits related to cost-effectiveness of including clinical pharmacists within the emergency departments are summarized below (Abdelaziz et al., 2016; Farmer et al., 2018; Hooker et al., 2019; Laureau et al., 2021; Morgan et al., 2018; Roman et al., 2018; Witsil et al., 2010).

- Clinical pharmacists performed 646 in an emergency department over a period of 4 months. These interventions resulted in saving $192,923. The majority of the interventions performed by clinical pharmacists involved correcting subtherapeutic doses, identifying allergies, and provision of other treatment-related consultations.
- Clinical pharmacists performed 1,393 in an emergency department over a period of 4 months. These interventions resulted in saving $1,029,776. The majority of the interventions performed by clinical pharmacists involved adjusting doses and suggesting starting medications.

1.7 Challenges and barriers limiting the inclusion of clinical pharmacists in the emergency departments

The roles, duties, and contributions of the emergency department clinical pharmacists were recently recognized. Similar to any new service, there are several challenges and barriers that hinder the inclusion of clinical pharmacists within the multidisciplinary care team in the emergency departments. The barriers to the inclusion of clinical pharmacists within the multidisciplinary care team in the emergency departments are summarized below (Thomas, Acquisto, Shirk, & Patanwala, 2016; Witsil et al., 2010):

- Obtaining approvals to fund and support allocating clinical pharmacists to the emergency department.
- Maintaining staff beyond the classic working hours.
- Defining the roles and job description of the clinical pharmacists within the emergency department.
- Adapting the workflow within the emergency department to include clinical pharmacists and clinical pharmacy services.
- Acceptance by and securing the needed support from the staff in the hospital, pharmacy, and emergency department.

For most hospitals, inclusion of clinical pharmacists in the emergency department is often considered an expensive decision. This could be attributed to the fact that the emergency department clinical pharmacists would not generate direct revenues (Thomas et al., 2016). Therefore, it is important for the management and leadership within the healthcare system and hospitals to value the contributions of the clinical pharmacists in the emergency department to make such a decision (Witsil et al., 2010).

1.8 Emergency department clinical pharmacists in the Arab region

In Qatar, a study was conducted to evaluate the impact of introducing clinical pharmacy services in emergency department (Abdelaziz et al., 2016). The study was conducted to evaluate the contributions of clinical pharmacy services in a short stay unit of an emergency department. Within 7 months, the interventions and recommendations made by the clinical pharmacists in the emergency department were reviewed. There were 824 documented interventions. The most frequent interventions were related to providing informational consultations to the physicians, recommendation to discontinue medications, adjusting doses, adding medications, modifying the frequency of medication administrations, resuming medication administration, and educating patients.

In a more recent study, pharmacist-led interventions among hospitalized patients in a major hospital in Qatar were analyzed (Naseralallah et al., 2023). The study was conducted in different departments including the emergency department. A total of 858 interventions were included in the study. The study showed that the interventions were related to addition of medications, discontinuation of medications, and dosing adjustments. The study concluded that the interventions of the clinical pharmacists resulted in identifying, preventing, and resolving medication related problems.

Another study was conducted to evaluate the economic benefits of the clinical pharmacist interventions in a tertiary care hospital in Qatar (Abushanab et al., 2023). The study was conducted in different departments including the emergency department. Authors analyzed 852 clinical pharmacist interventions. During a 3-month period, the interventions resulted in projected annual benefits of $621,106. These were based on negative based savings and positive cost avoidance.

In Saudi Arabia, a study was conducted to explore the perceptions of staff in the emergency department on the clinical pharmacy services provided by emergency department clinical pharmacists (Abualenain & Bakhsh, 2018). The study used a questionnaire that contained 24 items. The questionnaire was answered by 122 emergency staff professionals. The majority of the study participants reported that they have sought consultation by the emergency department pharmacists at least once. About half of the participants expressed agreement that the emergency department pharmacists contribute to the safety of medications use through the medication order review process. The

majority of the participants expressed agreement that emergency department clinical pharmacists improve the quality of care by checking medication orders. The study concluded that the emergency staff agreed that the emergency medicine clinical pharmacists are important members of the care team in the emergency department who can maximize the safety of the medications, educate the staff and patients on medications, and improve the overall quality of care.

In Jordan, a study was conducted to investigate the role of clinical pharmacists in providing emergency pharmacy services, intercepting prescription errors, and prevent medication errors (Abdel-Qader et al., 2021). The study showed that the incidence of prescription errors dropped from 24.6% to 5.4%. The most frequent errors reduced were related to contraindications, selection of drugs, and selection of dosage forms. The study concluded that the emergency department clinical pharmacists reduced prescription errors significantly.

1.9 The problem of the study

In Palestine, emergency departments are the usual point of entry for the majority of the patients who are admitted to the hospitals. The emergency departments are often crowded and according to the statistics of the Palestinian Ministry of Health, 2,2245,471 patients visited the emergency departments in 2021 (Rosenbloom & Leff, 2022).

In 2020, the number of registered pharmacists in the West Bank was 5,152. As pharmacy profession has transitioned in different regions of the world from product-centered into patient-centered, there have been many calls to expand the roles of pharmacists in providing more patient-centered care services in Palestine. Currently, little clinical roles are played by pharmacists in the hospitals of the West Bank of Palestine. Moreover, the roles of clinical pharmacists in the emergency departments in Palestine were not established as none of the hospitals in Palestine has dedicated emergency clinical pharmacy services. The roles and benefits of including clinical pharmacists within the multidisciplinary care team in the emergency departments were previously outlines. Similarly, many studies conducted in North America, Europe, Australia, and the Arab region have demonstrated the benefits of including clinical pharmacists within the multidisciplinary care team in the emergency departments. Therefore, emergency department clinical pharmacists can be included to take medication history, answering

inquiries of the other healthcare team and patients about medications, provide advice on how to prepare the doses of medications, conducting sensitivity assessment, ensuring patient safety, and providing the full array of clinical pharmacy services (Abdel-Qader et al., 2021; Elenbaas et al., 1977; Hu & Myres, 2020; Hughes et al., 2010).

Although the emergency department staff expressed positive attitudes toward including clinical pharmacists within the multidisciplinary care team in the emergency departments in different regions of the world, the views and opinions of emergency department staff in Palestine were not investigated before. Similarly, little studies were conducted to assess the views and opinions of the patients visiting the emergency departments on the inclusion of clinical pharmacists within the multidisciplinary care team in the emergency departments.

1.10 Questions of the study

The study was conducted to answer the following research questions:

- What are the views and opinions of the physicians and nurses about the inclusion of the clinical pharmacists within the multidisciplinary care team in the emergency department?
- Could pharmacists perceive their roles in case they were included within the multidisciplinary care team in the emergency department?
- What are the activities that can be done by the clinical pharmacists in case they were included within the multidisciplinary care team in the emergency department from the perspectives of healthcare professionals?
- What are the roles of the clinical pharmacists in the development of treatment plans in case they were included within the multidisciplinary care team in the emergency department from the perspectives of healthcare professionals?
- What are the roles of the clinical pharmacists in ensuring medication safety in case they were included within the multidisciplinary care team in the emergency department from the perspectives of healthcare professionals?
- Is there any association between the variables of the healthcare professionals and their views and opinions on the roles of clinical pharmacists in the emergency departments?

- What are the roles of the clinical pharmacists in providing care services in case they were included within the multidisciplinary care team in the emergency department from the perspectives of the patients?
- Is there any association between the demographic variables of the patients and their views and opinions on the roles of clinical pharmacists in the emergency departments?

1.11 General aim

The general aim of this study was to assess the views and opinions of the physicians, nurses, and patients about the inclusion of the clinical pharmacists within the multidisciplinary care team in the emergency department in the West Bank of Palestine.

1.12 Specific objectives

The study was conducted to achieve the following objectives:

- Assess the views and opinions of the physicians and nurses about the inclusion of the clinical pharmacists within the multidisciplinary care team in the emergency department
- Assess how the pharmacists perceive their roles in case they were included within the multidisciplinary care team in the emergency department
- Assess the views and opinions on the activities that can be done by the clinical pharmacists in case they were included within the multidisciplinary care team in the emergency department from the perspectives of healthcare professionals
- Assess the views and opinions on the roles of the clinical pharmacists in the development of treatment plans and medication safety in case they were included within the multidisciplinary care team in the emergency department from the perspectives of healthcare professionals
- Assess the association between the variables of the healthcare professionals and their views and opinions on the roles of clinical pharmacists in the emergency departments
- Assess the views and opinions on the roles of the clinical pharmacists in providing care services in case they were included within the multidisciplinary care team in the emergency department from the perspectives of the patients
- Assess the association between the variables of the patients and their views and opinions on the roles of clinical pharmacists in the emergency departments

1.13 Significance of the study

Exposing the views and opinions of the healthcare professionals and patients on the roles of clinical pharmacists in the emergency departments might reveal acceptance and readiness to collaborate with clinical pharmacists to be included in the emergency departments and the other healthcare providers and patients. The study might pave the way to include clinical pharmacists as care team members in the emergency departments in Palestine. The study might help plan for studies to measure the impact of clinical pharmacist interventions on the medication safety, efficacy, and cost-effectiveness of the medications used to treat patients in the emergency departments.

1.14 Novelty

This study was the first of its type to be conducted in Palestine. The findings of this study would reflect the current thinking of healthcare professionals, patients, and other stakeholders on the future roles of clinical pharmacists in providing care services to patients admitted to the emergency departments in Palestinian hospitals.

Chapter Two
Methods

2.1 Study design

This study was conducted in a cross-sectional design. A questionnaire in face-to-face setting was used to investigate and collect the opinions and views of healthcare providers in the emergency department and patients visiting the emergency departments in different Palestinian hospitals on the inclusion of clinical pharmacists within the multidisciplinary care team in the emergency department and the roles of the included clinical pharmacists in providing patient-centered care services to the patients admitted to the emergency departments. The questionnaire was developed based on similar previous studies that assessed the opinions and views of healthcare providers in the emergency department and patients visiting the emergency departments elsewhere on the inclusion of clinical pharmacists within the multidisciplinary care team in the emergency department and the roles of the included clinical pharmacists in providing patient-centered care services to the patients admitted to the emergency departments (Collignon, Oborne, & Kostrzewski, 2010; Morgan et al., 2018; Thomasset & Faris, 2003; Wanbon et al., 2015).

2.2 Study settings

This study was conducted in different governmental and private hospitals with functional emergency departments in the West Bank of Palestine. Hospitals and emergency departments were the sampling frames in this study.

2.3 Study population

The study population were healthcare providers including pharmacists, physicians, and nurses who provided care to hospitalized patients. Another population was the patients who were visited to the emergency departments in the West Bank of Palestine.

2.4 Sample size

The sample size was calculated using a sample size calculator that used Daniel's formula (Raosoft). The sample size was calculated for a large population at a 95% confidence interval. A response distribution of 50% was used assumed and a maximum margin of error of 5% was tolerated. The appropriate sample size of pharmacists, physicians, and

nurses were computed. The sample size calculated for this study was allocated as follows: 85 physicians, 116 nurses, 120 pharmacists, and 385 patients.

2.5 Inclusion criteria

The inclusion criteria for this study were as follows:

The healthcare providers were included when they were practicing physicians, nurses, or pharmacists

- Willing to answer all items in a questionnaire
- Willing to provide informed consent

The patients were included when they were admitted to the emergency department in one of the Palestinian hospitals

- Willing to provide informed consent
- Willing to respond to a questionnaire by reading all questions.

2.6 Exclusion criteria

The potential participants were excluded when they met one or more of the following criteria:

- Being a trainee pharmacist, pharmacy student, trainee physician, medical student, trainee nurse, or nursing student
- Patients who did not visit the emergency departments

2.7 Sampling method

A convenience sampling procedure was used to identify, invite, and recruit the study participants. This technique was used to ensure the inclusion of all Professions interested in improving healthcare services provided to patients admitted to the emergency departments in Palestine.

2.8 Data collection

The study participants were recruited from the different hospitals and emergency departments in the different hospitals in the West Bank of Palestine. After providing written informed consent, the participants were provided with an Arabic copy translated

from English origin of the questionnaire and were asked to respond to each item in the questionnaire.

2.9 Study tools

For this study, a questionnaire was developed as the study tool. The questionnaire was based on the previous studies that were conducted for similar purposes (Collignon et al., 2010; Morgan et al., 2018; Thomasset & Faris, 2003; Wanbon et al., 2015).

2.9.1 The questionnaire used among the healthcare providers

In the first section, the healthcare providers were asked to provide their demographic variables including age, sex, type of hospital, educational level and years of experience. In addition to collecting the demographic variables, the pharmacists were asked if they were of the opinion that the inclusion of clinical pharmacists within the multidisciplinary care team in the emergency department would improve the care services provided to the patients admitted to the emergency department.

