TURKISH REPUBLIC OF NORTH CYPRUS

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INSTITUTE OF GRADUATE STUDIES

PHARMACEUTICAL CARE SERVICES IMPLEMENTATION IN THE MIDDLE EAST COUNTRIES AND FACTORS ASSOCIATED WITH THE SUSTAINABILITY OF THE SERVICES

By:

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MASTERS OF CLINICAL PHARMACY

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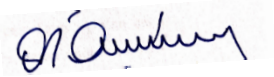
Committee Member*:	Prof.Dr. Tanju Özçelikay	
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Declaration

I hereby declare that all information, documents, analysis, and results in this thesis have been collected and presented according to the academic rules and ethical guidelines of the Institute of Graduate Studies, Near East University. I also declare that as required by these rules and conduct, I have fully cited and referenced information and data that are not original to this study.

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ABSTRACT

Student Name: Hebah Sallom
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Background: Over the past decades pharmaceutical care services (PCs) continued to evolve globally with increasing emphasis on patients and proven effectiveness in variety of settings. Evidence supporting this practice is mostly from the US, yet the evaluation and adoption of PCs varies across different regions of the world.

Aim and objective: The aim of this work is to describe the nature of pharmaceutical care services implemented in Middle East countries and evaluate the sustainability of the implemented services.

Methodology: Arkesy and O'Malley framework was used to conduct a scoping review. This review was undertaken in 6 databases: PubMed/Medline, Scopus, Cochrane Library, Springer Link, Clinical Trail and Web of Science. The quality of studies was evaluated using Van Tulder Scale for Randomized studies and Down and Black checklists for Non-Randomized studies. General descriptive and numerical analysis regarding selected studies and thematic analysis for included studies, which created 4 main themes: Nature of applicable PCs, Pharmaceutical implementers, studies outcomes and quality. A questionnaire tool for a cross-sectional study was prepared using a 3 step Delphi method. Data was analyzed using SPSS version 23 software.

Results: This study identified 431,753 citations initially of which only 132 were eligible articles that were involved in the study. Study designs varied, with 43 (32.6%) randomized controlled trails (RCTs) and 89 (67.4%) non-RCTs. Thirty-five (26.5%) of included studies were published in the year 2020. Majority of the studies were conducted in Jordan, KSA followed by Turkey, respectively (25.8%, 16.7%, 11.4%). Thirty-seven studies (19.7%) were interested in resolving DRPs, while 27 studies (14.4%) aimed at improving quality of life and 23 studies (12.2%) targeted improving medication adherence. A questionnaire tool of 35 items was generated for a cross-sectional study with more than 80% level of agreement was attained between experts involved in the Delphi study.

Conclusion: Studies in the Middle East continue to provide evidence supporting the positive impact of pharmaceutical care services on both hard and soft outcomes measured in most studies. Yet, rigorous evaluation of the economic impact of introduced services and their sustainability is a must.

Keywords: pharmaceutical care services, Middle East, assessment, pharmacy practice, clinical pharmacy services.

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List of Abbreviations

PCS:	Pharmaceutical Care Services
WHO:	World Health Organization
PAHO:	Pan American Health Organization
FIP:	International Federation of Pharmacists
ASHP:	American Society of Hospital Pharmacists
UKCPA:	United Kingdom Clinical Pharmacy Assessment
ACCP:	American College of Clinical Pharmacy
AphA:	American Pharmacists Association
MOH:	Ministry of Health
OTC:	Over the Counter
PHPC:	Pew Health Profession Commission
GP	General Practitioners
NHS	National Health Service
SM	Sustainability Model

CHAPTER I

Introduction

Statement of Problem

Pharmaceutical care has become a dominant style of practice for thousands of pharmacists everywhere the globe. However, for the common patient, this idea remains unknown because traditionally, it had been not being performed as a routine, and on the opposite side, patients don't seem to be at home with being attended elsewhere than the counter and secondarily, because this practice it's not provided on abroad scale and in an identifiable manner within the community pharmacies. It's important to confirm on the concept that pharmacists don't provide treatment, yet the education patients receive makes them realize how important treatment is(Berenguer B. et al., 2005).

The scope of the pharmacy profession has been evolving in several countries, transforming the pharmacist role from the production and dispensing of medicines to the direct care of patient. There has been growing emphasis and demand for more involvement of pharmacists in providing clinical pharmacy services(Saseen et al., 2017). The World Health Organization (WHO), Pan American Health Organization (PAHO), International Federation of Pharmacists (FIP), among others, have organized several meetings and published important documents to transform the concept of Pharmacy from a commodity-based into a clinical profession. This alteration focused also implies that the Pharmacy curriculum should be adapted, to provide effective clinical pharmacy services, pharmacists need to adopt and implement the philosophy and practice of pharmaceutical care (PC) and to act as active members of multidisciplinary healthcare teams(Bean, 1979).

On other hand, ASHP believes that pharmaceutical care may be a crucial new concept that represents growth within the profession beyond clinical pharmacy as often practiced and beyond other activities of pharmacists, including medication preparation and dispensing. All of these professional activities are important, however, and ASHP continues to be a sturdy proponent of the necessity for pharmacists' involvement in them. In practice, these activities should be integrated with and culminate in pharmaceutical care provided by individual pharmacists to individual patients(Elements, 2020).

As pharmaceutical care is outcome-oriented and has an accomplishment process (assessment of drug-related problems, development of care plan and evaluation of treatment outcome), (Currie et al., 2003)(Simpson Douglas 2001) it requires the Pharmacist to amass skills, qualifications, and capacity to be ready to overcome the challenges that include such responsibility. In spite of the wide importance of pharmaceutical care services, the implementation of pharmacy practice research into practice an activity or program of known dimensions has not been clearly defined in the Middle East countries so that independent observers can detect its presence, strength, and sustainability (Carolina et al., 2005).

Purpose of the Study

The existing philosophy or concept of professional practice in pharmacy is called pharmaceutical care. According to this concept, the important role of the pharmacist is to "responsibly provide drug therapy with the goal of achieving specific outcomes that improve the patient's quality of life." In 2015, RPS proposed further integration of pharmacists into general practices and outlined the multiple benefits pharmacists can provide. Australia, New Zealand and Canada have shown positive GP responses to pharmacist involvement in general practices(K. Mohiuddin, 2019). Therefore, this study is designed to evaluate and determine the quality of pharmaceutical care services of 17 countries in the Middle East region and the ability of Pharmaceutical care services in optimizing rational use of medicines, promoting well-being, and preventing illness. Besides, it is created to assess the sustainability of pharmaceutical care services in the Middle East countries and evaluate researchers ' perceptions of the barriers and motivations/ facilitators related to pharmaceutical care services implementation in the middle east.

Research Questions⁄ Hypothesis

To clarify the services which are able to be provided, APhA has proposed a classification of activities in pharmacy practice. A consensus group coordinated by APhA and involving numerous pharmaceutical institutions produced the Pharmacy Practice Activity Classification (PPAC)(Wiedenmayer, 2006), a comprehensive document divided into four areas or domains: domain A: ensuring appropriate therapy and outcomes. Domain B: Dispensing of medications and devices. Domain C: Health

promotion and disease prevention. Domain D: Health Systems management. Each domain includes more specific classes of activities, with activities in Domain A directly related to pharmaceutical care practices: A.1. Ensuring appropriate pharmacotherapy. A.2. ensuring that the patient understands and follows their treatment plan. A.3. monitoring and reporting outcomes. Therefore, a compilation with the main components and core objectives of Clinical Pharmacy and Pharmaceutical Care could facilitate the creation of a global definition of Clinical Pharmacy and clarify its relationship to Pharmaceutical Care (Charles D. Hepler, 2004).

Significance of the Study

As healthcare providers, pharmacists are in a position to provide world-class patient care, and membership in multidisciplinary clinical teams is required to give them this opportunity. Evidence-based pharmaceutical care can be a natural and logical concept within modern pharmacy practice to achieve first-class quality and greater proximity to practice. Pharmaceutical care, but more effort and resources are needed to promote a new attitude towards a more professional profession. Another strong body of data shows that pharmaceutical care improves health outcomes and is cost-effective therapy. Further efforts, guidelines, and qualified personnel are needed to establish "evidence-based pharmaceutical care" as a new daily professional practice. The evidence to support pharmacists in their new role as care providers is available to increase the effectiveness and quality of pharmaceutical care. Approach is significant to arrange pharmacists to supply top quality pharmaceutical care(K. Mohiuddin, 2019).

Furthermore, determining and approving the vital roles of pharmacists or clinical pharmacists will not only help or enhance the implementation of Pharmaceutical Care services but it will improve the collaboration between pharmacists and other health care providers. As a study, it was presented that closer collaboration between physicians and pharmacists in primary care prevents ADR. This also helps pharmacists to ensure rational and cost-effective use of medications, promote healthy lifestyles, and improve clinical outcomes by actively participating in direct patient care and collaborating with many health care disciplines. With this expanded scope of practice, pharmacists are recognized as a key component in individual patient care as part of inter-professional health care provide(Kefale et al., 2016).

On other hand, that specialize in the importance of research and education isn't based only on developing or strengthening pharmaceutical services, but rather their impact will reflected on the extent of pharmacists and also the high competitiveness of providing a hit medical intervention. As proposed by the ACPE and the Center for the Advancement of Pharmacy Education, they have promoted collaboration between the health professions and pharmacy by increasing the skills and confidence of academics in optimizing patient care and management. They also encourage pharmacy students to "attend to community needs" and evaluate faculty members for their contributions to community service. Assuming that an emphasis on service, teaching, and research is one of the characteristic evaluation measures of all institutional programs, it is important to develop consistent pedagogical models that can be adopted. In the public health arena, these goals benefit society's pharmaceutical practice by leading to desirable patient outcomes, minimizing overuse, underuse, and misuse of medications, and achieving medication-related public health goals(Galal et al., 2014).

In addition, the expanded scope of practice includes activities such as modifying medication dosages and other aspects of patient prescriptions, therapeutic substitution, initiating drug therapies (including therapy for minor illnesses), and ordering and evaluating laboratory tests, which has further focused the role of the pharmacist within a patient-centered model of care. Knowledge of medications and diseases, and thus the ability to use this data, are key components to success. Pharmacists are engaged in an ever-expanding scope of practice and have a dramatic impact on patient and economic outcomes. A review of the pharmaceutical literature reveals that pharmacists' success is determined by their engagement in practice and innate or cultivated personal characteristics(K. Mohiuddin, 2019).