In the second section, the healthcare providers were asked to indicate their views and opinions on the duties of clinical pharmacists in the emergency department using a Likert scale of 1-5 (strongly disagree to strongly agree). The duties included: 1) taking medication histories, 2) educating on the reasons for prescription of medications, 3) answering inquiries about preparation and administration of medications to the patients, 4) preparation or dilution of medications before administration to the patients, 5) counseling patients about the medications, 6) reconciliation of medications at the time of discharge, 7) screening for allergies to medications, 8) evaluation of liver and kidney functions to adjust doses when needed, and 9) screening for drug toxicities and recommending the appropriate treatment.

In the third section, the healthcare providers were also asked to indicate their views and opinions on the roles of clinical pharmacists in preparing the therapeutic care plans in the emergency departments using a Likert scale of 1-5 (strongly disagree to strongly agree). The roles included: 1) assessment of the efficacy and cost effectiveness of the medications used, 2) assessment of the appropriateness of the medications and doses given to the patients after considering the age and disease state of the patient, 3) evaluation of the responses of the patients to the pharmacotherapy, 4) discussion and consultation with the

treating physician on the effectiveness of the pharmacotherapy for each patient, 5) screening for and prevention of medication-medication interactions, 6) education and advice to the fellow healthcare providers on the use, administration, and storage of high-alert medications, and 7) periodic review of the medication therapy plan for each patient.

In the last section, the physicians, nurses, and pharmacists were also asked to indicate their views and opinions on the roles of clinical pharmacists in ensuring medication safety in the emergency departments using a Likert scale of 1-5 (strongly disagree to strongly agree). The roles included: 1) ensuring the prescription of the most safe and appropriate medications for the patients, 2) prevention of medication-medication interactions, adverse medication events, and medication errors, 3) selecting medications based on the latest guidelines and evidence-based practice, 4) ensuring reducing doses of medications and discontinuation of the medications when needed, 5) ensuring appropriate dosing and conducting dose adjustments when needed, 6) participation in selection and periodic review of the medications selected for each patient, and 7) participation with fellow healthcare providers in the development of treatment guidelines. The terms important roles will be used to express the jobs and duties that clinic pharmacist can play in emergency department.

2.9.2 The questionnaire used among the patients

In the first section, the patients were asked to provide their demographic variables including age, sex, type of hospital, educational level, number of emergency department visits in the last year, and number of emergency department admissions.

In the second section, the patients were asked to indicate their views and opinions on the roles of clinical pharmacists in the emergency departments using a Likert scale of 1-5 (strongly disagree to strongly agree). These roles included: 1) the pharmacists are the best healthcare professionals to provide information about the medications, 2) the pharmacist should educate the patients on the reasons why their medications were prescribed to them, 3) the clinical pharmacist is the best healthcare professional to answer inquiries relevant to medications, when to take them, and how many times the medications should be taken, 4) clinical pharmacists should prepare the medications before being administered to the patients including intravenous injections, 5) in all cases, clinical pharmacists should educate the patients on the importance and how to use the medications prescribed for

them in the emergency department, 6) the clinical pharmacists should conduct a review of the discharge medications before the patients are discharged, 7) clinical pharmacists should screen for and inquire about allergy to medications, 8) clinical pharmacists can adjust doses or recommend to change medications based on the renal and hepatic functions of the patients, and 9) the clinical pharmacist should ensure that appropriate medications were ordered and follow up with the patients to ensure that the medications are safe and effective.

2.10 Efforts to reduce bias

To reduce bias, the following steps were followed:

- The participants were recruited from different geographical regions of the West Bank of Palestine
- Different healthcare professionals including physicians, nurses, and pharmacists were recruited and included in this study
- Patients admitted to the emergency departments were also included in this study
- The questions were posed neutrally
- The interviewer was maintained non-alignment throughout the data collection
- The interview was not interested in shaping the answers of the participants

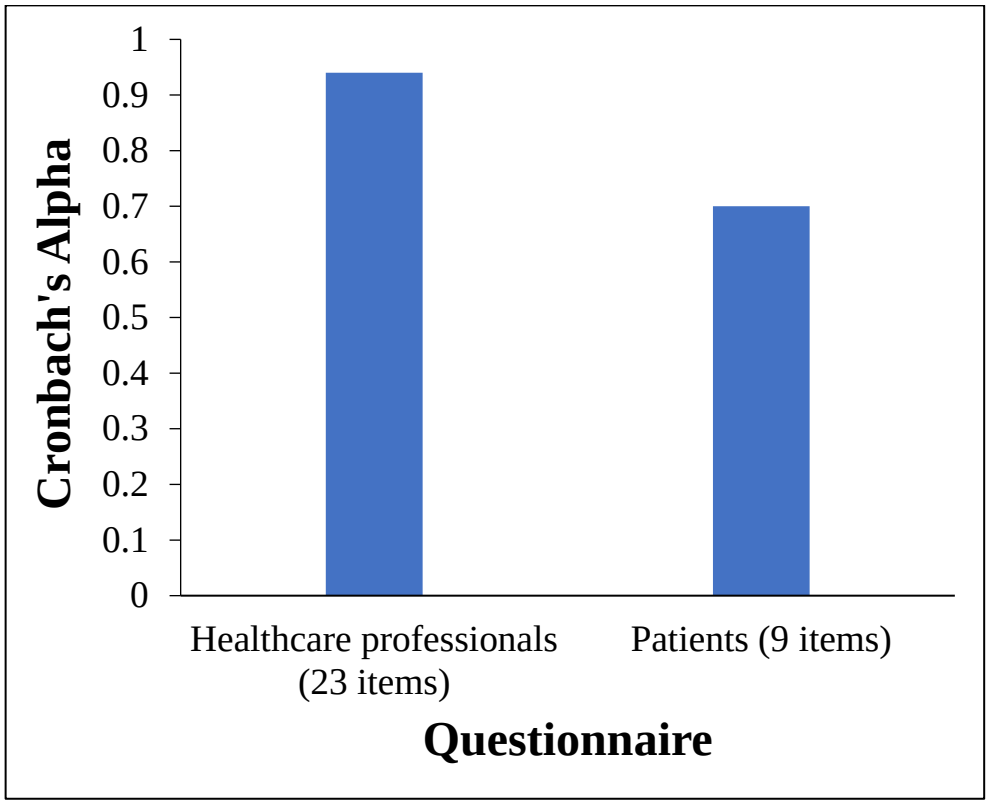
2.11 Validity and reliability

A pilot study was conducted to assess the readability, clarity, and comprehensibility of the questionnaire, the participant in this pilot study were not included in the final result. The test-retest method used to ensure the stability of the answers over a short period and the Cronbach's alpha test used to ensure the internal consistency of the items in the questionnaire.

Table 1 shows the reliability coefficients of the items. Overall, the Cronbach's Alpha for the healthcare professionals' items was 0.940 and 0.700 for patient's items.

Figure 1

Correlation coefficients



2.12 Statistical analysis

The collected data were entered into MS Excel sheets and analyzed by the Statistical Package for Social Sciences (SPSS) Version (28). Data entry was performed by the researcher and double-checked for outliers or errors.

Data analysis of descriptive and inferential statistics was conducted. Descriptive statistics, frequency, percentages, mean score, standard deviation (SD), minimum, and maximum were used to described collected data. Regarding normally distributed data, parametric tests such independent t-test and One-Way ANOVA were used to assess the differences between demographic characteristics in terms of the important roles of clinical pharmacists in emergency department mean score. Nonparametric tests like the Mann-Whitney U test, and Spearman's correlations used to analyze the nonparametric data.

2.13 Ethical considerations

Approvals were obtained from the Institutional Review Board (IRB) of An-Najah National University, the Office of Medical Education in the Ministry of Health, and the

managers of the hospitals. Informed consent was obtained from all participants after explaining the aim of this study and how to fill the paper. Each participant had told to withdrawal answer any time they want, no names appear, data saved confidentially and used for study purpose only.

Chapter Three

Results

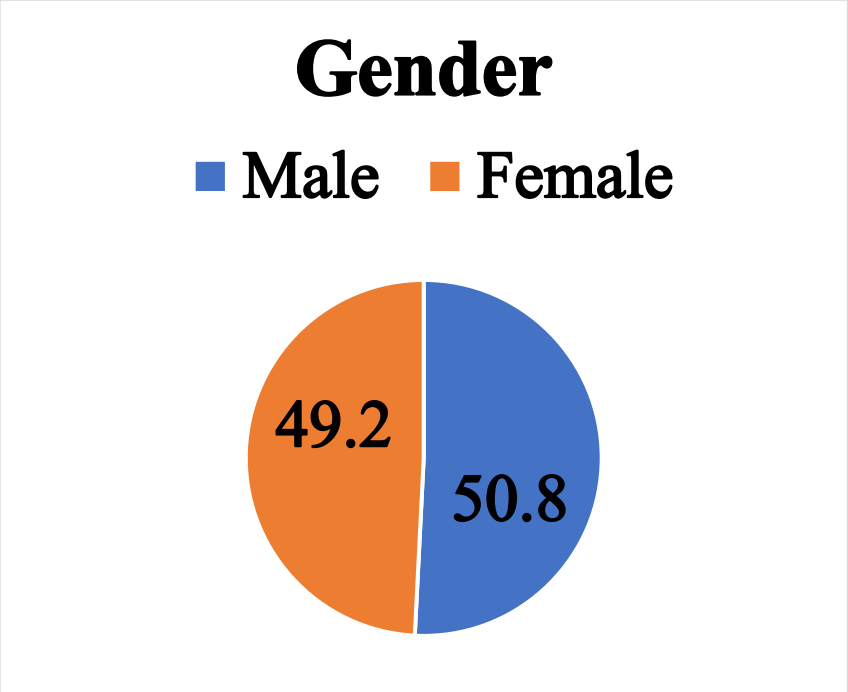
3.1 Demographic characteristics of the health care professionals

Table 1 illustrates the demographic characteristics of the healthcare professionals. This study surveyed 321 healthcare professionals in total. The mean age of healthcare professionals was 36.4 years with a minimal age of 22 years and a maximal age of 62 years (25^{th} percentile=29 years, 50^{th} percentile = 37 years and 75^{th} percentile= 41 years old).

Almost half of the healthcare professionals were male as shown in Figure 2.

Figure 1

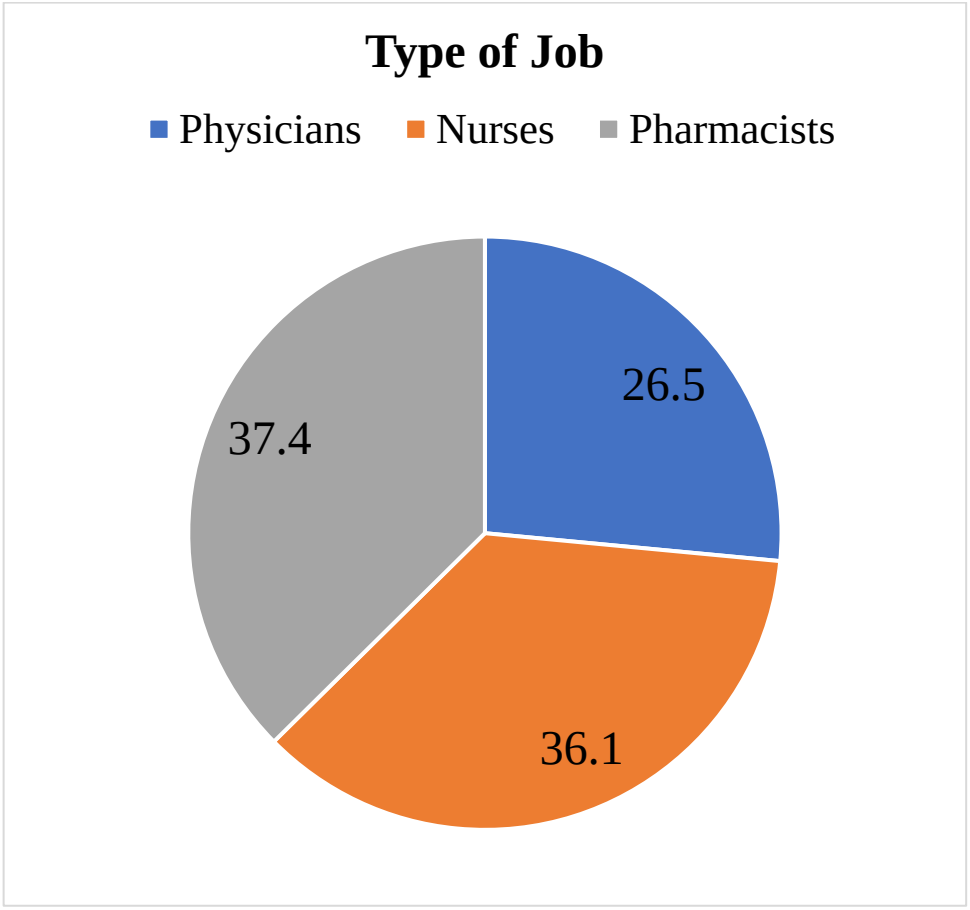
Gender distribution of the participants (n=321)



Of the healthcare professionals, 201 (62.6%) were physicians and nurses as shown in Figure 3.

Figure 2

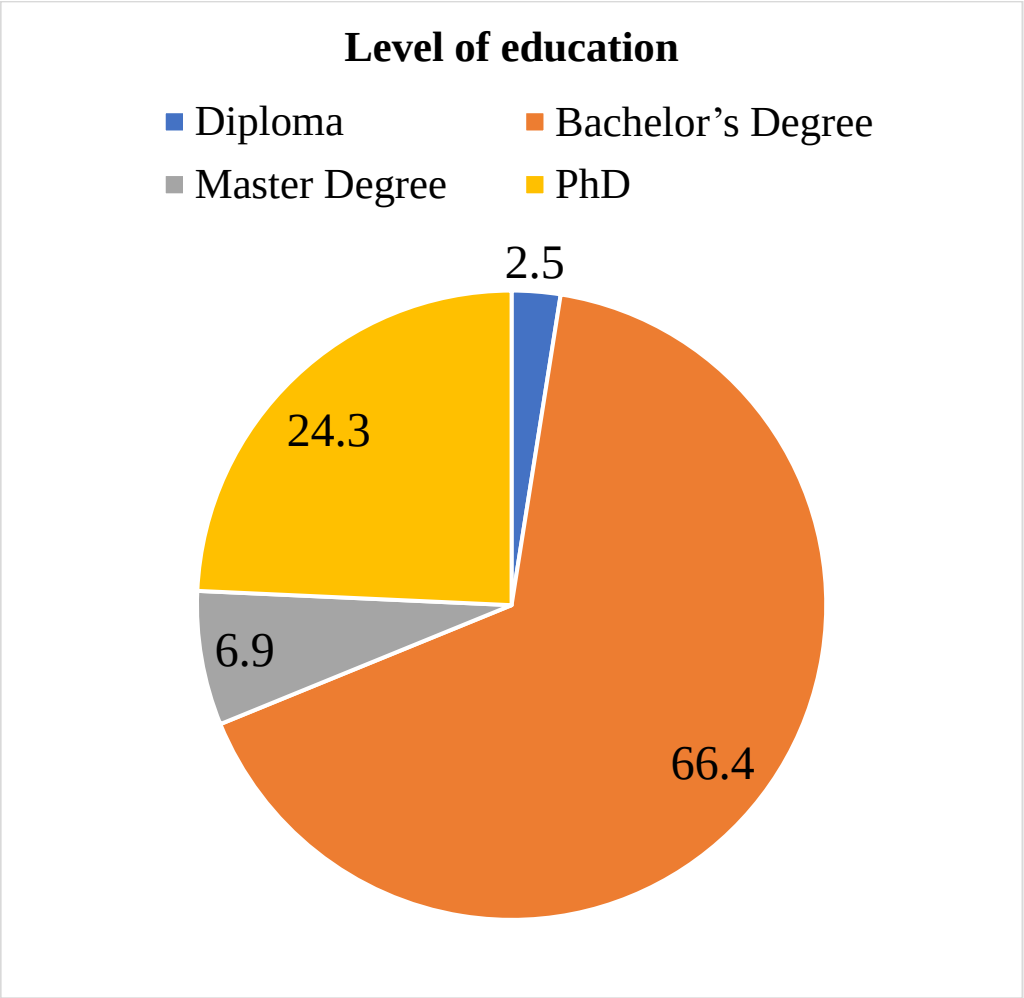
Type of job of the participants (n=321)



Of the participants, the majority of the participants had a bachelor's degree as shown in Figure 4.

Figure 3

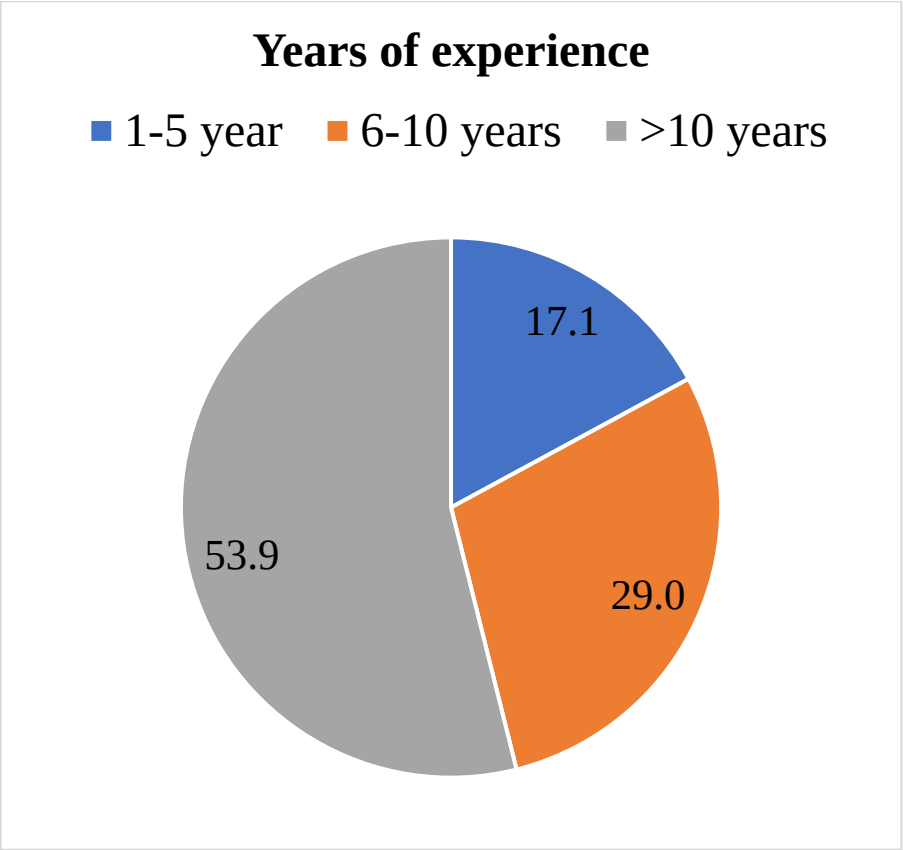
Educational level of the participants (n=321)



Of the participants, more than half had an experience of longer than 10 years as shown in Figure 5.

Figure 4

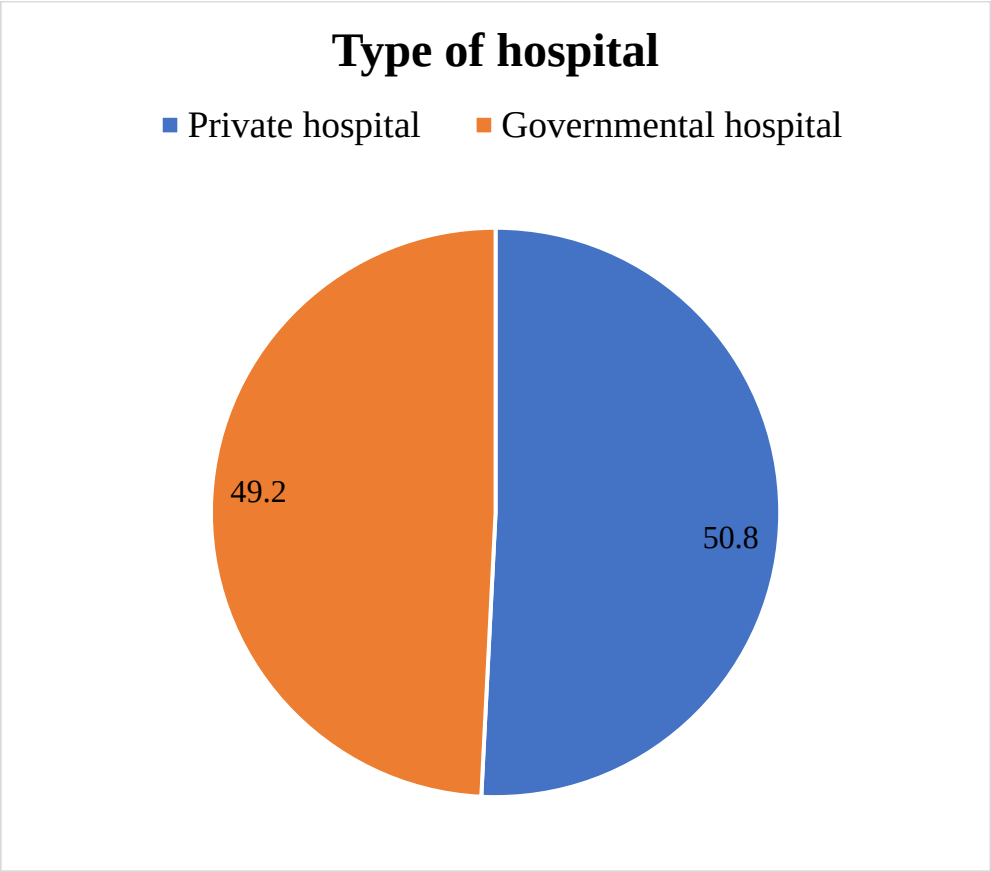
Years of experience (n=321)



In this study, almost half of the participants were recruited from governmental hospitals as shown in Figure 6.

Figure 5

Type of hospital (n=321)



3.2 The involvement of a clinical pharmacist in the emergency department staff can improve medical services from the viewpoint of physicians, nurses, and pharmacists

Table 1 presents that the vast majority of physicians and nurses have been revealed that a clinical pharmacist in the emergency department staff will improve medical services, while only 6% shown will not improve a medical service. In addition, most of pharmacists shown the important role of clinical pharmacist in emergency department.

Table 1

Frequency and percentages of healthcare professionals about existence of a clinical pharmacist in the emergency department team will improve medical services and important role of a clinical pharmacist in the emergency department

Item	Yes		No	
	n	%	n	%
As a physician/nurse do you think the existence of a clinical pharmacist in the emergency department team will improve medical services (n=201)	189	94.0%	12	6.0%
Are you, as pharmacist, convinced with the important role of a clinical pharmacist in the emergency department?	118	98.3%	2	1.7%

3.3 Patient care activity that could be done in the emergency department by the clinical pharmacists

Table 2 presents the percentages of patient care activity that could be done in the emergency department by clinical pharmacists. The healthcare professionals shown that the highest patient care activity could be done directly in the emergency department by clinical pharmacists that a clinical pharmacist should be a qualified person to take patients' medical history and advise patients and educating them about medicines is an essential task in the profession of pharmacy median =5 for both items. In detail, 61.4% of healthcare professionals strongly agreed and 37.4% agreed that “a clinical pharmacist should be a qualified person to take patients' medical history”. In addition, 58.3% strongly agreed and 39.3% agreed that “advising patients and educating them about medicines is an essential task in the profession of pharmacy”. More details are shown in Table 2.

Table 2

Percentages and mean scores for each item toward the patient care activity that could be done directly in the emergency department by pharmacists/clinical pharmacists (n=321)

Items	SD n %	D n %	N n %	A n %	SA n %	Median (25^{th} - 75^{th})
1- In your opinion, a clinical pharmacist is a qualified person to take patients' medical history?	0 0.0%	0 0.0%	4 1.2%	120 37.4%	197 61.4%	5 (4-5)
2- The role of the clinical pharmacist is to explain why prescribed medications are given to patients in the emergency department?	0 0.0%	3 0.9%	21 6.5%	145 45.2%	152 47.4%	4 (4-5)
3- Clinical pharmacists are required to answer inquiries related to medicines, such as how to administer and prepare medicines for patients?	0 0.0%	0 0.0%	4 1.2%	145 45.5%	171 53.3%	5 (4-5)
4- Should a clinical pharmacist prepare and dilutes medications before giving them to a patient?	0 0.0%	11 3.4%	34 10.6%	134 41.7%	142 44.2%	4 (4-5)
5- Advising patients and educating them about medicines is an essential task in the profession of pharmacy?	0 0.0%	0 0.0%	8 2.5%	126 39.3%	187 58.3%	5 (4-5)
6- The clinical pharmacist must ensure that all medications upon patient discharge from emergency department are compatible with the medical condition prescribed for them?	0 0.0%	0 0.0%	2 0.6%	142 44.2%	177 55.1%	5 (4-5)
7- Clinical pharmacists should ask the patient about any previous allergies that occurred to him / here from any medication that he /she had previously taken?	0 0.0%	0 0.0%	1 0.3%	71 22.1%	249 77.6%	5 (5-5)
8- Clinical pharmacist could evaluate the patient's kidney/liver function tests to adjust the medication dose and change it when needed?	0 0.0%	3 0.9%	24 7.5%	119 37.1%	175 54.5%	5 (4-5)
9- Are clinical pharmacists adequately able to help identify cases of poisoning and choose the appropriate treatment for each case?	0 0.0%	9 2.8%	36 11.2%	91 28.3%	185 57.6%	5 (4-5)

Note: SD=Strongly Disagree, D=Disagree, N=Neutral, A=Agree & SA=Strongly Agree

3.4 The role of clinical pharmacist in developing treatment plans (pharmacotherapy role) for patients in the emergency department

Table 3 presents the percentages of pharmacotherapy roles of clinical pharmacists. The healthcare professionals shown that the highest pharmacotherapy role of clinical pharmacists was drug interaction prevention is an essential task of a clinical pharmacist to be done to assure patient safety and the clinical pharmacists should monitor the administration of the correct medication, including the dosage required for the age and condition of the patient median =5 for both items. In detail, 61.1% strongly agree and 35.8% agreed that “drug interaction prevention is an essential task of a clinical pharmacist to be done to assure patient safety”. Furthermore, 57.3% strongly agreed and 42.1% agree that “clinical pharmacists should monitor the administration of the correct medication, including the dosage required for the age and condition of the patient”. More details are shown in Table 3.