Thus, this study is taken into account because the first of its type to be held to measure the pharmaceutical care services in 17 different Middle East Countries and seeking to detect the factors that obstacle the implementation of pharmacy practices within the Middle East Countries. Moreover, assessing the impact of Pharmacy Practice Research from the purpose of various Authors among a range of Middle East Countries. The potential benefits that will result from this study will provide information to the choice makers to possess an inclusive picture of the practicality to develop and implement such practice.

Limitation of the Study

The pharmacy profession in different Middle East Countries showed some challenges encountered and hindered the application of pharmaceutical services, as shown in Saudi Arabia which demonstrated extensive changes and numerous challenges in the field since the late 1950s. Further development and optimization are anticipated, and pharmaceutical services are expected to improve dramatically shortly. On other hand, Studies conducted in Iraq had been identified a variety of reasons including 32 years of an atmosphere of conflicts, an uncontrolled private sector, profit orientation, a lack of learning skills, and as well limited role of hospital pharmacists[14][14]. As well as, pharmacy practice in Palestine and Yemen is still progressing, and continuing education is needed to upgrade pharmacists/clinical pharmacist's services [14][14].

Over and above that, the search strategy, search terms and different databases were utilized in order to be as a comprehensive as possible, but there were some countries from the Middle East not included and this can be due to the lack of focus or it may be the result of a set of obstacles that these countries may encounter.

Definition of Terms

Pharmacy is the technique and science concerned with the preparation and dispensing of medicines, and hence with informing the public about medicines. It includes interpretation of formulary instructions, compounding, labeling, and dispensing of drugs and devices, selection of drugs and verification of adherence to therapy, monitoring of and intervention with patients, and thus the provision of cognitive services related to the use of drugs and devices. Pharmacists are also considered one of the most important members of the health care system because they can help and reduce the severity of health problems. In addition, the approach of PC emphasizes the essential role of the pharmacist in many ways, be it in the management of medicines so that pharmacist/clinical pharmacist can increase the life satisfaction of the patient(K. Mohiuddin, 2019).

When David Burkholder, one in all Don Francke's students, finished his degree and moved to the University of Kentucky, he promoted the involvement of pharmacists in clinical decision-making via drug information (Pharmaco et al., 1981)(Hutchinson & Burkholder, 2006). The term Clinical Pharmacy was quickly adopted in Europe (Van der Kelyn E 1970). Since that point, a series of definitions of Clinical Pharmacy has

emerged. Although all the listed definitions agree that clinical pharmacy is interested in the use of medicines or their effects, there are differences. For instance, UKCPA describe Clinical Pharmacy as a body of data (UKCPA 2002), rather than knowledgeable practice that pulls on or applies such knowledge, and Frankin and Van Mil describe the aims of Clinical Pharmacy in terms of improving processes (‘‘rational and appropriate use of medicinal products and devices’’ (Franklin & Foppe Van Mil, 2005), while ACCP defines it as a health science discipline in which pharmacists care for patients, medically optimize therapy, and health enhancement , wellness, and disease prevention, and both ACCP and UKCPA emphasize achieving optimal outcomes for individual patients(UKCPA 2002)(Bean, 1979). Additionally, certain elements of structure must be in place to supply quality pharmaceutical care. Variety of elements are (1) knowledge, skill, and performance of personnel, (2) systems for data collection, documentation, and transfer of information, (3) efficient workflow processes, (4) references, resources and equipment, (5) communication skills, and (6) commitment to quality improvement and assessment procedures.

One of the most commonly used definitions are those of European Society from Clinical Pharmacy(Pharmacy, 2017) and additionally those of American College from Clinical Pharmacy(*ACCP - Clinical Pharmacy Defined*, n.d.) , as shown in Table.1. In evaluating these definitions, they overlap in three important ways. First, the primary role of the clinical pharmacist in patient care. The pharmacist's services in patient care extend to prescribing and administering immunizations. Second, their specialization in selecting the rational and appropriate use of medications. Rational use of medications requires that patients receive medications that meet their clinical needs, at a dosage that meets their needs, for an appropriate period of time, and at the least cost to them and their community (WHO, 2003). Third, clinical pharmacy is often practiced in very different settings at different levels of care. At a very tertiary level of care, pharmacists may provide clinical pharmacy services at the bedside on a full-time basis. Advanced levels of patient care are provided by clinical pharmacists in collaboration with other health care professionals. These pharmacists are referred to as clinical pharmacists because they primarily provide direct patient care. A community pharmacist spends most of his or her time providing medications and other pharmacy management tasks. However, this does not preclude the provision of clinical services. All cognitive services a community pharmacist provides are clinical once they are involved in direct patient care (Chen, 2016).

Figure1:

Factors of Quality Care (United Kingdom. The Scottish Government, 2017)

Table 1:

Definition of Clinical Pharmacy

Definition of Clinical Pharmacy by ESCP and AACP	
European Society of Clinical Pharmacy (ESCP)	The services of Clinical Pharmacy can develop and promote the rationality of medication use and devices that can be provided in many different health care settings such as hospitals, community pharmacies, nursing homes, and other settings where medications are prescribed and used. (Pharmacy, 2017)
The American College of Clinical Pharmacy (AACP)- Abridged Definition	Clinical pharmacy is a branch of pharmacy concerned with the science and practice of medication rationality (ACCP - Clinical Pharmacy Defined, n.d.)
The American College of Clinical Pharmacy (AACP)- Unabridged Definition	The practice of clinical pharmacy encompasses the philosophy of pharmaceutical care; it combines a caring orientation with specialized therapeutic knowledge, experience, and judgment with the goal of ensuring optimal patient outcomes. (ACCP - Clinical Pharmacy Defined, n.d.)

The definition of pharmaceutical care was published by Hepler and Strand in 1990. They define it as "the responsible provision of drug therapy with the goal of achieving specific outcomes that improve a patient's quality of life. To realize the idea of pharmaceutical care, the profession of pharmacy shifted from primarily specializing in the drug itself to providing drug therapy to the patient and optimizing it for the individual patient."(68 - HEPLER, C D Opportunities and Responsabilities in Pharmaceutical Care_1990.Pdf, n.d.). Then some new definitions have appeared. The definition, originally from 1998 by a group in Minnesota, USA, is patient-centered and emphasizes that the pharmacist is usually responsible for the patient's drug therapy: pharmaceutical care could be a practice in which the physician takes responsibility for a patient's drug-related needs and is held accountable for this commitment. Within this practice, responsible drug therapy is provided with the goal of achieving positive patient outcomes(Strand et al., 2004). A more modern definition of Pharmaceutical Care Network Europe (PCNE), which specifies pharmaceutical care as a service provided by pharmacists, states: Pharmaceutical Care is that the pharmacist's contribution to the care of people is to optimize the use of medicines and improve health outcomes (Allemann et al., 2014). Therefore, understanding the true meaning of sustainability of pharmacy practice research can help determine all factors that may occur in the application of pharmacy practice. To be defined as the continued integration of a new practice or service within an organization to become a routine component of care so helping in the achievement of the health outcomes (Ellström, 2010; Pluye et al., 2004; Scheirer & Dearing, 2011).

CHAPTER II

Literature Review

Theoretical Framework

The theory of assessment of pharmaceutical care services in the Middle East countries offers a method of examining the role of pharmacists or clinical pharmacists in providing different services either on the medical side or educational side as well as barriers to the provision of pharmaceutical care and counseling.

For the sake of demonstrating the ability of pharmacists or clinical pharmacists to practice and comprehension the pharmaceutical care services. The Theoretical Model of this search was based on two perspectives. The first level or perspective is a direct observation of varieties of services or interventions directed by clinical pharmacists.

By understanding "Role Theory" which defined by Conway as "a collection of concepts and a spread of hypothetical formulations that predict how actors will perform in a very given role or under what circumstances certain varieties of behaviors is expected" (Taylor et al., 2020). The role of pharmacist whose job is to organize medicines and to sell or supply them to the general public in an exceedingly store or in a hospital(Oxford University, 2005; Taylor et al., 2020). This definition, although accurate, essentially represents only the supply function performed by pharmacists.

The role of the pharmacist has however evolved since the early 1900s, when pharmacists were apothecaries preparing drug products for medicinal use (Pearson, 2007). By the 1950s, large-scale manufacturing of most therapeutic agents shifted pharmacists' responsibility to still include some compounding but mainly to dispensing and labeling commercial products (Pearson, 2007). During the mid-1960s, pharmacists assumed a more patient-orientated role and therefore the concept of clinical pharmacy developed(Pearson, 2007).

Therefore, of these expansion and advancement within the role of Pharmacists supported to contemplate them as medication experts with a primary role of ensuring the safe, effective and judicious supply of medicines (Dr Chris Freeman & Pharmaceutical Society of Australia, 2019). However, they're increasingly expanding their role by developing skills and knowledge to produce expanded services(Hoti et al., 2011).

Through measuring this perception, we will be more capable of capturing a general picture not only regarding the services but how some of the Middle East Countries

taking into their account the paramount importance of the presence of pharmacists or clinical pharmacists and their effective part among medical staff.

Further, by comparing the role of pharmacists and the medical intervention provided by clinical pharmacists in European countries, we found that the obstacles that exist are less than what is evident in the countries of the Middle East. And to that their focus rate on pharmacy practice research is higher than what is clearly obvious in the Middle East counties.

The second view of this research was based on measuring the point of view of researchers within the Middle East countries, the primary contributors to the research of pharmaceutical practice. This measurement depends on their standpoint, whether in terms of explanations for the continuity of pharmaceutical services or the factors that led to discontinuity. These perceptions are significant because knowing the roles that pharmacists or clinical pharmacists play, especially within the Middle East countries will give a sign of the effort they devote to providing these services and medical counseling.

Accordingly, the NHS Institute for Innovation and Improvement Sustainability Model(Al-Arifi, 2012) (SM) was developed to help teams implement new services. This can enable them to anticipate and assess the key variables in their local context that will determine whether a new practice is likely to be sustained, and take timely action to increase the likelihood of this being achieved.