Table 3

Percentages and mean scores for each item toward the pharmacotherapy roles of pharmacists/clinical pharmacists (n=321)

Items	SD n %	D n %	N n %	A n %	SA n %	Median (25^{th} - 75^{th})
1- Evaluation of the drugs given to the patient (efficacy and cost) is the main task performed by the clinical pharmacist within the department?	1 0.3%	14 4.4%	15 4.7%	144 44.9%	147 45.8%	4 (4-5)
2- Clinical pharmacists should monitor the administration of the correct medication, including the dosage required for the age and condition of the patient?	0 0.0%	2 0.6%	0 0.0%	135 42.1%	184 57.3%	5 (4-5)
3- Evaluating the drug response for each patient is a vital task carried out by the clinical pharmacist in the emergency department to ensure the required effectiveness of the drug?	1 0.3%	3 0.9%	13 4.0%	169 52.6%	135 42.1%	4 (4-5)
4- One of the important duties of the clinical pharmacist is to discuss the medication status of each patient separately with the specialist doctor to ensure the effectiveness of the medications prescribed to patients?	1 0.3%	0 0.0%	3 0.9%	149 46.4%	168 52.3%	5 (4-5)
5- Drug interaction prevention is an essential task of a clinical pharmacist to be done to assure patient safety	1 0.3%	1 0.3%	8 2.5%	115 35.8%	196 61.1%	5 (4-5)
6- Clinical pharmacists provide advice to medical staff on medications, such as infusion rate for essential (hazardous) medications, method of administration and storage?	1 0.3%	0 0.0%	8 2.5%	160 49.8%	152 47.4%	4 (4-5)
7- Clinical pharmacists must review the written medications for each patient to ensure that appropriate medication is dispensed to them?	2 0.6%	0 0.0%	5 1.6%	146 45.5%	168 52.3%	5 (4-5)

Note: SD=Strongly Disagree, D=Disagree, N=Neutral, A=Agree & SA=Strongly Agree

3.5 The clinical pharmacist's involvement in ensuring medication safety for patients in the emergency department

Table 4 presents the percentages of patient safety roles done by clinical pharmacists. The healthcare professionals shown that the highest patient safety roles of pharmacists were that a clinical pharmacists and doctors work to develop appropriate treatment protocols for each case in the emergency department and clinical pharmacists choose medications based on therapy guidelines, and they are prepared to choose drug alternatives, when necessary, median =5 for both items. In detail, 56.1% strongly agreed and 43.3% agreed that clinical pharmacists and doctors work to develop appropriate treatment protocols for each case in the emergency department. More details are shown in Table 4.

Table 4

Percentages and mean scores for each item toward the patient safety role of pharmacists/clinical pharmacists (N=321)

Items	SD n %	D n %	N n %	A n %	SA n %	Median (25^{th} -75^{th})
1- The safest and the most appropriate medications are prescribed for the patient's condition in the presence of clinical pharmacists?	1 0.3%	7 2.2%	24 7.5%	112 34.9%	177 55.1%	5 (4-5)
2- The presence of a clinical pharmacist in the emergency department prevents unwanted drug interactions and reduces medication errors, in case occurred?	2 0.6%	0 0.0%	8 2.5%	132 41.1%	180 55.8%	5 (4-5)
3- Clinical pharmacists choose medications based on therapy guidelines, and they are prepared to choose drug alternatives when necessary?	1 0.3%	0 0.0%	4 1.2%	136 42.4%	180 56.1%	5 (4-5)
4- The presence of a clinical pharmacist in the emergency department helps doctor to decide reduce the dose of the medication or even stop giving the medicine, depending on the medical status of each patient?	1 0.3%	3 0.9%	24 7.5%	138 43.0%	155 48.3%	4 (4-5)
5- Clinical pharmacists must ensure that an appropriate drug dose given for each patient and do dose adjustments when necessary to prevent any medical error?	2 0.6%	2 0.6%	4 1.2%	136 42.4%	177 55.1%	5 (4-5)
6- Should clinical pharmacists participate in writing, reviewing and selecting medications for each patient according to their medical condition?	0 0.0%	3 0.9%	14 4.4%	123 38.3%	181 56.4%	5 (4-5)
7- In order to verify medication safety for patients, clinical pharmacists and doctors work to develop appropriate treatment protocols for each case in the emergency department?	0 0.0%	1 0.3%	1 0.3%	139 43.3%	180 56.1%	5 (4-5)

Note: SD=Strongly Disagree, D=Disagree, N=Neutral, A=Agree & SA=Strongly Agree.

3.6 Differences between socio-demographic characteristics of healthcare professionals in terms of the important roles of clinical pharmacists in emergency departments mean score

Table 5 illustrates the differences between socio-demographic characteristics of healthcare professionals in terms of the important roles of clinical pharmacists in emergency departments mean score. The Independent t-test and One Way ANOVA were shown that no significant difference was found in gender (p=0.322), years of experience (p=0.754) and type of hospital (p=0.892) in terms of the important roles of clinical pharmacists in emergency departments.

On the other hand, a significant difference was found in type of job (F=50.314, p=<0.001). The Tukey post-hoc test indicated that pharmacists (M=4.71) were reported the important roles of clinical pharmacists in emergency departments higher than nurses (M=4.45) and physicians (M=4.20). In addition to that, nurses (M=4.45) reported the important roles of clinical pharmacists in emergency departments higher than physicians (M=4.20).

Furthermore, a significant difference was found in age groups (F=3.730, p=0.025). The Tukey post-hoc test indicated that healthcare professionals who aged between 20-29 years old (M=4.54) reported the important roles of clinical pharmacists in emergency departments higher than who were aged >39 years old (M=4.39).

In addition, a significant difference was found in level of education (F=21.218, p=<0.001). The Tukey post-hoc test indicated that healthcare professionals who held Master and Bachelor's Degrees (M=4.74 and M=4.56 respectively) have reported higher important roles of clinical pharmacists in emergency departments that who held PhD (M=4.20).

Table 5

Differences between socio-demographic characteristics of healthcare professionals in terms of the important roles of clinical pharmacists in emergency department mean score (n=321)

Demographic characteristics		Mean Score	SD	Statistical values	P-value
Type of Job	Physicians	4.20	.302	F=50.314 Df=2	<0.001*
	Nurses	4.45	.406		
	Pharmacists	4.71	.340		
Age groups	20-29 years old	4.54	.401	F=3.730 Df=2	0.025*
	30-39 years old	4.51	.413		
	>39 years old	4.39	.394		
Gender	Male	4.46	.422	T=-.992 Df=1	0.322
	Female	4.50	.392		
Level of education	Diploma	4.39	.367	F=21.218 Df=3	<0.001*
	Bachelor's Degree	4.56	.400		
	Master Degree	4.74	.336		
	PhD	4.20	.303		
Years of experience	1-5 year	4.51	.407	F=.283 Df=2	0.754
	6-10 years	4.49	.416		
	>10 years	4.47	.405		
Type of hospital	Private hospital	4.48	.415	T=-.135 Df=1	0.892
	Governmental hospital	4.48	.401		

Independent t-test and One Way ANOAV

*Significant at p=<0.05

*Higher mean score means higher important roles of clinical pharmacists in emergency department

3.7 Correlation between socio-demographic characteristics of healthcare professionals in terms of the important roles of clinical pharmacists in emergency departments mean score

A Pearson's correlation was conducted to assess the relationships between participants age in terms of the important roles of clinical pharmacists in emergency departments.

A small negative relationship was found between participants age and the important roles of clinical pharmacists in emergency departments (r=-0.141, p=0.012). This means when age groups increase, the important roles of clinical pharmacists in emergency departments decreases.

3.8 Demographic characteristics of the patients

Table 6 illustrates the demographic characteristics of the patients. Out of 309 patients, the mean age was 43.2 years old with Min= 27 years and Max=76 years (25^{th} percentile=36 years, 50^{th} percentile= 43 years and 75^{th} percentile= 51 years old). (Regarding patients' gender, 54.7% were male and the rest were female. Closely half of patients were held an either diploma or Bachelor's Degree. 51.1% of patients were visited private hospitals, while the 48.9% were in governmental hospitals.

Table 6

Demographic characteristics of patients (n=309)

Demographic characteristics		n (%)
Gender	Male	169 (54.7)
	Female	140 (45.3)
Level of education	Uneducated	15 (4.9)
	Primary education	5 (1.6)
	Secondary education	113 (36.6)
	Bachelor's Degree	152 (49.2)
	Higher education	24 (7.8)
Type of hospital	Private hospital	158 (51.1)
	Governmental hospital	151 (48.9)

3.9 Number of visits and admissions in Emergency Department

The mean score of the number of daily emergency department visits was 1.57 times, SD=1.147, with a Min 0 time and Max 7 times (Table 7). On the other hand, the mean score for ED admission was 0.938 times, SD=0.794 with Min 0 times and Max 5 times. Overall, 47.9% of patients have one-time emergency department visits, and 31.1% have two times visits. On the other hand, more than half of patients have one-time emergency department admission. More detail is shown in Figures 7 and 8.

Table 7

Mean score of the number of visits and admission (n=309)

	Mean	SD	Min	Max
Number of daily ED visits	1.57	1.147	0	7
Number of ED admissions	0.938	0.794	0	5

Note: SD=Standard Deviation

Figure 6

Number of daily emergency department visits from patients (n=309)

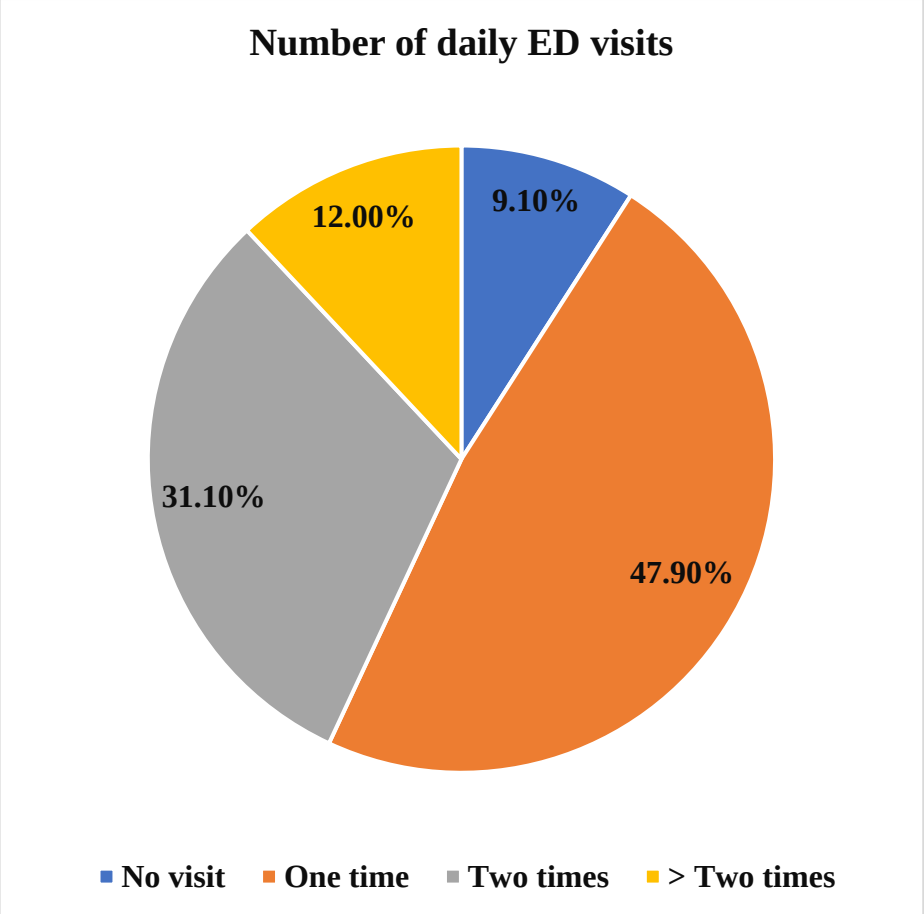
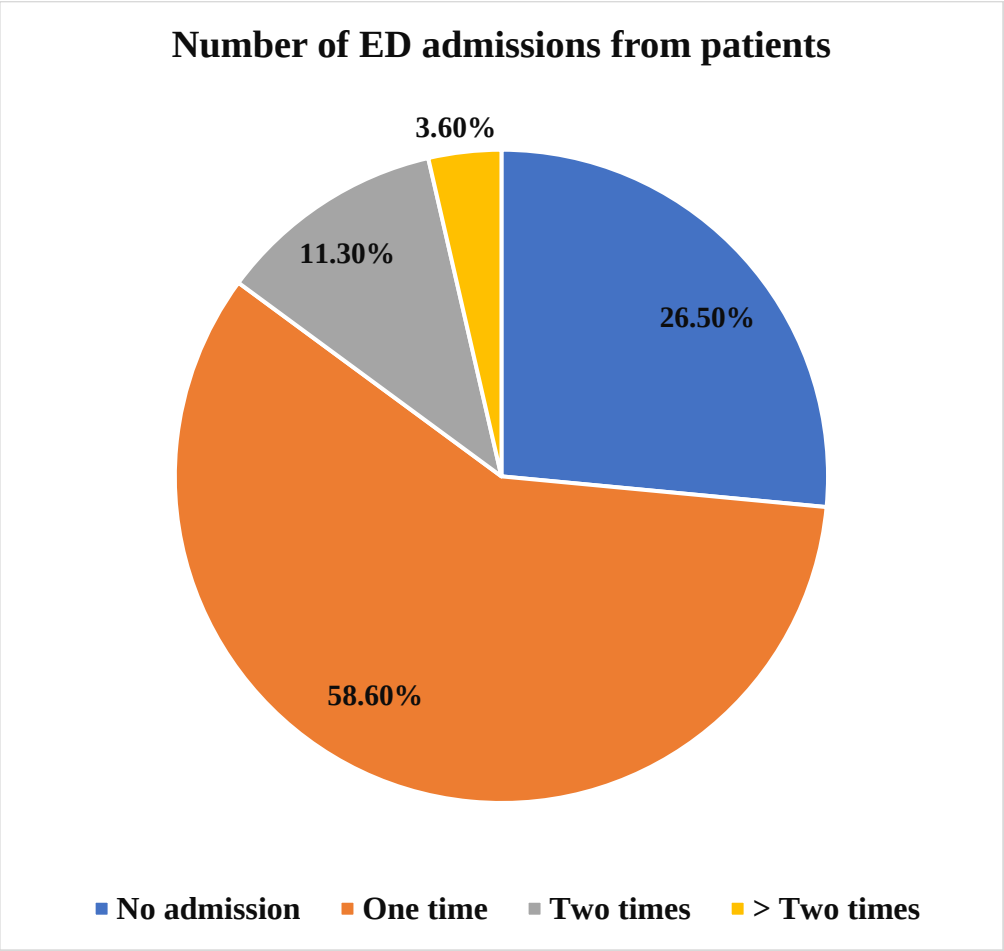


Figure 7

Number of emergency department admission from patients (n=309)



3.10 Roles that clinical pharmacist can play directly in the emergency department from the patient's point of view

Table 9 presents the percentages and mean scores for each item toward the tasks could be done directly in the emergency department by a clinical pharmacist from patient's view. The patients shown that the highest tasks could be done directly in emergency department were prepare medicines before giving them to the patient, such as intravenous injections and clinical pharmacist is the most appropriate person to obtain the patient's medication history with median =5 for both items. In detail, 85.8% strongly agreed and 12.6% agreed that one of the most important tasks of the clinical pharmacist is to prepare medicines before giving them to the patient, such as intravenous injections. Furthermore, 80.9% strongly agreed and 18.8% agreed that the clinical pharmacist is the most appropriate person to obtain the patient's medicine history. More details are shown in Table 8.

Table 8

Percentages and mean scores for each item toward the tasks could be done directly in the emergency department by a clinical pharmacist from patient's view (N=309)

Items	SD n %	D n %	N n %	A n %	SA n %	Median (25^{th} - 75^{th})
1- In your opinion, the clinical pharmacist is the most appropriate person to obtain the patient's medication history?	0 0.0%	0 0.0%	1 0.3%	58 18.8%	250 80.9%	**5 (5-5)**
2- Clinical pharmacist should explain to the patient the reason for requesting his medications in the emergency department?	0 0.0%	0 0.0%	8 2.6%	80 25.9%	221 71.5%	**5 (4-5)**
3-A clinical pharmacist is the most adequate person to answer questions about medications, such as how to take the medication and how often to use it.	0 0.0%	0 0.0%	4 1.3%	73 23.6%	232 75.1%	**5 (4-5)**
4- One of the most important tasks of the clinical pharmacist is to prepare medicines before giving them to the patient, such as intravenous injections?	0 0.0%	0 0.0%	5 1.6%	39 12.6%	265 85.8%	**5 (5-5)**
5-In all cases, the clinical pharmacist should guide and educate patients about the importance and how to use the medicines prescribed for them in the emergency department?	0 0.0%	0 0.0%	2 0.6%	66 21.4%	241 78.0%	**5 (5-5)**
6- the most important tasks for clinical pharmacist to do are checking and ensuring that the prescribed medications are suitable for the patient when leaving the emergency department.	0 0.0%	0 0.0%	2 0.6%	69 22.3%	238 77.0%	**5 (4-5)**
7-Is the task of assessing the patient's sensitivity to drugs and asking about them one of the most important functions of the clinical pharmacist in the hospital	0 0.0%	0 0.0%	9 2.9%	107 34.6%	193 62.5%	**5 (4-5)**
8-By evaluating the level of kidney and liver function for patients, the clinical pharmacist can adjust doses and change medicines that are not suitable for patients.	0 0.0%	4.5%	14 2.3%	135 43.7%	153 49.5%	**4 (4-5)**
9-The clinical pharmacist must ensure the correct process of ordering the drug for the patient, and follow up the patient from the therapeutic aspect to guarantee that the drug is safe and effective?	0 0.0%	0 0.0%	1 0.3%	73 23.6%	235 76.1%	**5 (5-5)**

Note: SD=Strongly Disagree, D=Disagree, N=Neutral, A=Agree & SA=Strongly Agree.

3.11 Differences between socio-demographic characteristics of patients in terms roles that clinical pharmacists can play directly in the emergency department from the patient's point of view

Table 9 illustrates the differences between socio-demographic characteristics of patients in terms of roles that clinical pharmacists can play directly in the emergency department from the patient's point of view. The Independent t-test and One Way ANOVA were shown that no significant difference was found in gender (p=0.105), years of experience (p=0.067) and type of hospital (p=0.663). This means all demographic variables of patients have same roles that clinical pharmacists can play directly in the emergency department.

Table 9

Differences between socio-demographic characteristics of patients in terms roles that clinical pharmacists can play directly in the emergency department from the patient's point of view (n=321)

Demographic characteristics		n	Mean	SD	Statistical value	P-value
Gender	Male	169	4.68	.227	t=-1.626 Df=1	.105
	Female	140	4.72	.216		
Level of education	Uneducated	15	4.73	.186	F=2.222 Df=4	.067
	Primary education	5	4.44	.423		
	Secondary education	113	4.70	.205		
	Bachelor’s Degree	152	4.70	.226		
	Higher education	24	4.76	.232		
Type of hospital	Private hospital	158	4.69	.233	T=-.436 Df=1	.663
	Governmental hospital	151	4.71	.212		

Independent t-test and One Way ANOAV

*Higher mean score means higher roles of clinical pharmacists in emergency department from patients view

3.12 Relationships between number of daily emergency department visits and admission in terms of the roles that clinical pharmacists can play directly in the emergency department from the patient's point of view

Table 10 illustrates Correlation between number of daily emergency department visits and admission in terms of the roles that clinical pharmacists can play directly in the emergency department from the patient's point of view. A Pearson correlation was conducted to assess these relationships. There is no significant relationship between number of daily visits of patients and the roles that clinical pharmacists can play directly in the emergency department from the patient's point of view (r=0.023, P=0.693). In addition, no significant relationship between number of patient's admission and the roles that clinical pharmacists can play directly in the emergency department from the patient's point of view (r=-0.033, P=0.558). More details are shown in Table 10

Table 10

Relationships between number of daily emergency department visits and admission in terms of the roles that clinical pharmacists can play directly in the emergency department from the patient's point of view

Variables		Number of daily visits of patients	Number of patient's admission
Clinical pharmacy roles can play directly in the emergency department	r	0.023	-0.033
	P value	0.693	0.558

Note: Pearson Correlation

Chapter Four
Discussions and Conclusions

In this chapter, the main findings of this study are discussed. First, the main findings of this study are highlighted and summarized. Second, the findings are interpreted, compared, and contrasted against those reported in the literature. Third, the strengths and limitations of the study are appraised. Fourth, implications on future practice, implications on education, and implications on future research are discussed. Fifth, recommendations based on the findings of this study are suggested. Finally, future works are suggested.

4.1 Summary of the main findings

Emergency departments are often the main point of encounter between healthcare providers and patients visiting hospitalized patient settings (Greenwood-Ericksen & Kocher, 2019; Lane, Mallow, Hooker, & Hooker, 2020). The pharmacy profession has evolved over the years and the roles of pharmacists have transitioned from product-centered to patient-centered care. Over the last few decades, the roles of clinical pharmacists in providing patient-centered care in the emergency department were recognized and clinical pharmacy services have been valued (Morgan et al., 2018; Ortmann et al., 2021; Witsil et al., 2010). In this study, healthcare providers in the emergency department and patients visiting the emergency departments in different hospitals in Palestine were surveyed for their opinions on the inclusion of clinical pharmacists within the multidisciplinary care team in the emergency department.

4.2 Discussion and Interpretation of the Main Results

Healthcare providers expressed agreement that clinical pharmacists in the emergency departments improves care for the patients. These findings were in line with those previously reported in different healthcare systems around the world including those in the US, Europe, Australia, and Saudi Arabia (Abualenain & Bakhsh, 2018; Acquisto et al., 2020; Collignon et al., 2010; Farmer et al., 2018; Roman et al., 2018; Sinopoulou et al., 2021; Thomas et al., 2016; Thomasset & Faris, 2003; Wanbon et al., 2015; Witsil et al., 2010). Furthermore, physicians and nurses are also willing to accept and collaborate

with the clinical pharmacists once included in the multidisciplinary care team in the emergency departments.

When the pharmacists were asked if they appreciate the importance of the roles that a clinical pharmacists can play in the emergency department, the majority of the respondents expressed agreement. Together, these findings indicate that pharmacists are also willing to play more patient-centered roles and expand their roles, duties, and responsibilities beyond dispensing and preparation of medications (Hu & Myres, 2020; Hughes et al., 2010). These might also indicate that the pharmacists were enthusiastic and ready to use their knowledge and skills in providing care services to the patients admitted to the emergency departments.

In this study, the majority of the healthcare professionals agreed that clinical pharmacists can play important roles in the emergency departments. The findings reported in this study were consistent with those reported on the acceptance and readiness to collaborate with clinical pharmacists to be included in the emergency departments elsewhere (Collignon et al., 2010; Morgan et al., 2018; Thomas et al., 2016; Thomasset & Faris, 2003; Wanbon et al., 2015). The majority of the healthcare professionals agreed that clinical pharmacists are best positioned to take the medication history from the patients admitted to the emergency departments. As experts in medications, clinical pharmacists are in key position to take the medication history of the patients (Leguelinel-Blache et al., 2014). The pharmacists might help identify medication related adverse effects, inappropriate medications, inappropriate doses, inappropriate dosage form, or inappropriate dosage frequency. Again, the majority of the healthcare professionals agreed that clinical pharmacists are in key position to educate patients and explain the reasons why their medications were prescribed, when, and how to use them. Similarly, the majority of the healthcare professionals agreed that the clinical pharmacists should answer the inquiries about medications including those related to the medication administration, frequency, and how to prepare the medication for administration. In modern clinical practice, patients are increasingly involved in decisions related to their healthcare (Kvarnström, Westerholm, Airaksinen, & Liira, 2021). Improving knowledge of the patients about their treatments can improve adherence to taking medications and the consequent patient outcomes. The clinical pharmacists are well-trained to prepare and dilute medications before these medications are administered to the patients. In Palestine,

these services are often provided by the nurses. The findings of this study indicate that nurses are ready to share or return this service to the clinical pharmacists. The healthcare professionals also agreed that the clinical pharmacists should conduct medication reconciliation and ensure that all discharge medications are appropriate for the medical conditions of the patient (Choi & Kim, 2019). Conducting this service was previously shown to be effective in detecting and correcting medication orders. Moreover, this service was also shown to reduce adverse medication events and medication errors. The clinical pharmacists should also screen for and prevent allergy to medications. During their education and training, pharmacists are equipped with the adequate knowledge about medication allergies (Turner et al., 2021). Therefore, the clinical pharmacists are in key position to screen for and prevent medication allergies. Clinical pharmacists are recognized as experts in drugs. Therefore, they can advise physicians, nurses, and patients on the right doses after evaluating the renal and hepatic functions of the patients. Additionally, clinical pharmacists can provide recommendations to adjust/change/correct the dosing regimens of medications in case needed (Al Raiisi et al., 2019).