The model SM was further developed using information gathered from a variety of sources to identify ten key factors that increase the likelihood of sustainability and continuous improvement. A review of the management literature on sustainability and a survey of project managers, directors, clinicians, and global health experts within a national NHS Improvement Program initially identified over 100 factors that were considered to be the most important components of sustainable change. 250 NHS staff and health professionals were asked to rate these factors on a scale of 1 to 10, from which 10 factors were eventually derived (Doyle et al., 2013). Then individual team members choose one of four statements or 'levels' that they believe represent the 'best fit' with their current situation. This is often an ordinal scale, with the very best level representing the most favorable perspective on sustainability (Doyle et al., 2013).

Although the scope of pharmacy practice research has expanded over the past 50 years to incorporate clinical, behavioral, economic, and humanistic implications of the practice of pharmacy, additionally as practice change and implementation of

innovations like health interventions and patient-care services in routine practice. Thus expanding the concept of pharmacy practice research within the Middle East region, particularly, the countries of low- income will progress the growing and showing a raise within the contribution not only in the national research area but to the worldwide health research.

Related Research

General impression about the Services of Pharmaceutical Care

Pharmaceutical care consists of several components that begin with the disclosure of a social need, focus on meeting the patient's needs by establishing and maintaining a therapeutic relationship, and end with an overview of the specific tasks of the practitioner (Hutchinson & Burkholder, 2006).

The social necessity lies in the undeniable fact that almost all failures in pharmacotherapy are often due to the patient misusing the drug and not understanding the goals of the therapy. This occurs in over 50% of cases where the intended outcomes are not achieved (Johnson & Bootman, 1997), despite correct prescribing and dispensing (Faus & Martínez, 1999) and thus represents a significant economic burden on healthcare costs (Beney et al., 2000). In conformity with other authors (Snella & Sachdev, 2003), we will claim that "intervention is considered a pharmaceutical care intervention if it involves at least the following:

- a face-to-face discussion between a patient and a pharmacist with the aim of managing health or resolving medication-related problems,
- development of a care plan,
- pharmacotherapy follow up

Recommendations need to be made to begin this process to increase patient awareness of this service (Snella & Sachdev, 2003). There is a need to highlight all the potential benefits to a patient using these services: ensuring that the medications work appropriately to strengthen the patient's health, reducing problems associated with the medications such as adverse effects and interactions with other medications (McDonough et al., 1998).

Pharmaceutical Care Services in the Middle East Countries

In the Middle East, which encompasses countries between Western Asia and Northern Africa, pharmacy practice continues to evolve, although its progress is

hampered by many challenges. While the impact of Arabs on medicine and pharmacy in Europe, and therefore the reminder of the global, can't be overstated, the advancement in pharmacy education and practice in Arabic-speaking Middle Eastern countries caught up and centered around traditional curricula and apothecary pharmacy for many years. This recession can be attributed to multiple factors, including past and current periods of conflict, occupation, social and economic pressures, and political instability (Kheir et al., 2008).The introduction of clinical pharmacy and clinical pharmacists in these countries began to participate in inpatient rounds, provide drug information, and use medication profiles to document patients' drug therapies (C. D. Hepler & Strand, 1990).

Like in other countries within the world, the emergence of pharmaceutical care challenged Middle Eastern pharmacists to embrace this new paradigm, which focuses on outcomes of care instead of products or tasks(C. D. Hepler & Strand, 1990).

Clinical Pharmacy Practice in Jordan

In Jordan, pharmacy practice as a contemporary profession started only within the early 4th decade of the 20th century with just a couple of pharmacists practicing in their community pharmacies. Rapid growth within the number and size of pharmacy services followed, as Jordan now has quite 8,800 registered pharmacists, and more than 1,600 community pharmacies(Al-Wazaify & Albsoul-Younes, 2005). Managing and controlling the severity of diseases is one among the vital roles of clinical pharmacists. A prospective, randomized control study was the primary study to investigate the role of clinical pharmacists in clinical outcomes of IDA patients in Jordan. This study showed that clinical pharmacy services resulted in a significantly greater percentage of intervention group patients reaching their Hgb goals compared with control group patients(L. M. Tahaineh & Khasawneh, 2018).

Many studies have investigated clinical pharmacists' roles in improving health outcomes in numerous disease states and different settings in Jordan(L. Tahaineh et al., 2011)(Hammad et al., 2011)(Albsoul-Younes et al., 2011). While Another study showed that community pharmacist's contact with both sick and healthy individuals allows pharmacists to contribute to preventative efforts such as screening for various diseases and their risk factors, in addition as providing treatment for those that need it(Eades et al., 2011).

Health Care System and Pharmacy Practice in Saudi Arabia

The Ministry of Health (MOH) plays the role of designing and functions because the regulatory body within the health system(Al-Yousuf M et al. 2002). As a part of its remit as a regulatory body, MOH enacted a law in 1978 restricting the practice of pharmacy for licensed pharmacists among other regulations on the pharmacy profession. Furthermore, that law forbade pharmacists from dispensing medicines without a prescription, except for those defined by the law as over the counter (OTC)(Bawazir SA 1992). This law represented the start of recent pharmacy in Kingdom of Saudi Arabia. However, despite that the law, which laid a solid foundation for permanently pharmacy practice, the pharmacy profession in Asian nation generally, and community pharmacy especially, still lags behind the strides made by the health care system in Saudi Arabia.

Several studies were reviewed with attention on the pharmaceutical services provided. Dispensing was found to be the dominant service provided by community pharmacists altogether those studied without exception(Bawazir SA 1992)(Al-Arifi, 2014)(Beall, 2011)(Al-Hassan, 2009). Additionally, some studies reported that the majority consumers who visited community pharmacies for pharmaceutical services self-medicated not only with OTC medicines but also with other classified pharmacy and prescription drugs(Al-Mohamadi et al., 2013)(Wazaify et al., 2008)(Sreelalitha et al., 2012)(Anyama & Adome, 2003).

Furthermore, in Saudi Arabia, a prospective study in 2008 was administered in Riyadh to assess the role of clinical pharmacists in an intensive care unit (ICU), specifically to what extent they were accepted by physicians, their frequency within the ICU, their clinical significance, and also the way how they influenced targeted patient outcomes. They found that the bulk of DRPs that occurred within the ICU involved not giving a drug for a given medical condition (33.2%), wrong dosing regimen (28.9%), and no indication for drug use (14.3%)(Al-Jazairi et al., 2008). Similarly, in 2013, another study was conducted in central Kingdom of Saudi Arabia to explore the occurrence of adverse drug events (ADEs). The experts found that pharmacists reported 361 possible events of ADEs, of which around 78% were considered as potential ADEs that, if it reached a patient, it can cause harmful effects(Aljadhey et al., 2013).

Pharmaceutical Care services in Turkey

Pharmaceutical care could also be a comparatively new concept in Turkey. A stepwise process has been followed in implementing the concept and education of clinical pharmacy and pharmaceutical care in Turkey. Recently the duration of undergraduate pharmacy education has been increased to five years, consisting of more clinical content (i.e., courses of pharmaceutical care, clinical pharmacy, pharmacotherapy, professional communication skills, etc.) making a usefulness opportunity for further implementation of these concepts (Sancar et al., 2013).

A limited number of studies have confirmed pharmacist involvement within the care of cancer patients within the outpatient setting. These studies have explored the protection profile of medication used, the management of adverse effects, and thus the problem around supportive care and potential drug interactions(Bayraktar-Ekincioglu et al., 2014)(Periasamy et al., 2017)(Ma et al., 2016)(Colombo et al., 2017).

While other studies outline the potential role of the pharmacist in an oncology setting; however, there was minimal reporting on the character and incidence of actual or potential drug-related problems (DRPs) where targeted chemotherapy and/or immunotherapy was utilized to treat patients diagnosed with cancer(Periasamy et al., 2017)(Ma et al., 2016)(Hamel et al., 2018)(Holle et al., 2017)(Marr et al., 2018)(Vantard et al., 2015)(Walter et al., 2016)(Timmers et al., 2017).

Documentation of Pharmaceutical Care Services Processes

The term "documentation" has used to count activities more closely to descriptive protocols or administrative reports. This expanded non-clinical use of the term "documentation" has caused the profession to lose sight of a necessary step within the improvement, justification, and successful implementation of clinical pharmacy services. It consists of the following six interrelated steps: (1) establish a comprehensive patient-specific database; (2) identify patient-specific, DRP; (3) describe desired therapeutic outcomes; (4) list all therapeutic alternatives which can produce the desire outcomes; (5) select the drug recommendation(s) that the bulk likely will end within the required outcomes; (6) establish an intention for therapeutic drug monitoring that documents that desired effects occur and undesired effects are minimized (Basics, 1988).

Another study had drafted guidelines for the documentation elements that must be included in any record of the care provided by pharmacists in order to assess the quality

of care and described the use of these guidelines to improve the quality of pharmacist documentation (Currie et al., 2003).

Barriers limiting Pharmaceutical Care Services Implementation

The pharmaceutical care process implies a general change in the health care process offered by pharmacists. As it is an innovative professional practice, this is often met with reluctance by professionals, exacerbated by the lack of informed recognition and economic compensation from health authorities. Therefore, the process of accomplishment is slow and difficult to implement(Martín-Calero et al., 2004).

A study conducted by Desselle and Hunter(Desselle, 1998) determined some barriers that are limiting the implementation of PCs which they're as follow:

- Pharmacy should adopt specific standards of practice in implementing pharmaceutical care.
- Lack of documentation mechanisms for community pharmacists.
- Interprofessional relationships of Pharmacists and physicians.
- Pharmacists themselves as a barrier.

On the other hand, a study revealed a variety of barriers based on the experience level of professionals(Plaza Guerrero & Herrera Carranza, 2003):

- Pharmacists who have already adopted this practice are concerned about training issues and communication with physicians.
- Those who have already adopted this practice complain about lack of time, lack of space in the pharmacy, reimbursement, consensus on the approach, a collaboration between their group, that of the patients and therefore the physicians.
- Those who consider pharmaceutical care unprofitable mention structural problems (lack of staff, training, money, space) and thus the lack of recognition by the administration and professional institutions

The relation between Educational and Research Practice in Improving Pharmaceutical Care Services.