The clinical pharmacists can help the other healthcare team in the emergency department select safe and effective medications. Moreover, the clinical pharmacists can help intercept and prevent medication errors, allergies, adverse events, and interactions. Many previous studies have reported on the effectiveness of the clinical pharmacist interventions in reducing or preventing these medication problems (Abdel-Qader et al., 2021; Abdelaziz et al., 2016; Abushanab et al., 2023; Acquisto et al., 2020; Al Raiisi et al., 2019; Collignon et al., 2010; Farmer et al., 2018; Laureau et al., 2021). Taken together, the results reported in this study paved the way for new and emerging roles for clinical pharmacists in the emergency departments.

The pharmacists who were surveyed in this study reported more agreements compared to the physicians and nurses. These findings were not surprising and could be explained by the eagerness and enthusiasm of the pharmacists to expand their roles in providing more patient-centered care services as opposed to their traditional dispensing, dilution, and preparation of medications to be administered to the patients (Acquisto et al., 2020; Alshaya et al., 2021; Hecq, 2016; Morgan et al., 2018; Roman et al., 2018). In addition, younger healthcare professionals rated the roles of the clinical pharmacists in the emergency departments higher that older healthcare professionals. These findings could

be explained by the openness, understanding, readiness to collaborate of the younger healthcare professionals compared to the older healthcare professionals.

The patients also agreed that the pharmacists are the best healthcare professionals to prepare medications before administering them to the patients. The patients also agreed that the clinical pharmacists should conduct periodic reviews of their medication orders including the discharge medications, screen for allergies, adjust doses based on the clinical and nonclinical factors of the patients, and follow up with the patients to ensure safe and effective medication use. The findings reported in this study indicated that the patients valued and appreciated the potentials of the clinical pharmacists in contributing to patient care in the emergency departments. Previous studies have reported that pharmacists are trusted healthcare professionals (Gregory & Austin, 2021; Ilardo & Speciale, 2020). A previous qualitative study reported 5 main factors that promoted trust between the patients and pharmacists (Gregory & Austin, 2021). These factors were interpersonal chemistry, respect, availability, acknowledgement, and affability. Probably, educators and trainers should train future clinical pharmacists on interpersonal communications skills.

4.3 Implications on future practice

The findings reported in this study might pave the way to include clinical pharmacists within the multidisciplinary care team in the emergency departments in the different hospitals in Palestine. Inclusion of clinical pharmacists within the multidisciplinary care team in the emergency departments can be associated with many benefits related to the safety, efficacy, cost-effectiveness, and improvements in outcomes of the patients.

4.4 Implications on future education

The findings of this study can be implicated in educating and training future clinical pharmacists on the roles that can be played by the clinical pharmacists in case included within the multidisciplinary care team in the emergency departments. Additionally, the findings can be implicated in promoting interpersonal communication skills that might help fostering trust between the clinical pharmacists and the patients as well as between the clinical pharmacists and the multidisciplinary care team members in the emergency departments.

4.5 Implications on future research

The findings of this study can be implicated in planning for and designing studies to measure the impact of emergency department clinical pharmacists in promoting medication safety, efficacy, cost-effectiveness, and improvements in outcomes of the patients. The studies might compare the prevalence and incidence of medications-related problems before and after the inclusion of clinical pharmacists within the multidisciplinary care team in the emergency departments. In addition, studies might be conducted to compare the cost-effectiveness of the inclusion of clinical pharmacists within the multidisciplinary care team in the emergency departments.

4.6 Appraisal of the strengths of the study

The study has many strength points that can be considered. First, the was the first study to assess the views and opinions of healthcare professionals and patients on the roles of clinical pharmacists in emergency departments in Palestine. Second, the healthcare professionals surveyed in this study included physicians, nurses, and pharmacists. Inclusion of the different professionals should have ensured representativeness of the stakeholders and providers of healthcare services to the patients admitted to the emergency departments. Third, patients admitted to the emergency departments were also surveyed in this study. Inclusion of the views and opinions of the patients who receive services in emergency departments could also be important. Fourth, the healthcare professionals and patients included in this study were diversified in terms of sex, age, geographical location, and type of hospital, among other demographic and experience variables. Finally, the questionnaire used was tested for reliability and internal consistency. The testing ensured that the questionnaire was readable, clear, comprehensive, reliable, and internally consistent.

4.7 Appraisal of the Limitations of the Study

This study also has some limitations to be considered. First, this was a cross-sectional study. Cross-sectional studies consider as one of the weakest studies, can't answer the causes. Second, the data collected in this study were self-reported by the participants themselves. Self-reported data could be associated with desirability and recall bias. Third, emergency department clinical pharmacy services do not exist within the Palestinian healthcare system. The collected data could reflect a desire for these services.

4.8 Conclusion

The findings of this study showed that physicians, nurses, and patients valued and appreciated the roles that can be played by clinical pharmacists in the emergency departments. The roles of the clinical pharmacists in the emergency departments are consistent with the traditional, expanding, and new roles of the clinical pharmacists in hospitalized patient settings. These roles include provision of direct and patient-centered care services. The perceived benefits of inclusion of clinical pharmacists within the multidisciplinary care team in the emergency department include improved medication safety, efficacy, cost-effectiveness, and patient outcomes.

4.9 Recommendations and future works

Researchers are called to investigate the impact of emergency department clinical pharmacists in improved medication safety, efficacy, cost-effectiveness, and patient outcomes. Developing a national system to prepare a candidate clinical pharmacist with the knowledge and education to be qualified for emergency department duties.

List of Abbreviations

Abbreviation	Meaning
IRB	Institutional Review Board
PCIP	Patient Care Impact Program
SD	Standard deviation
SPSS	Statistical Package for Social Sciences

References

Abdel-Qader, D. H., Saadi Ismael, N., Al Meslamani, A. Z., Albassam, A., El-Shara, A. A., Lewis, P. J., . . . Al Mazrouei, N. (2021). The Role of Clinical Pharmacy in Preventing Prescribing Errors in the Emergency Department of a Governmental Hospital in Jordan: A Pre-Post Study. *Hosp Pharm, 56*(6), 681-689. doi:10.1177/0018578720942231

Abdelaziz, H., Al Anany, R., Elmalik, A., Saad, M., Prabhu, K., Al-Tamimi, H., . . . Cameron, P. (2016). Impact of clinical pharmacy services in a short stay unit of a hospital emergency department in Qatar. *Int J Clin Pharm, 38*(4), 776-779. doi:10.1007/s11096-016-0290-9

Abualenain, J. T., & Bakhsh, H. T. (2018). Staff perceptions toward emergency clinical pharmacists in a Saudi Arabian academic emergency department. *Hong Kong Journal of Emergency Medicine, 25*(2), 67-72. doi:10.1177/1024907917748712

Abushanab, D., Atchan, M., Elajez, R., Elshafei, M., Abdelbari, A., Al Hail, M., . . . Al-Badriyeh, D. (2023). Economic impact of clinical pharmacist interventions in a general tertiary hospital in Qatar. *PLoS One, 18*(6), e0286419. doi:10.1371/journal.pone.0286419

Acquisto, N. M., Slocum, G. W., Bilhimer, M. H., Awad, N. I., Justice, S. B., Kelly, G. F., . . . Thomas, M. C. (2020). Key articles and guidelines for the emergency medicine clinical pharmacist: 2011-2018 update. *Am J Health Syst Pharm, 77*(16), 1284-1335. doi:10.1093/ajhp/zxaa178

Al-Jumaili, A. A., Hussain, S. A., & Sorofman, B. (2013). Pharmacy in Iraq: history, current status, and future directions. *Am J Health Syst Pharm, 70*(4), 368-372. doi:10.2146/ajhp120415

Al Raiisi, F., Stewart, D., Fernandez-Llimos, F., Salgado, T. M., Mohamed, M. F., & Cunningham, S. (2019). Clinical pharmacy practice in the care of Chronic Kidney Disease patients: a systematic review. *Int J Clin Pharm, 41*(3), 630-666. doi:10.1007/s11096-019-00816-4

Aldridge, V. E., Park, H. K., Bounthavong, M., & Morreale, A. P. (2009). Implementing a comprehensive, 24-hour emergency department pharmacy program. *Am J Health Syst Pharm, 66*(21), 1943-1947. doi:10.2146/ajhp080660

Alshaya, A. I., Alhammad, A. M., Ismail, N., Alkhani, N., Alharbi, S., Alenazi, A. O., & Aljuhani, O. (2021). Critical care pharmacy in Saudi Arabia: Historical evolution and future directions—A review by the Critical Care and Emergency Medicine Pharmacy Specialty Network at the Saudi Society of Clinical Pharmacy. *JACCP: JOURNAL OF THE AMERICAN COLLEGE OF CLINICAL PHARMACY, 4*(11), 1428-1437. doi:https://doi.org/10.1002/jac5.1518

Choi, Y. J., & Kim, H. (2019). Effect of pharmacy-led medication reconciliation in emergency departments: A systematic review and meta-analysis. *J Clin Pharm Ther, 44*(6), 932-945. doi:10.1111/jcpt.13019

Collignon, U., Oborne, C. A., & Kostrzewski, A. (2010). Pharmacy services to UK emergency departments: a descriptive study. *Pharm World Sci, 32*(1), 90-96. doi:10.1007/s11096-009-9347-3

Elenbaas, R. M., Waeckerle, J. F., & McNabney, W. K. (1977). The clinical pharmacist in emergency medicine. *Am J Hosp Pharm, 34*(8), 843-846 .

Fahmy, S. A., Rasool, B. K., & Abdu ,S. (2013). Health-care professionals' perceptions and expectations of pharmacists' role in the emergency department, United Arab Emirates. *East Mediterr Health J, 19*(9), 794-801 .

Farmer, B. M., Hayes, B. D., Rao, R., Farrell, N., & Nelson, L. (2018). The Role of Clinical Pharmacists in the Emergency Department. *J Med Toxicol, 14*(1), 114-116. doi:10.1007/s13181-017-0634-4

Greenwood-Ericksen, M. B., & Kocher, K. (2019). Trends in Emergency Department Use by Rural and Urban Populations in the United States .*JAMA Netw Open, 2*(4), e191919. doi:10.1001/jamanetworkopen.2019.1919

Gregory, P. A., & Austin, Z. (2021). How do patients develop trust in community pharmacists? *Res Social Adm Pharm, 17*(5), 911-920. doi:10.1016/j.sapharm.2020.07.023

Hecq, J. D .(2016) .A Short History of the Development of Hospital Pharmacy in Belgium. *Pharmacy (Basel), 4*(3). doi:10.3390/pharmacy4030025

Hooker, E. A., Mallow, P. J., & Oglesby, M. M. (2019). Characteristics and Trends of Emergency Department Visits in the United States .(2014-2010) *J Emerg Med, 56*(3), 344-351. doi:10.1016/j.jemermed.2018.12.025

Hu, D., & Myres, J. (2020). Emergency medicine pharmacist market perceptions: Emergency medicine residency program directors and directors of pharmacy. *J Am Pharm Assoc (2003), 6*.547-541 ,(4)0e542. doi:10.1016/j.japh.2020.01.014

Hughes, D. W., Roth, J. M., & Laurel, Y. (2010). Establishing emergency department clinical pharmacy services. *Am J Health Syst Pharm, 67*(13), 1053-1057. doi:10.2146/ajhp090125

Ilardo, M. L., & Speciale ,A. (2020). The Community Pharmacist: Perceived Barriers and Patient-Centered Care Communication. *Int J Environ Res Public Health, 17*(2). doi:10.3390/ijerph17020536

Kvarnström, K., Westerholm, A., Airaksinen, M., & Liira, H. (2021). Factors Contributing to Medication Adherence in Patients with a Chronic Condition: A Scoping Review of Qualitative Research. *Pharmaceutics, 13*(7). doi:10.3390/pharmaceutics13071100

Lane, B. H., Mallow, P. J., Hooker, M. B., & Hooker, E. (2020). Trends in United States emergency department visits and associated charges from 2010 to 2016. *Am J Emerg Med, 38*(8), 1576-1581. doi:10.1016/j.ajem.2019.158423

Laureau, M., Vuillot, O., Gourhant, V., Perier, D., Pinzani, V., Lohan, L., . . . Breuker, C. (2021). Adverse Drug Events Detected by Clinical Pharmacists in an

Emergency Department: A Prospective Monocentric Observational Study. *J Patient Saf, 17*(8), e1040-e1049. doi:10.1097/pts.0000000000000679

Leguelinel-Blache, G., Arnaud, F., Bouvet, S., Dubois, F., Castelli, C., Roux-Marson ,C., . . . Kinowski, J. M. (2014). Impact of admission medication reconciliation performed by clinical pharmacists on medication safety. *Eur J Intern Med, 25*(9), 808-814. doi:10.1016/j.ejim.2014.09.012

Mekonnen, A. B., McLachlan, A. J., & Brien, J. A. (2016a). Effectiveness of pharmacist-led medication reconciliation programmes on clinical outcomes at hospital transitions: a systematic review and meta-analysis. *BMJ Open, 6*(2), e010003. doi:10.1136/bmjopen-2015-010003

Mekonnen, A. B., McLachlan, A. J., & Brien, J. A. (2016b). Pharmacy-led medication reconciliation programmes at hospital transitions: a systematic review and meta-analysis. *J Clin Pharm Ther, 41*(2), 128-144. doi:10.1111/jcpt.12364

Morgan, S. R., Acquisto, N. M., Coralic, Z., Basalyga, V., Campbell, M., Kelly, J. J., . . . Phelan, M. (2018). Clinical pharmacy services in the emergency department. *Am J Emerg Med, 36*(10), 1727-1732. doi:10.1016/j.ajem.2018.01.056

Naseralallah, L., Al-Badriyeh, D., Atchan, M., Abdul Rouf, P. V., Hail, M. A., El-Kassem, W., & Abushanab, D. (2023). Characteristics of the clinical pharmacists' interventions at the main general tertiary care hospital in Qatar. *Qatar Med J, 2023*(4), 28. doi:10.5339/qmj.2023.28

Ortmann, M. J., Johnson, E. G., Jarrell, D. H., Bilhimer, M ,.Hayes, B. D., Mishler, A., . . . Zimmerman, D. E. (2021). ASHP Guidelines on Emergency Medicine Pharmacist Services. *Am J Health Syst Pharm, 78*(3), 261-275. doi:10.1093/ajhp/zxaa378

Patanwala, A. E., Sanders, A. B., Thomas, M. C., Acquisto, N. M., Weant, K. A., Baker, S. N., . . . Erstad, B. L. (2012). A prospective, multicenter study of pharmacist activities resulting in medication error interception in the emergency department. *Ann Emerg Med, 59*(5), 369-373. doi:10.1016/j.annemergmed.2011.11.013

Roman, C., Edwards, G., Dooley, M., & Mitra, B. (2018). Roles of the emergency medicine pharmacist: A systematic review. *Am J Health Syst Pharm, 75*(11), 796-806. doi:10.2146/ajhp170321

Rosenbloom, R., & Leff, R. (2022). Emergency Care in the Occupied Palestinian Territory: A Scoping Review. *Health Hum Rights, 24*(2), 255-263 .

Rothschild, J. M., Churchill, W., Erickson, A., Munz, K., Schuur, J. D., Salzberg, C. A., . . . Bates, D. W. (2010). Medication errors recovered by emergency department pharmacists. *Ann Emerg Med, 55*(6), 513-521. doi:10.1016/j.annemergmed.2009.10.012

Sinopoulou, V., Rutter, P., Price, G., Heald, V., Kaba, S., & Kwok, J. (2021). Implementing an emergency department pharmacy service and its effect on medication safety. *Int J Pharm Pract, 2* .396-394 ,(4)9 doi:10.1093/ijpp/riab012

Taylor, B., & Young, M. (2022). Pediatric ED departmental complexity: a different approach to the concept of ED crowding. *Cjem, 24*(3), 318-324. doi:10.1007/s43678-022-00261-9

Thomas, M. C., Acquisto, N. M., Shirk, M .B., & Patanwala, A. E. (2016). A national survey of emergency pharmacy practice in the United States. *Am J Health Syst Pharm, 73*(6), 386-394. doi:10.2146/ajhp150321

Thomasset, K. B., & Faris, R. (2003). Survey of pharmacy services provision in the emergency department. *Am J Health Syst Pharm, 60*(15), 1561-1564. doi:10.1093/ajhp/60.15.1561

Turner, N. A., Wrenn, R., Sarubbi, C., Kleris, R., Lugar, P. L., Radojicic, C., . . . Anderson, D. J. (2021). Evaluation of a Pharmacist-Led Penicillin Allergy Assessment Program and Allergy Delabeling in a Tertiary Care Hospital. *JAMA Netw Open, 4*(5), e219820. doi:10.1001/jamanetworkopen.2021.9820

Wanbon, R., Lyder, C., Villeneuve, E., Shalansky, S., Manuel, L., & Harding, M. (2015). Clinical Pharmacy Services in Canadian Emergency Departments: A

National Survey. *Can J Hosp Pharm, 68*(3), 191-201. doi:10.4212/cjhp.v68i3.1452

Witsil, J. C., Aazami, R., Murtaza, U. I., Hays, D. P., & Fairbanks, R. J. (2010). Strategies for implementing emergency department pharmacy services: results from the 2007 ASHP Patient Care Impact Program. *Am J Health Syst Pharm, 67*(5), 375-379. doi:10.2146/ajhp080572

Appendices

Appendix A

The questionnaire

عمادة الدراسات العليا

جامعة النجاح الوطنية - نابلس

كلية الطب وعلوم الصحة

استبيان طبي للمرضى.

البحث: خدمات الرعاية الصيدلانية في قسم الطوارئ: مكان للصيادلة السريرين؟

الجزء الأول: المعلومات التعريفية للمشاركين:

أ.1. عمر المريض: .....

أ.2. الجنس:

□ انثى □ ذكر

أ.3. طبيعة المستشفى:

□ خاص □ عام (حكومي)

أ.4. مستوى التعليم الحالي:

□ غير متعلم □ ابتدائي □ الثانوية □ جامعة □ دراسات عليا

أ. 5. كم مرة قمت\ي بزيارة قسم الطوارئ خلال العام 2022؟ (_____/ سنوياً) ان وجد.

أ. 6. كم عدد حالات النوم في قسم الطوارئ خلال العام 2022؟ (_____/سنوياً) ان وجد.

الجزء الثاني: هل تعتقد (كمريض / مراجع) في قسم الطوارئ أن هذه المهام يمكن القيام بها مباشرة في قسم الطوارئ من قبل الصيدلي السريري؟ يرجى إبداء رأيك في كل من هذه العبارات من خلال وضع علامة "✓ " في مربع إجابتك.

السؤال	موافق بشدة	موافق	حيادي	أعارض	أعارض بشدة
1. باعتقادك الصيدلي السريري الشخص الأنسب للحصول على المعلومات الدوائية الخاصة بالمريض؟					
2. هل يتوجب على الصيدلي السريري التوضيح للمريض ما سبب طلب الأدوية الخاصة به داخل قسم الطوارئ؟					
3. الصيدلي السريري الشخص المناسب للإجابة عن الأسئلة حول الأدوية، مثل كيفية أخذ الدواء وعدد مرات الاستخدام؟					
4. من أحد أهم مهام الصيدلي السريري تحضير (تجهيز) الأدوية قبل الإعطاء للمريض مثل الحقن الوريدية؟					
5. في جميع الأحوال على الصيدلي السريري إرشاد وتثقيف المرضى حول أهمية وكيفية استخدام الأدوية المكتوبة لهم في قسم الطوارئ؟					
6. الفحص والتأكد من ملائمة الأدوية المكتوبة للمريض عند الخروج من قسم الطوارئ من أهم مهام الصيدلي السريري؟					
7. تعتبر مهمة تقييم حساسية المريض للأدوية والسؤال عنها من أهم وظائف الصيدلي السريري في المستشفى؟					
8. من خلال تقيم مستوى وظائف الكلى والكبد للمرضى يستطيع الصيدلي السريري تعديل الجرعات وتغير الأدوية غير المناسبة للمرضى.					
9. يتوجب على الصيدلي السريري التأكد من عملية طلب الدواء للمريض بطريقة صحيحة، ومتابعة المريض من الناحية العلاجية لتأكدٍ من ان الدواء أمن وفعال؟					

مع الشكر: الباحث حسام الدين بالي.

اشراف دكتور: رمزي شواهنة.

*أن أجابتكم على الأسئلة الخاصة بالاستبيان الطبي هي بمثابة الموافقة على المشاركة بشكل فعلي مع حفظ الخصوصية.

كلية الدراسات العليا

جامعة النجاح الوطنية - نابلس

كلية الطب والعلوم الصحية

استبيان خاص بالطاقم الطبي في المستشفيات

العنوان:

خدمات الرعاية الصيدلانية في قسم الطوارئ مكان للصيادلة السريريين؟

أ. الخصائص الديموغرافية للمشاركين.

أ. 1: عمر المشارك: .....

أ. 2: الجنس:

☐ ذكر ☐انثى

أ. 3: المهنة:

☐ صيدلي إكلينيكي ☐ صيدلي مستشفى ☐ طبيب /ه ☐ ممرض /ه

أ. 4: الأقدمية (عدد السنوات في الوظيفة الحالية؟): _____ وتصنيف المستشفى:

☐ عام (حكومي) ☐ خاص

أ. 5: مستوى التعليم الحالي هو:

☐ دبلوم ☐بكالوريوس ☐دكتور صيدلي ☐ ماجستير ☐دكتوراه.

أ. 6: العدد المتوقع من المرضى الذين يزورون قسم الطوارئ يوميا دون مبيت (ودون تحويلهم لقسم اخر) في المستشفى الخاص بك لعام 2022: (_____)/ باليوم تقريبًا. (إجابة واحدة لكل مستشفى)

أ. 7: عدد حالات الدخول اليومية (المبيت) ويتم تحويل المرضى من قسم الطوارئ في المستشفى الخاص بك لعام 2022 (_____) / باليوم تقريبا. (إجابة واحدة لكل مستشفى)

أ. 8: في حال كونك طبيب/ه او ممرض /ه، هل تعتقد أن وجود صيدلي إكلينيكي في طاقم قسم الطوارئ سيحسن الخدمات الطبية للمرضى؟

☐ نعم ☐ لا

أ. 9: في حال كونك صيدليًا يعمل في مستشفى، هل أنت مقتنع بأهمية دور الصيدلي السريري في قسم الطوارئ؟

☐ نعم ☐ لا

ب: وجهة نظر المشارك في مهام وأدوار الصيدلي الإكلينيكي في قسم الطوارئ، يرجى إبداء رأيك في كل عبارة بوضع علامة "✓" في مربع الإجابة ☐ .

ب.1: المهام التي يمكن أن يقوم بها الصيدلي السريري داخل قسم الطوارئ.	موافق بشدة	موافق	محايد	أعارض	أعارض بشدة
1. باعتقادك الصيدلي السريري هو شخص مؤهل لأخذ التاريخ الدوائي للمرضى؟					
2. وظيفة الصيدلي السريري توضيح سبب أعطاء الأدوية التي توصف للمرضى في قسم الطوارئ؟					
3. يجيب على الصيادلة السريريين الاجابة على الاستفسارات المتعلقة بالأدوية مثل كفية أعطاء الأدوية وتحضيرها للمرضى؟					
4. يجب على الصيدلي الاكلينيكي تحضير الأدوية وتحليلها قبل أعطائها للمريض؟					
5. تقديم المشورة للمرضى وتثقيفهم حول الأدوية مهمة أساسية في مهنة الصيدلة؟					
6. يجب على الصيدلي الإكلينيكي أن يتأكد من جميع الأدوية عند خروج المريض من حيث توافقها للحالة الطبية الموصوفة لها؟					
7. يجب على الصيادلة الإكلينيكيين أن يسألوا المريض عن أي حساسية سابقة حدثت له من أي مستحضر دوائي تم تناوله مسبقا؟					
8. يمكن للصيدلي السريري تقييم اختبارات وظائف الكلى / الكبد للمريض لتعديل جرعة الدواء وتغييرها عند الحاجة؟					
9. لدى الصيادلة الإكلينيكيين القدرة الكافية في المساعدة بتحديد حالات التسمم واختيارالعلاج المناسب لكل حالة؟					
ب.2: دور الصيدلي السريري في تقرير الخطة العلاجية للمرضى داخل قسم الطوارئ.	**موافق بشدة**	**موافق**	**محايد**	**أعارض**	**أعارض بشدة**
1. إن تقييم الأدوية المعطاة للمريض (الفعالية والتكلفة) هي المهمة الرئيسية التي يقوم بها الصيدلي الإكلينيكي داخل القسم؟					
2. يجب على الصيادلة الإكلينيكيين متابعة إعطاء الدواء الصحيح، بما في ذلك الجرعة المطلوبة لعمر وحالة المريض؟					
3. تقيم الاستجابة الدوائية لكل مريض مهمة حيوية يقوم بها الصيدلي السريري داخل قسم الطوارئ للتأكد من الفعالية المطلوبة للدواء؟					
4. من الواجبات المهمة للصيدلي السريري مناقشة الحالة الدوائية لكل مريض على حدا مع الطبيب المختص للتأكد من فاعلية الادوية الموصوفة للمرضى؟					