Pew Health Profession Commission (PHPC) suggested after an analysis of all health professions, that pharmaceutical education "should begin with curricular reform to be qualified to provide pharmaceutical care" (Martin-Calero MJ et al. 2004).

The PHPC recommends that some of the following skills be acquired: critical judgment, communication, the ability to identify and resolve DRP, ethical behavior, teamwork, continuing education, and leadership. This includes the introduction of new topics in addition to the prevailing ones that are still important to pharmaceutical practice. In addition, it is suggested that this curriculum should educate pharmacy students alongside those in other health professions (Martin-Calero MJ et al. 2004).

In order to adequately implement and improve pharmaceutical care practices from various fields, postgraduate education is important. As mentioned earlier, the introduction of this subject into the curricula of colleges of pharmacy is very recent, and in many of them, it is not yet taught. For this reason, pharmacists who graduated five years ago lack such training or have approached it only superficially(Martín-Calero et al., 2004).

Professional organizations have intervened in postgraduate education, recognizing that this shortcoming is one of the biggest obstacles in pharmacy education. International organizations such as the FIP (FIP 2000) maintain that continuous education is necessary to ensure competency in any pharmaceutical service through constant updating of knowledge and skills. It has been shown that professionals who participate in continuing education courses and programs significantly improve their skills in pharmaceutical care and reduce the perception of barriers (Barner & Bennett, 1999)(Young et al., 1999)(Farris et al., 1999).

CHAPTER III

Methodology

Research Design

A Scoping review and Cross-Sectional Study were carried to describe nature Pharmaceutical Care Services and evaluate sustainability of implemented services.

The first study procedure: Scoping review

To identify and summarize the studies showing the impact of pharmaceutical care services of 17 countries in the Middle East region.

Study inclusion and exclusion

Inclusions and exclusions criteria that were taking into our consideration are described as follow:

Inclusion criteria:

- Studies report an assessment of Pharmaceutical care services in general or clinical pharmacy practice provided by pharmacists or clinical pharmacists.
- Full-text English-language journal articles only.
- Original research results, with the following forms of study design (randomized control studies, pre-post interventional studies, non-randomized control studies including in retrospective, prospective and cross-sectional studies are eligible).
- Studies had been done only within the Middle East Countries which they're as follow:
  (Bahrain, Cyprus, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Palestine, Qatar, Kingdom Saudi Arabia, Syria, Turkey, United Arab Emirates, and Yemen).
- The publication year of study was selected for those between 2020 and 2013.

Exclusion criteria:

- The study was a summary of the literature to collect information or comments, an editorial, or a discussion paper.

Search terms and Sources

A comprehensive literature search was conducted for studies between 2020-2013 years in the following databases: The Cochrane Central Register of Controlled Trials (CENTRAL) within The Cochrane Library, Springer Link, PubMed/ Medline, Scopus, Clinical Trial, and Web of Science using specific keywords (("Clinical pharmacy practice" OR "Pharmacy practice" OR "Pharmaceutical Care" OR Pharmacy OR Pharmacist) AND (Service OR Intervention OR Program OR Evaluation OR Assessment OR indicators OR Quality) AND ("Middle East Countries" OR "Low-Income Countries" OR "Developed countries" OR "underdeveloped countries" OR "Developing countries" OR Bahrain OR Cyprus OR Egypt OR Iran OR Iraq OR Israel OR Jordan OR Kuwait OR Lebanon OR Oman OR Palestine OR Qatar OR "Saudi Arabia" OR Syria OR Turkey OR "The United Arab Emirates" OR Yemen))

Data to be assessed

Once the studies identified two reviewers independently were selected the trials to be included in the review. Disagreements were resolved by the discussion of the articles by the two reviewers. Two phases of study selection were performed. Firstly, only titles and abstracts were assessed for inclusion. In the next phase, the full texts of potentially eligible studies were reviewed thoroughly.

Measures to assess the selected studies quality

The quality of included studies was assessed independently using Van Tulder Scale for reporting randomized controlled trials, (Appendix. A), and the Downs and Black checklist for the assessment of the methodological quality of non-randomized studies (Appendix. B) .For each individual non-randomized study, we were assigned it either as ‘’ excellent, good, fair or poor’’, while for each included randomized study, we were summarized it either as low quality or high quality.

Data Elements to be abstracted

The characterization of the selected studies were summarized in the table including the following elements:

Authors/Year, Location, Design, Hospital characterization, Intervention guardian, Unite, Data collection, Data analysis, PCs implanted, impact factors and Quality rating.

The Second Study procedures: A semi-structured questionnaire

To assess the sustainability of pharmaceutical care services in the middle east countries and evaluate researchers ' perceptions of the barriers and motivations/ facilitators related to pharmaceutical care services implementation in the middle east.

Data Sources

A qualitative method using a semi-structured questionnaire was developed and adapted. A Delphi method of consensus development was used with three survey rounds. In the first round, invited experts (n=5) were asked to rate their agreement/disagreement with 36 statements over four domains concerning demographical data of respondents, respondent's participation in, the sustainability of, and facilitators/ barriers of pharmacy practice research. In the second and third rounds, participants reappraised their ratings in view of the group consensus.

Participants were also asked to contribute further ideas in relation to these topics, which were incorporated in rounds 2 (n=9) and 3 (n = 3). Then inform the invited experts of the results that we got so that we can reach a final consensus and start surveying with corresponding authors as shown in Figure 2. Then semi structure questionnaire with four sections was send to all corresponding authors via email.

Study Inclusion criteria

Themes were later developed and data was presented accordingly. To determine the validity of qualitative survey seven criteria should be included (1) carrying out ethical research; (2) importance of the research; (3) clarity and coherence of the research report; (4) use of appropriate and rigorous methods; (5) importance of reflexivity or getting to researcher bias; (6) importance of establishing validity or credibility; and (7) importance of verification or reliability.

Data collection tool

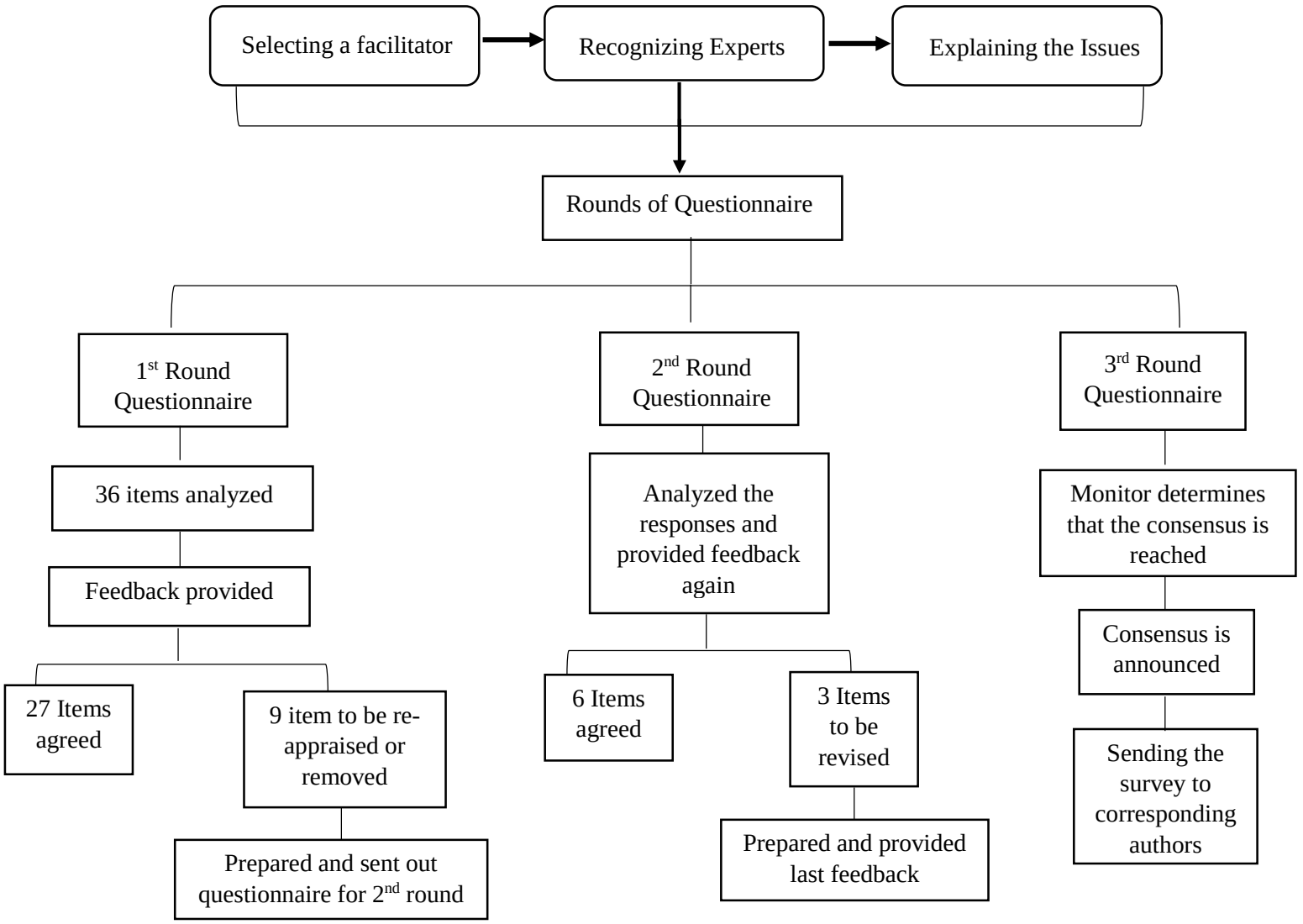
The questionnaire were consisting of 4 sections: demographic information section like the age of respondent, gender, nationality, current qualification, practice area and years of experience; respondent's participation in, the sustainability of; and potential barriers/ facilitators of implemented pharmaceutical care services sustainability in pharmaceutical care practice. Then, based on the number of studies included within the scoping review, the questionnaire will be distributed to the Corresponding Authors of every selected study.

Data Analysis

Microsoft Excel 2017 and statistical package for the Social Sciences (SPSS), Software Version 23.0 were used to collect and analyze the data. Descriptive analysis was used for demographic data, research activities, and interests. For categorical data, a Pearson Chi-square test, and Binary Logistic Regression were conducted, while for measuring the relationship between demographic and scores Mann-Whitney U test (2 groups) and Kruskal- Wallis for the groups more than two. P-value was considered to be ≤ 0.05 which reflecting the statistical significance of the study.

Figure.2:

The following figure shows the flow diagram of Delphi Study.



CHAPTER IV

Findings and Discussion

The findings of the First Procedure (Scoping Review)

Study selection

The initial search identified 431,753 studies and six parameters were chosen to contribute to the selection of studies: (Keywords, type of study, date, full text, language, and title). Subsequently, the exclusion of articles not matching study question and duplicates, 155 article abstracts were evaluated yielding 131 studies. Following full-text reading 24 studies were excluded due to study design, not carried in one of the Middle East countries, no relevant aim and not meet the other inclusion criteria. Thus, at the end of the selection process, we reached 132 articles that met the inclusion criteria.

Study characteristics and journal of publication

The study characteristics of the included studies are shown in Table.2 (Appendix. C). The selected studies were published between 2020 and 2013 and the studies were conducted in Jordan, with the largest number of published studies (34, 25.8%), followed by Saudi Arabia (22,16.7%), Turkey (15,11.4%), Iran (14,10.6%), then Egypt (13,9.8%), Qatar (8, 6.1%), Cyprus (7, 5.3%), Iraq (6, 4.5%) and Kuwait (4, 3%). While Lebanon and Palestine (3, 2.3%), next Israel and Oman (2, 1, 1.5% and 0.8%, respectively). (Ababneh et al., 2019; Abu-Oliem et al., 2013; Abu Farha et al., 2017; Abuloha et al., 2016; AbuNaba'a & Basheti, 2020; Aburuz et al., 2013; Akour et al., 2017; Al-Azzam et al., 2016; Al-Qudah et al., 2020; Al alawneh et al., 2019; Al Tall et al., 2020; Alawneh et al., 2020; Alefishat et al., 2020; Alkoudsi et al., 2020; Alkoudsi & Basheti, 2020; Almomani et al., 2017; Alnawayseh et al., 2020; Basheti et al., 2018; Basheti, Al-Qudah, et al., 2016; Basheti, Tadros, et al., 2016; Batta et al., 2018; El-Refae & Abuhamdah, 2017; Faqeer et al., 2020; Hadi & Sbeitan, 2015; Hammour et al., 2016; A. S. Jarab, Almousa, et al., 2020; A. S. Jarab, Rababa'h, et al., 2020; F. Jarab et al., 2020; Qudah et al., 2016; Salameh et al., 2019; Salmany et al., 2018; L. Tahaineh et al., 2020; L. M. Tahaineh & Khasawneh, 2018; Wishah et al., 2015), (A.A. et al., 2017; Al-Somai et al., 2014; Aljumah & Hassali, 2015; Almitwazi et al., 2017; Almulhim et al., 2019; Almzeiny et al., 2020; Alrabiah et al., 2017; Alshammari, 2019; AlShayban et al., 2020; Alsultan et al., 2013; Alsuwayni & Alhossan, 2020; Assiri et al., 2017; Babelghaith et al., 2020; Bahmaid et al., 2018;

Bloem et al., 2017; Khojah, 2019; M F Najjar et al., 2017; Muath Fahmi Najjar et al., 2018; Raja et al., 2020; Suleiman et al., 2016; Sultana et al., 2016; Tourkmani et al., 2018; Yılmaz et al., 2019), (Apikoglu-Rabus et al., 2016; Ertuna et al., 2019; İzzettin et al., 2019; Izzettin et al., 2017; Kara et al., 2019; Kucuk et al., 2020; ÖZDEMİR et al., 2020; Paksoy et al., 2019; Sancar et al., 2015; Selcuk et al., 2015; Tecen-Yucel et al., 2018; Tezcan et al., 2018; Topal et al., 2020; Umar et al., 2020; Yalçin et al., 2019), (Dashti-Khavidaki et al., 2013; Farsaei et al., 2014; Forough & Esfahani, 2017; Foroughinia et al., 2016; Jahangard-Rafsanjani et al., 2015; Khalili et al., 2013; Lin et al., 2017; Mahmoodpoor et al., 2018; Mehralian et al., 2015; Mehrpooya et al., 2018; Mousavi et al., 2013; Nikvarz & Seyedi, 2019; Sarayani et al., 2018; Vazin et al., 2018) (K. Abdelaziz & Abdelrahim, 2015; M. A. S. Ali et al., 2018; Amin & Chewning, 2014; Bahnasawy et al., 2017; Casper et al., 2019; Ebid et al., 2020; El Borolossy et al., 2014; Eldeib et al., 2019; Mostafa et al., 2020; NCT02922140, 2016; Saeed et al., 2020; Shalaby, 2017; Tawfik et al., 2020), (H. Abdelaziz et al., 2016; Alsalimy et al., 2017; El Hajj et al., 2017; El Hajj, AL-Saeed, et al., 2016; El Hajj, Mahfoud, et al., 2016; Kheir et al., 2014; Pallivalapilla et al., 2018; Zidan et al., 2016), (Abdi et al., 2018; Al-Baghdadi et al., 2017; Arsoy et al., 2018; Birand et al., 2019; Boşnak et al., 2019; Gökçekuş et al., 2016; Korcegez et al., 2017), (Abdulameer, 2018a, 2018b; Z. T. Ali et al., 2019; Mahwi & Obied, 2013; Marouf et al., 2020; Yassin et al., 2020) (Al-Taweel et al., 2014; Aldosari et al., 2020; Maram G. Katoue et al., 2013; Maram Gamal Katoue, 2020) (Chamoun et al., 2016; Hijazi et al., 2020; Makkaoui et al., 2020)(Charfeddine et al., 2002; Ghanem et al., 2020; Shawahna, 2020), (Frankenthal et al., 2014; Shchory et al., 2020)(Al-Hashar et al., 2018). Table.3.

According to the study design of the selected studies, the majority of them were Non-Randomized controlled trials (89, 67.4%) including in four types Prospective, Pre-post interventional, Retrospective, and Cross-sectional studies and (43, 32.6%) studies were identified as Randomized. Table.4.

On the other hand, the most common type of journals used to publish full reports of data of included studies was an International Journal of Clinical Pharmacy and subsequently followed by Journal of Oncology Pharmacy Practice, Jordan Journal of Pharmaceutical Science and Journal of Evaluation in Clinical Practice (14.4%, 4.5%). Table.5. Whereas 3.8% from the included studies were published in Saudi

Pharmaceutical Journal and 68.2% from the involved studies were published in various other of journals.

Nature of pharmaceutical care Services provided

The main outcomes effectuated were as follows: Resolving and preventing DRP and TRP (37 studies,19.7 %), Managing or Controlling Patients disease and parameters (31 studies,17%), Increasing adherence to medications (23 studies,12.2%), Reducing the severity of disease (1 study, 0.5%), Improving HRQOL or QOL (27 studies,14.4%), Reducing or reviewing patients' medication discrepancies (14 studies,7.4%), Measuring patients satisfaction on PC services (3studies, 1.6%), Educating or increasing awareness or improving patients' knowledge (29 studies,15.4%), Reducing mortality rate (4 studies,2.1%), Reducing hospitalization (3 studies,1.6%), appropriate selection of medicines (10, 5.3%), detecting barriers for providing pharmaceutical care services (3, 1.6%) and reducing the cost of medications (2, 1.1%).Table.6 On the other hand, most of the units in which the pharmaceutical intervention was applied are respectively as follows: Community pharmacies by 17.9%, Cardiac clinic= 12.9%, Oncology= 8.6% and Out-patients clinic, DM clinic and Internal = 5.7%, 5.7%, and 5%, respectively. 3.6% for Hematology and Pediatrics clinics. On the other hand, 2.9% were conducted in ICU, Psychic clinic, Geriatrics, ED, Multiple centers, and Infectious wards, while 1.4% in Nephrology clinic, not specified, Ambulatory pharmacy Syrian refugees' clinic, Gynecology, and Neurology. Correspondingly, 0.7% had focused on the intervention of pharmacists/ clinical pharmacists in DIC, Urology, HIV clinic, chronic diseases clinic, Kidney transplantation clinic, and Anticoagulation clinic. Table.7

Pharmaceutical services implementers

In terms of the implementation of the pharmaceutical interventions, we found that most of these interventions were by clinical pharmacists by 57%, 34.8% by pharmacists, and followed by 8.1% for well-prepared health practitioners. Where we found that one of the most countries to have a pharmaceutical intervention or provide services through the clinical pharmacist is Jordan by 36.6%, then Turkey by 17.3% and Saudi Arabia by 13.3%, followed by Iran, Egypt and Cyprus by 10.7%, 8%, and 6.7%, respectively. Lastly, 2.7% for Iraq and Qatar. While we observed that most countries relied on pharmacists to provide pharmaceutical services was Saudi Arabia by 22.9%, followed by Jordan, Iran, and Qatar by 12.5%, then 8.3% for Iraq and

Kuwait. As well as, by 6.3% for Palestine and 4.2% in Lebanon. While 2.1% for Israel, Oman, and Cyprus, sequentially. Besides, in Egypt by 44.4%was depending on well health practitioners, followed by 11.1% for Jordan, Cyprus, and Saudi Arabia, respectively. Figure.3 Regarding the year of publication, we found that the majority of studies were published in 2020 by 26.5% followed by 2018 16.7% and 13.6% for the studies published in 2017 and 2016 respectively. While 6.8% for the ones published in 2013 and 6.1% for 2015, then 4.5% for the studies published in 2014 as shown in Table.3

Table.3:

The frequency distribution and the total percentage of included studies and their year of publication

		Frequency	Percent
Country	Jordan	34	25.8%
	Iran	14	10.6%
	Egypt	13	9.8%
	Iraq	6	4.5%
	Cyprus	7	5.3%
	Qatar	8	6.1%
	Saudi Arabia	22	16.7%
	Turkey	15	11.4%
	Israel	2	1.5%
	Oman	1	0.8%
	Lebanon	3	2.3%
	Kuwait	4	3%
	Palestine	3	2.3%
	Total	132	100.0%
		Frequency	Percent

		Frequency	Percent
Year	2013	9	6.8%
	2014	6	4.5%
	2015	8	6.1%
	2016	18	13.6%
	2017	18	13.6%
	2018	22	16.7%
	2019	16	12.1%
	2020	35	26.5%
Total		132	100%

Table.4:

The type of study design applied in the Included studies (n=132).