5. منع التداخل الدوائي هي مهمة ضرورية يقوم بها الصيدلي الإكلينيكي من أجل سلامة المرضى؟					
6. يقدم الصيادلة الإكلينيكيين النصائح لطاقم الطبي بشأن الأدوية، مثل معدل التسريب للأدوية الأساسية (الخطرة) وطريقة الإعطاء والتخزين؟					
7 يجب على الصيادلة الإكلينيكيين مراجعة الأدوية المكتوبة لكل مريض للتأكد من صرف الدواء المناسب لهم؟					
ب.3: دور الصيدلي السريري في السلامة الدوائية للمرضى في قسم الطوارئ.	**موافق بشدة**	**موافق**	**محايد**	**أعارض**	**أعارض بشدة**
1. يتم وصف وكتابة الأدوية الأكثر أمانًا وملائمة لحالة المريض في وجود الصيادلة السريرين؟					
2. وجود الصيدلي السريري في قسم الطوارئ يمنع من حدوث تداخلات دوائية غير مرغوب بها ويقلل الأخطاء الدوائية ان وجدت؟					
3. يختار الصيادلة الإكلينيكيين الأدوية بناءً على القواعد الارشادية الدوائية، وهم مهيؤون لاختيار البدائل الدوائية عند الضرورة؟					
4. وجود الصيدلي السريري في قسم الطوارئ يساعد الطبيب في تقرير تقليل جرعة الدواء او حتى توقف إعطاء الدواء تبعا للحالة الدوائية لكل مريض؟					
5.على الصيادلة الإكلينيكيين التأكد من الجرعات الدوائية المناسبة لكل مريض وإجراء تعديلات على الجرعة عند الضرورة لمنع وقوع أي خطا طبي؟					
6. يجب أن يشارك الصيادلة الإكلينيكيين في كتابة ومراجعة واختيار الأدوية لكل مريض حسب الحالة الطبية الخاصة بهم؟					
7. من اجل ضمان السلامة الدوائية للمرضى يعمل الصيادلة السريرين والأطباء على وضع البرتوكولات العلاجية المناسبة لكل حالة في قسم الطوارئ؟					

النهاية

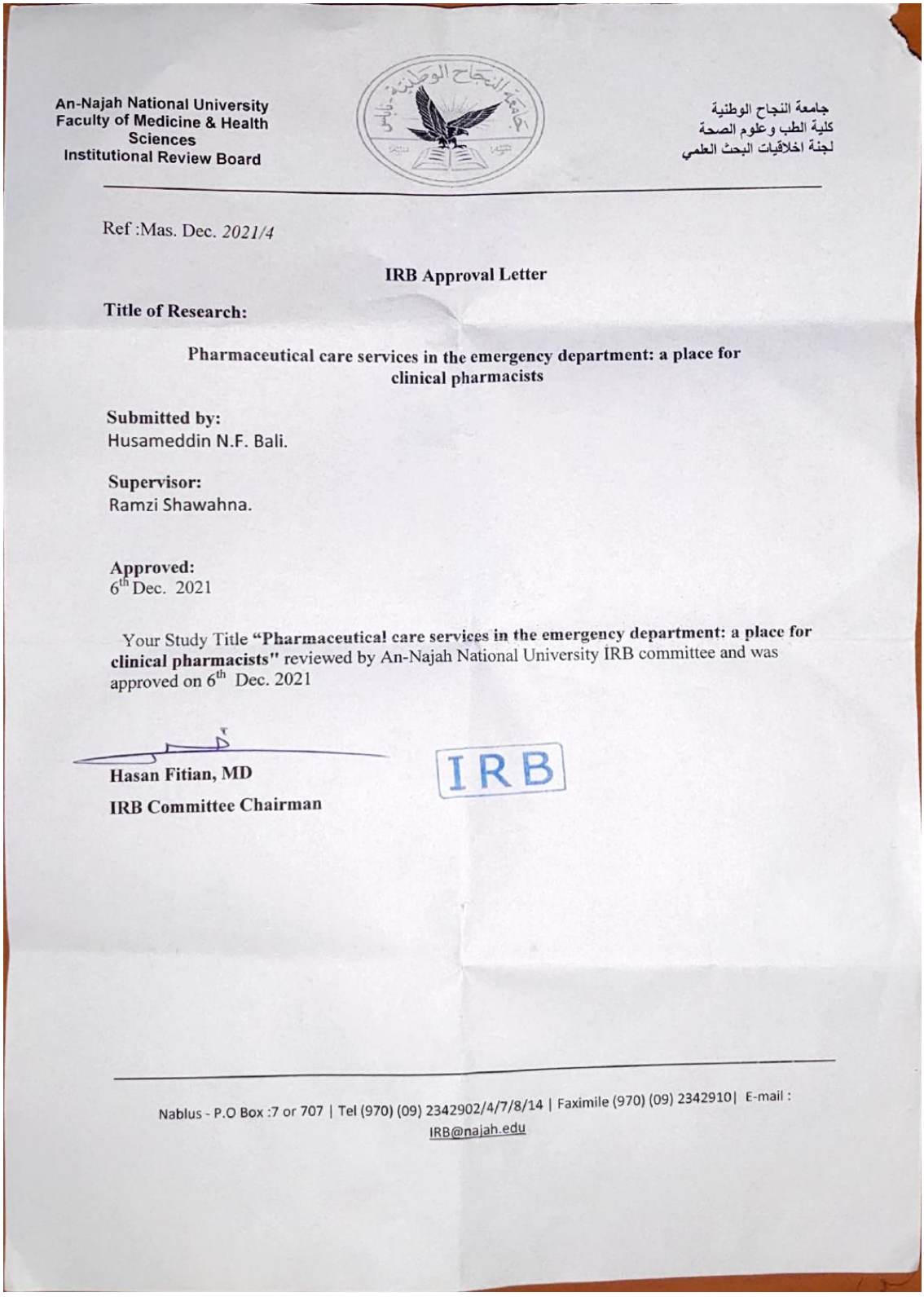
مع الشكر الباحث: حسام الدين بالي.

أشراف الدكتور: رمزي شواهنة.

*** تعتبر إجابتك على الاستبيان الطبي بمثابة الموافقة على للمشاركة دون أي ضغط على المشارك، مع العلم أن الاجابة تظل سرية وتستخدم لغايات البحث العلمي فقط دون التصريح باسم المشارك، مع حرية عدم استكمال الإجابة في أي وقت.**

Appendix B

IRB approval



An-Najah National University
Faculty of Medicine & Health Sciences
Institutional Review Board

جامعة النجاح الوطنية
كلية الطب وعلوم الصحة
لجنة اخلاقيات البحث العلمي

Ref :Mas. Dec. *2021/4*

IRB Approval Letter

Title of Research:

Pharmaceutical care services in the emergency department: a place for clinical pharmacists

Submitted by:
Husameddin N.F. Bali.

Supervisor:
Ramzi Shawahna.

Approved:
6th Dec. 2021

Your Study Title **"Pharmaceutical care services in the emergency department: a place for clinical pharmacists"** reviewed by An-Najah National University IRB committee and was approved on 6th Dec. 2021

Hasan Fitian, MD
IRB Committee Chairman

IRB

Nablus - P.O Box :7 or 707 | Tel (970) (09) 2342902/4/7/8/14 | Faximile (970) (09) 2342910| E-mail : IRB@najah.edu

Appendix C

Study approval'

An-Najah
National University

Faculty of Graduate Studies
Dean's Office

جامعة
النجـــاح الوطنية
كلية الدراسات العليا
مكتب العميد

التاريخ: 2021/11/29

حضرة الدكتور رواء الرمحي المحترم
منسقة برنامج ماجستير الصيدلة السريرية

تحية طيبة وبعد،

الموضوع : الموافقة على عنوان الاطروحة وتحديد المشرف

قرر مجلس كلية الدراسات العليا في جلسته رقم (412) المنعقدة بتاريخ 2021/11/10، الموافقة على مشروع الأطروحة المقدم من الطالب/ة حسام الدين نزار فضل بالي، رقم التسجيل 11952026، تخصص ماجستير الصيدلة السريرية، عنوان الأطروحة:

خدمات الرعاية الصيدلانية في قسم الطوارئ: مكان للصيادلة السريريين
Pharmaceutical Care Services in the Emergency Department: A Place for Clinical Pharmacists

بإشراف: د. رمزي شواهنة

ملاحظة: لاعتماد الأطروحة وتسجيلها على الفصل الاول 2022/2021.

يرجى اعلام المشرف والطالب بضرورة تسجيل الاطروحة خلال اسبوعين من تاريخ اصدار الكتاب. وفي حال عدم تسجيل الطالب/ة للاطروحة في الفترة المحددة له/ا ستقوم كلية الدراسات العليا بإلغاء اعتماد العنوان والمشرف

وتفضلوا بقبول وافر الاحترام ،،،

عميد كلية الدراسات العليا

أ.د. وليد صويلح

نسخة : د. رئيس قسم الدراسات العليا للعلوم الطبية والصحية المحترم
: عميد القبول والتسجيل المحترم
: مشرف الطالب

جامعة النجاح الوطنية من أفضل **500** جامعة على مستوى العالم في تصنيف التايمز البريطاني **2022**

فلسطين، نابلس، ص.ب 7،707 هاتف:/2345115، 2345114، 2345113 (09)(972)* فاكسميل:2342907(09)(972)
Nablus, P. O. Box (7) *Tel. 972 9 2345113, 2345114, 2345115 هاتف داخلي (5) 3200
* Facsimile 972 92342907 *www.najah.edu - email fgs@najah.edu

جـامعـــة النجاح الوطنية

كليـــة الدراســـات العليـــا

خدمات الرعاية الصيدلانية في قسم الطوارئ: مكان للصيادلة السريريين

إعداد

حسام الدين بالي

إشراف

د رمزي شواهنه

قدمت هذه الرسالة استكمالا لمتطلبات الحصول على درجة الماجستير في الصيدلة السريرية، من كلية الدراسات العليا، في جامعة النجاح الوطنية، نابلس– فلسطين.

2024

خدمات الرعاية الصيدلانية في قسم الطوارئ:
مكان للصيادلة السريريين

إعداد
حسام الدين بالي
إشراف
د رمزي شواهنه

الملخص

أجريت هذه الدراسة لتقييم وجهات نظر وآراء الأطباء والممرضات والمرضى حول إدراج الصيادلة السريريين ضمن فريق الرعاية متعدد التخصصات في قسم الطوارئ.

أجريت هذه الدراسة في تصميم مقطعي في مستشفيات حكومية وخاصة مختلفة مع أقسام طوارئ عاملة في الضفة الغربية وفلسطين. كانت أداة الدراسة عبارة عن استبيان تم تطويره بناء على دراسات سابقة. احتوى الاستبيان المستخدم بين المتخصصين في الرعاية الصحية على 23 عنصرا واحتوى الاستبيان المستخدم بين المرضى على 9 عناصر.

في هذه الدراسة، تم تضمين ما مجموعه 321 من المتخصصين في الرعاية الصحية و 309 مريضا. اتفق غالبية المتخصصين في الرعاية الصحية والمرضى على أن الصيادلة السريريين يمكن أن يلعبوا أدوارا رئيسية في تحسين سلامة الأدوية وفعاليتها وفعاليتها من حيث التكلفة والتحسينات في نتائج المرضى. أبلغ الصيادلة الذين شملهم الاستطلاع في هذه الدراسة عن اتفاقيات أكثر مقارنة بالأطباء والممرضات (القيمة الاحتمالية < 0.001). بالإضافة إلى ذلك ، صنف أخصائيو الرعاية الصحية الأصغر سنا أدوار الصيادلة السريريين في أقسام الطوارئ أعلى من المتخصصين في الرعاية الصحية الأكبر سنا (القيمة الاحتمالية < 0.025).

لم يكن هناك ارتباط كبير بين التركيبة السكانية للمرضى ووجهات نظرهم وآرائهم حول إدراج الصيادلة السريريين ضمن فريق الرعاية متعدد التخصصات في قسم الطوارئ.

يقدر الأطباء والممرضات والمرضى ويقدرون الأدوار التي يمكن أن يلعبها الصيادلة السريريون في أقسام الطوارئ. تتوافق أدوار الصيادلة السريريين في أقسام الطوارئ مع الأدوار التقليدية والموسعة والجديدة للصيادلة السريريين في إعدادات المرضى في المستشفى. وتشمل هذه الأدوار توفير خدمات الرعاية المباشرة التي تركز على المريض. تشمل الفوائد المتصورة لإدراج الصيادلة السريريين ضمن فريق الرعاية متعدد التخصصات في قسم الطوارئ تحسين سلامة الأدوية وفعاليتها وفعاليتها من حيث التكلفة ونتائج المرضى.

الكلمات المفتاحية: الصيدلة السريرية، الطوارئ، الرعاية التي تركز على المريض، الصيدلي، المسح.