		Frequency	Percent
Design	Randomized Controlled Studies	43	32.6%
	Non-Randomized studies	89	67.4%
	Total	132	100%

Table.5:

The Type of Journals Used to Publish the Articles

		Frequency	Percent
Name of Journal	International Journal of Clinical Pharmacy	19	14.4%
	Journal of Oncology Pharmacy Practice	6	4.5%
	Jordan Journal of Pharmaceutical Science	6	4.5%
	Journal of Evaluation in Clinical Practice	6	4.5%
	Saudi Pharmaceutical Journal	5	3.5%
	Other Type of Journals	90	68.2%
	Total	132	100%

Table.6:

The outcomes achieved through the implementation of pharmaceutical care services in different Middle East countries.

		Frequency	Percent
Outcomes	Resolving and preventing DRP or TRP	37	19.7%
	Reviewing or reducing medication discrepancies	14	7.4%
	Managing patients' disease and parameters	31	17%
	Increasing adherence to medications	23	12.2%
	Reducing the severity of the disease	1	0.5%
	Improving HRQOL or QOL	27	14.4%
	Measuring patient satisfaction	3	1.6%
	Educating or improving patient’s knowledge or awareness	29	15.4%
	Reducing the mortality rate	4	2.1%
	Reducing hospitalization	3	1.6%
	Appropriate selection of medicine	10	5.3%
	Detecting barriers of PCs	3	1.6%
	Reducing the cost of medications	2	1.1%
	Total	188	100.0%

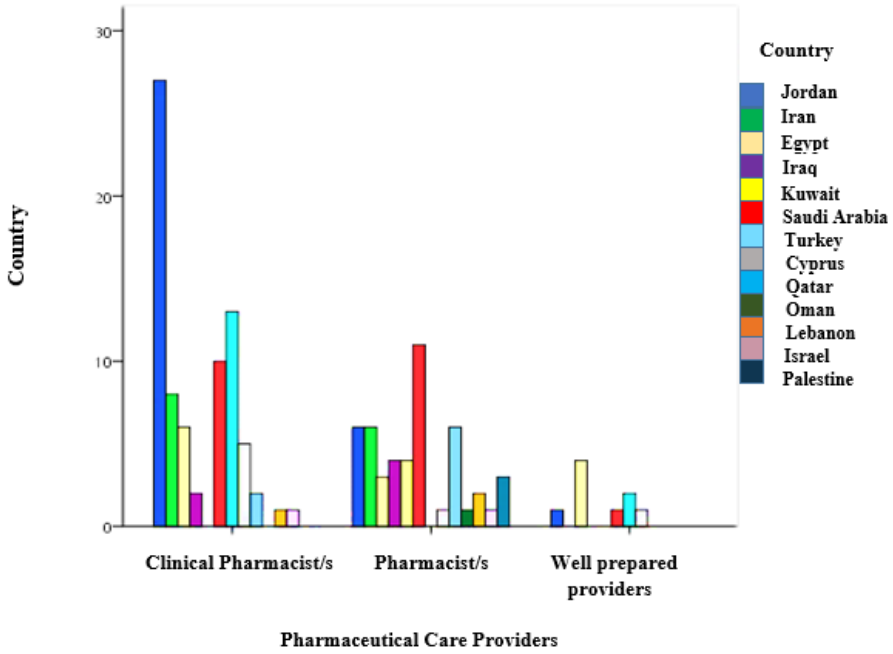
Table.7:

List of medical facilities that had received the services of the pharmacy practice.

		Frequency	Percent
Units	Drug Information Center (DIC)	1	0.7%
	Nephrology	2	1.4%
	Intensive Care Unit (ICU)	4	2.9%
	Cardiac Unit (Rehabilitation)	18	12.9%
	Outpatient clinics	8	5.7%
	Psychiatric unit	4	2.9%
	Geriatrics unit	4	2.9%
	Urology clinics	1	0.7%
	Diabetes clinics	8	5.7%
	Internal Ward	7	5%
	Hemodialysis unit	5	3.6%
	Pediatrics unit	5	3.6%
	Oncology Unit	12	8.6%
	Community Pharmacy	25	17.9%
	Emergency Department and Hospitalized	4	2.9%
	Multiple centers	4	2.9%
	Not specified	2	1.4%
	Ambulatory Pharmacy	2	1.4%
	Syrian Refugees' clinic	2	1.4%
	HIV center	1	0.7%
	Government and private hospitals	10	7.1%
	Gynecology	2	1.4%
	Infectious ward	4	2.9%
	Chronic disease ward	1	0.7%
	Kidney transplantation clinic	1	0.7%
	Anticoagulation clinic	1	0.7%
	Neurology	2	1.4%
Total		122	100.0%

Figure.3:

The following chart shows a comparison between those responsible for providing pharmaceutical care services in different countries of the Middle East.



Study Quality

Regarding the quality of the included studies, the majority were classified as high quality from Randomized and all high-quality studies have quantitative study design. While the majority of Non-Randomized considered as Fair quality. Table.8 and Figure.3

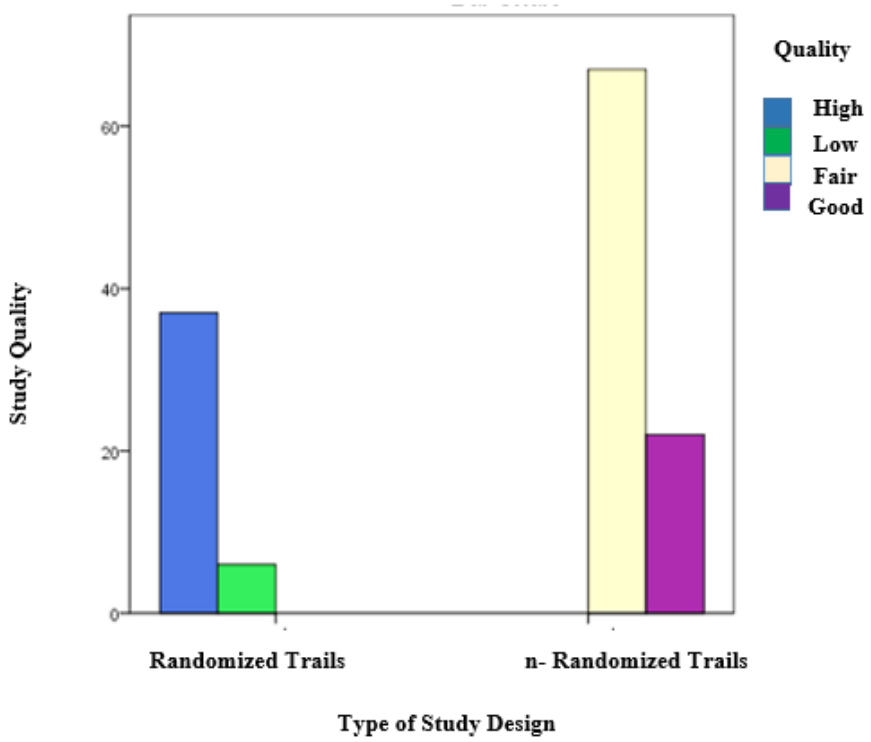
Table.8:

A comparison between the type of study designs and the quality rate of included studies (n= 132) as shown also in Figure.4

			Quality				Total
			High	low	Good	fair	
Design	Randomized Controlled Studies	Count	37	6	0	0	43
		% within design	100%	100%	.0%	.0%	32.6%
	Non-Randomized studies	Count	0	0	22	67	89
		% within design	.0%	.0%	100%	100%	67.4%
Total		Count	37	6	11	17	132
		% within design	100%	100%	100%	100%	100.0%

Figure.4:

The following chart shows a comparison between the type of study design and quality rate of included studies

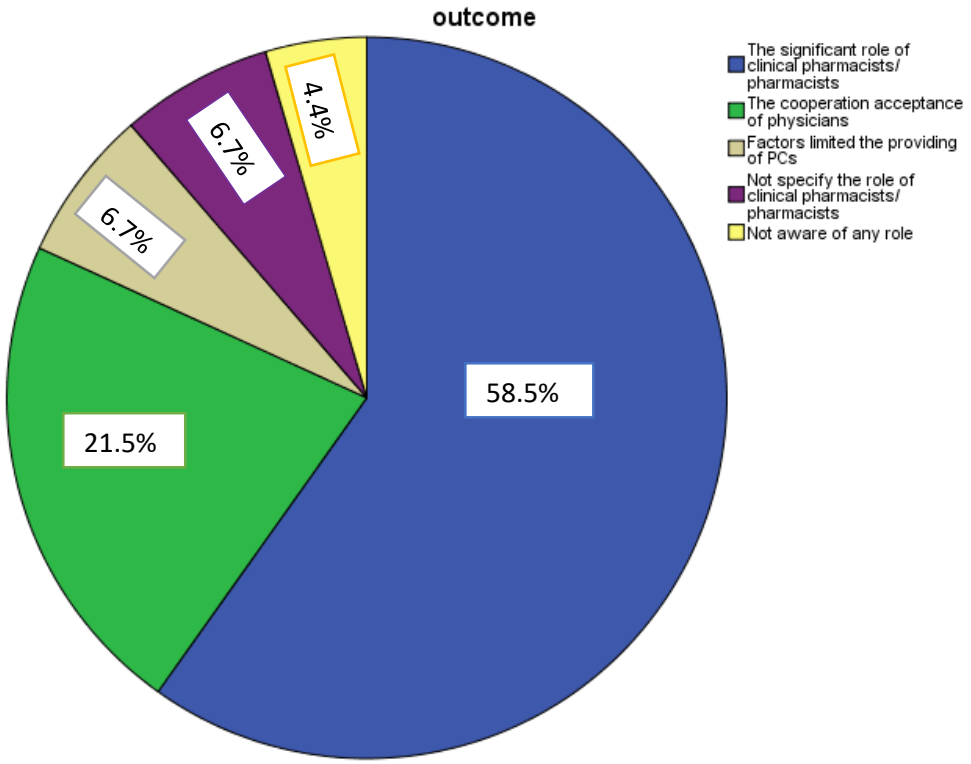


The implication of included studies in relation to pharmaceutical services provided

Through data analysis, we found that most of our selected studies confirmed the important role of clinical pharmacists or pharmacists with 58.5% in different ways as well as in the implementation of other services. Moreover, 21.5% of the physicians confirmed the collaboration with clinical pharmacists or pharmacists in the delivery of various pharmaceutical care services. In 6.7% of some selected studies, we discovered that these studies mentioned the factors that may limit the implementation of PC services. Nevertheless, 6.7% of some studies did not consider the role of clinical pharmacists or pharmacists because they examined the role of devices used, while 4.4% showed that there was no role for clinical pharmacists or pharmacists Figure.5.

Figure.5:

The following pie chart explains the feedback of studies regarding the implementation of pharmaceutical care services.



The impact of pharmaceutical care services provided

a. Identification of DRPs and diseases progression

Many pharmaceutical care services that have been covered by clinical pharmacists or pharmacists have been identified in various aspects. Getting back to the key aim of this review, thirty-three of the studies conducted in different Middle East Countries including Jordan (8, 22.2%), Cyprus (3, 8.3%), Israel (1, 2.8%), Qatar (2, 8.3%), Saudi Arabia (3, 8.3%), Oman (1, 3,2.8%), Turkey (7, 25%), Egypt (4, 11.1%), Iran (2, 5.6%) and Lebanon (2, 5.6%) showed how the clinical pharmacists/ pharmacists play a fundamental role to assess the patient's medications treatment from different aspects and different unites in the hospital which is facilitating the treatment control and enhancing therapy outcomes. Also, studies conducted by Haider al-Bagdadi, et al. (2017)(Al-Baghdadi et al., 2017), Attalla Saleh, et al (2013)(Abu-Oliem et al., 2013), and Majdoleen Al-Alawneh, et al. (2019)(Al alawneh et al., 2019) showed a great acceptance of physicians for clinical pharmacists' recommendations regarding their intervention in identifying drug-related problems. The intervention of clinical

pharmacists in reducing and identifying drug-related problems resulted in a significant impact in detecting drug problems and preventing harm(Al-Hashar et al., 2018)(Faqeer et al., 2020)(Basheti, Tadros, et al., 2016)(Basheti et al., 2018; Basheti, Al-Qudah, et al., 2016). While one study conducted in Turkey (Elif Ertuna, et al. 2019)(Ertuna et al., 2019) highlighted that despite the non- properly implementation of clinical pharmacy services, clinical pharmacists have a high rate of acceptance in recommending DRPs in a wide variety.

On other hand, pharmacists are the most accessible health care professional in a community. As such, they are in a position to provide early detection of chronic diseases and to identify unhealthy lifestyles. They can help patients reduce risk factors by prevention counseling when appropriate, e.g., weight and diet management, exercise, and smoking (1) Thus, we reviewed 21.2% of studies related to the role of either clinical pharmacist or pharmacist in managing, controlling chronic diseases and improving the health status of the patient. 8.3% of the studies in managing diabetes mellitus showed the significant impact of clinical pharmacists/ pharmacists in managing and controlling clinical parameters of diabetic patients(Al-Taweel et al., 2014),(Alsuwayni & Alhossan, 2020), (Ebid et al., 2020),(Jahangard-Rafsanjani et al., 2015), (Korcegez et al., 2017),(Sarayani et al., 2018),(Wishah et al., 2015),(Wishah et al., 2015)(Tourkmani et al., 2018),(Mahwi & Obied, 2013). Respectively, we found that 6.8% of the studies focused on the positive role of pharmacists/ clinical pharmacists in different diseases such as metabolic syndrome, PCOS, iron deficiency anemia and others(L. M. Tahaineh & Khasawneh, 2018),(Bahnasawy et al., 2017),(Nikvarz & Seyedi, 2019),(Hadi & Sbeitan, 2015),(Hijazi et al., 2020), (Mahmoodpoor et al., 2018),(H. Abdelaziz et al., 2016),(Maram G. Katoue et al., 2013),(Alkoudsi et al., 2020),(Shawahna, 2020).

Furthermore, 2.3% of the studies related to the managing of CVDs(Qudah et al., 2016),(A.A. et al., 2017),(El Hajj, Mahfoud, et al., 2016), while 2.3% of the studies focused on the intervention on patients with CKDs(Marouf et al., 2020),(Suleiman et al., 2016),(Aburuz et al., 2013) and 1.5% of the studies described the implementation of PCs in patients with respiratory diseases such as asthma (El Hajj et al., 2017),(Almomani et al., 2017). All of them substantiated that pharmacists/ clinical pharmacists are an essential part of the health care team to provide early detection of chronic diseases, managing associated complications, and how the physicians strongly recommended the importance of integrating the pharmaceutical care services.

b. Patient education, medication adherence, and improvement in QoL/ HRQoL

Regarding the role of pharmacists/ clinical pharmacists in counseling, educating, enhancing medications used, and improving QoL of the patients, we found that 39.1% of the studies showed their great impact, well-defined education, care that is helping to improve the outcomes of the patients and increase their desire to counsel, complete their medications appropriately and the positive impact of counseling not only on medications use but to develop a verity of strategies to improve compliance too. Where the percentage of studies that focused on increasing adherence to the use of the drug was 17.3%, 21.1% were focused mainly on the role of pharmacists/ clinical pharmacists in educating and counseling, and 20.3% on their effective role in improving quality of life of the patients. Besides, some studies demonstrated that comprehensive educational intervention might improve the knowledge, attitudes, and perceptions among pharmacists and encourage them to incorporate and participate in this into their everyday clinical practice.

c. Mortality and hospitalization rates

From other aspects, we discovered that 6% of the studies confirmed the significant impact of pharmaceutical care services and the great reductions in the rate of hospitalization this also revealed a significant benefit with pharmacists mainly in the management of chronic diseases. While a study conducted by Muath Fahmi Najjar , et al. 2018, (Muath Fahmi Najjar et al., 2018) suggested that the intervention of clinical pharmacists would raise the significance value of their intervention to improve the prescription patterns among hospitalized patients. Moreover, another study had conducted by Elham 2019, (Alshammari, 2019) linked the intervention of a clinical pharmacist to the reduction of hospitalization, thus reducing the high cost that the patient may incur as a result of re-admission to the hospital.

d. Cost-effectiveness of pharmaceutical care

11.2% of the studies focused on the role of clinical pharmacists/ pharmacists in identifying irrational drug utilization, reducing medication costs for either hospitalized or non-hospitalized patients. These studies showed a significant impact of clinical pharmacists on the drug therapy cost and reduction of inappropriate medication use on admission as well as improvement in medication review services. In contrast, a study by Hossein Khalili, 2013, (Khalili et al., 2013) found that intervention by clinical pharmacist did not significantly reduced patients' direct medication costs. While a

study conducted by Huda, et al 2017, (El-Refae & Abuhamdah, 2017) confirmed that intervention by clinical pharmacist had a significant impact on the cost of drug therapy and patient outcomes. The results support the usefulness of pharmaceutical care services for all hospitalized CVD patients. A retrospective study from Elif Ertuna 2019,(Ertuna et al., 2019) although clinical pharmacy services are not yet properly implemented in Turkey; there's a high acceptance rate of pharmacist recommendations in interdisciplinary geriatric assessment teams. Based on the results conducted in a reference center in Iran, the implementation of guidelines by the pharmaceutical supply unit significantly reduced the consumption of albumin and IV pantoprazole and decreased their direct costs (van de Pol et al., 2019).

The persistently high cost of drugs therefore underlines the increasing importance of Pharmacoeconomics evaluation studies (Edgar, 1993). These studies make it possible to identify, measure and compare the costs of different pharmacotherapies or services and to determine their impact on health budgets and patient health.

e. Barriers hinder pharmaceutical care services

One of the goals that ensure continued Pharmaceutical Services is to secure patient satisfaction for services provided by either the pharmacist or the pharmacist's clinical. As shown in the two studies conducted by Dhfer Mahdi AlShayban et al 2020, (AlShayban et al., 2020) and Hussain Al-Omar 2020, (Almzeiny et al., 2020) that all the patients considered counseling as an important service and were satisfied with it and how pharmacist with skills in pharmaceutical care and counseling could be useful in promoting the service and making it profitable for pharmacy business as shown too in this study that all the participants had a positive perception of the pharmaceutical care services.

Moreover, pharmacists/ clinical pharmacists may face some barriers and challenges to provide pharmacy practice, so different studies conducted by Khawla abu hammour et al, 2016,(Hammour et al., 2016) Maram Gamal Katoue 2020, (Maram Gamal Katoue, 2020) and Khizra Sultana 2016, (Sultana et al., 2016) demonstrated that time constraint' was the primary barrier discouraging pharmacists from practicing such service, inconvenient access to patient medical information (78 %) and lack of staff and time (77 and 74 % respectively) and research experience for the pharmacists who have no prior experience to do research.

Consequently, two studies showed that the collaboration between different stakeholders in the profession is essential to support pharmacists' efforts in achieving

the change in the scope of pharmacy practice to improve patient care services. In addition, pharmacy practice implementation depends on the whole educational process from undergraduate study to residence training(Maram Gamal Katoue, 2020), (Abdulameer, 2018b).

The findings of the Second Procedure (Delphi Technique for semi- structure questionnaire)

The first question in opinion gathering is how many rounds it takes to reach consensus. The Delphi process for our study had 3 rounds. In round 1, the invited experts (n=5) determined their opinion and agreement on the different sets of questions (open and closed questions). The level of agreement was 75% in the first round, 25% had to be re-evaluated or deleted. In the second and third rounds, the questions were modified according to the experts' comments and the questions were discussed, which allowed us to reach an agreement level of more than 80% for the last two rounds. According to the level of agreement we can start surveying with corresponding authors (Appendix. D).

Scoping Review Discussion

To the author’s knowingness, the current review was the first that was done to identify the implementation impact of pharmaceutical care services in the low and middle income of Middle East Countries.

Only 132 articles were included in this scoping review. However, all included studies have been published from 2013 to 2020 by 45.7%. The massive majority of studies were from Jordan, with the largest number of published studies (34, 25.8%), followed by Saudi Arabia (22, 16.7%), Turkey (15, 11.4%), Iran (14, 10.6%) then Egypt (13, 9.8%), Qatar (8, 6.1%), Cyprus (7, 5.3%), Iraq (6, 4.5%) and Kuwait (4, 3%) While Lebanon and Palestine (3, 2.3%), next Israel and Oman (2, 1, 1.5% and 0.8%, respectively). Based on the World Bank Classification of countries by income level 2019-2020 (World Bank Data 2020), we found that 13 Middle East Countries were identified as 6 have Middle-Income countries including Jordan, Iran, Egypt, Iraq, and Turkey, while 6 countries considered as High income representing in Qatar, Cyprus, Saudi Arabia, Israel, and Oman. While in one country Palestine is considered a Low-income country.

Most of the studies included in this review reported the effective role of pharmacist/ clinical pharmacists in improving HRQoL/ QoL. This finding is also compatible with results from previous studies, which showed significant value and the positive impact of pharmacists on the QoL among older adult patients in rural areas (Falamić et al., 2020). Moreover, a study conducted in 2014 recited a statistical improvement in the HRQoL after pharmaceutical care intervention (Masoom Akhtar et al., 2014). A review supports this systematic review was carried on women with breast cancer (BC) in the Middle East countries (Haidari et al., 2020). A cross-sectional study distributed by Jordanian pharmacists to identify the predictors, levels, and prevalence of anxiety and stress and to assess the relationship between these factors and quality of life in recently displaced Iraqis and found that pharmacists play a significant role to alleviate anxiety and stress among refugees. Reducing and managing anxiety and stress may improve QOL among refugees worldwide(Haidari et al., 2020). While we found that some studies have traded different services that can be provided by pharmacists or clinical pharmacists. Majdoleen AL Alawneh et al. (2020), this study approved that the medication review service delivered by clinical pharmacists can improve DRPs and anxiety scores. As for QoL, significant improvements can be seen for all refugee patients, regardless of whether the DRPs identified were resolved or not(Alawneh et al., 2020).

Similar results were found in different studies. Pharmacists were found to be capable of helping to improve patients' health by reducing medication-related side effects and encouraging medication adherence, by decreasing physician visits, hospital admissions, and amending the whole primary care delivery(Mossialos et al., 2015). A systematic review correlated to pharmacist-led DM self-management Education (DSME) studies also indicated a significant improvement in medication adherence, quality of life, and diabetes knowledge after DSME(van Eikenhorst et al., 2017).

On the other hand, in a systematic review of non-dispensing pharmaceutical services in low- and middle-income countries, Pande et al. (2013) showed that the most commonly used terminology in the studies was "pharmaceutical care" and the majority of interventions involved simple patient education(Pande et al., 2013).

Although the main benefits were either more specifically implemented, such as improving HRQoL/QoL, disease management and control, increasing medication adherence, resolving DRPs or TRPs. A systematic review assessed the effectiveness of CPS, provided in primary care clinics, and most of the complex and comprehensive

interventions, such as physical assessment, monitoring, prescribing, and face-to-face communication with physicians, were implemented in high-income countries(Tan et al., 2014). Undoubtedly, the majority of CHD seems to be closely related to abnormal BP, diabetes, and dyslipidemia(Farkouh et al., 2013) in which several studies have been shown the effective role of pharmacists in reducing morbidity and mortality associated with CHD, as well as numerous articles have been identified that cooperation, especially cooperation between physicians and pharmacists, can effectively reduce the incidence of drug-related problems and improve outcomes very favorably in some clinical situations (Calvert et al., 2012)(Bailey et al., 2006)(V. et al., 2007).

The need for knowledgeable, proficient, and experienced health care practitioners has grown year after year and the role of a clinical pharmacist has expanded to encompass all phases of patient care as part of the health care team. A study looking at physicians, nurse practitioners, and physician assistants estimated a shortage of qualified oncology and hematology practitioners by 2020(Erikson et al., 2008). Because of their special knowledge and extensive training, oncology pharmacists are perfectly positioned to deliver high-quality care to cancer patients and offset some of the shortage of practitioners(Sessions et al., 2010). Another study conducted in the Hematological and has Unit shown that with the addition of a clinical pharmacist in the hemodialysis unit numerous DRP were detected and interventions made. The majority of interventions were significant and possibly led to better therapeutic outcomes (Grabe et al., 1997). Additionally, other studies conducted in diabetes clinics and have been documented the diabetes management of patients whose drug therapy was managed specifically by clinical pharmacists under physician supervision. The studies showed consistent, favorable results on glycemic control in the university-affiliated out-patient clinic, Veterans Affairs medical centers, and managed care settings(Jaber et al., 1996)(Coast-Senior et al., 1998)(Gong et al., 1999)(Kelly & Rodgers, 2000).

As shown in our scoping review that the cooperation between pharmacists and physicians can impact patient outcomes, whereas qualitative semi-structured interviews showed the presence, visibility, and implication of hospital pharmacists need to be improved, and physicians should be more aware of what they can offer them. Consequently, trust is one of the most important factors for enhancing the cooperation of physicians and pharmacists/ clinical pharmacists as we found numerous

studies conducted by Jorgenson D et.al (2013), Ebert L et.at (2014) and D'Amour D et.al (2008) discovered that trust is critical for physician–pharmacist collaboration and has been associated with greater commitment and dialogue(Jorgenson et al., 2013)(Ebert et al., 2014)(D'Amour et al., 2008).

According to our review, we tried to spot the factors which may either promote the implementation of pharmaceutical care services or restrict the continuation of services within the Middle East countries. Hence, we found only a few studies that reported some factors, including a limited number of clinical pharmacists, lack of cooperation between pharmacists/ clinical pharmacists and health care professionals, low variable socioeconomic status, and lack of expert and trained pharmacists. As shown within the study of Waltz et al. (2015) reported that the identification of barriers and facilitators of implementation is one among the foremost important and feasible strategies to implement change. Therefore, the identification of influencing factors employing a framework, like APOTECA, could guide the development of a multifaceted, multilevel tailored plan, using implementation strategy tools, to a successful implementation of CPS(Waltz et al., 2015).

CHAPTER V

Conclusion and Recommendation

Scoping Review

Summary for Main Results and Recommendation

This study report that intervention of clinical pharmacists/ pharmacists in middle east countries were mostly targeting patients' QoL, medication adherence, mortality rate, hospital readmission, and hospitalization and reviewing patients' medication discrepancies. The knowledgeable, trained, and skills of pharmacists support a wide variety of functions in all aspects of patient care and different settings.

Nevertheless, some limitations restrict the generalizable of this scoping review regarding the impact of pharmaceutical care services because the review has not included all the Middle East Countries, so at the same time, this gave us an indication of the lack of studies and the non-acceptance of some countries for the interventions that guided by pharmacists. The majority of quality for our included studies was classified as high quality and a few numbers were identified as low quality.

Conclusion

This scoping review showed that Studies in the Middle East continue to provide evidence supporting the positive impact of pharmaceutical care services on both hard and soft outcomes measured in most studies. Clinical pharmacists/ pharmacists' interventions in different general practices have a significant improvement in most of the measured outcomes, including QoL, medication adherence, mortality rate, hospital readmission, and hospitalization, reviewing patients' medication discrepancies and DRPs. Also, these findings can help us to develop a strategy that helps to identify the factors and ensures the continuity of pharmaceutical services and also the factors that affect the continuity of these services. Besides, it can enable these services in countries where Pharmaceutical Care Services are not consolidated so take the consideration of inserting these services. Yet, rigorous evaluation of the economic impact of introduced services and their sustainability is necessary.

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APPENDICES

Appendix A

The Van Tulder scale for Randomized studies

	Criteria	Assessment
A	Was the method of randomization adequate?	Yes/No/Don't know
B	Was the treatment allocation concealed?	Yes/No/Don't know
C	Were the group similar at baseline regarding the most important prognostic indicators?	Yes/No/Don't know
D	Was the patient blinded to the intervention?	Yes/No/Don't know
E	Was the care provider blinded to the intervention?	Yes/No/Don't know
F	Was the outcome assessor blinded to the intervention?	Yes/No/Don't know
G	Were co-interventions avoided or similar?	Yes/No/Don't know
H	Was the compliance acceptable in all groups?	Yes/No/Don't know
I	Was the drop-out rate described and acceptable?	Yes/No/Don't know
J	Was the timing of the outcome assessment in all groups similar?	Yes/No/Don't know
K	Did the analysis include an intention-to-treat analysis?	Yes/No/Don't know

Appendix B

Modified Downs and Black checklist for the assessment of the methodological quality of non-randomized studies

Item	Criteria	Possible Answers
Reporting		
1	*Is the hypothesis/aim/objective of the study clearly described?*	Yes = 1 No = 0
2	*Are the main outcomes to be measured clearly described in the Introduction or Methods section?* If the main outcomes are first mentioned in the Results section, the question should be answered no.	Yes = 1 No = 0
3	*Are the characteristics of the patients included in the study clearly described?* In cohort studies and trials, inclusion and/or exclusion criteria should be given. In case-control studies, a case-definition and the source for controls should be given.	Yes = 1 No = 0
4	*Are the interventions of interest clearly described?* Treatments and placebo (where relevant) that are to be compared should be clearly described.	Yes = 1 No = 0
5	*Are the distributions of principal confounders in each group of subjects to be compared clearly described?* A list of principal confounders is provided.	Yes = 2 Partially = 1 No = 0
6	*Are the main findings of the study clearly described?* Simple outcome data (including denominators and numerators) should be reported for all major findings so that the reader can check the major analyses and conclusions. (This question does not cover statistical tests which are considered below).	Yes = 1 No = 0
7	*Does the study provide estimates of the random variability in the data for the main outcomes?* In non-normally distributed data the interquartile range of results should be reported. In normally distributed data the standard error, standard deviation or confidence intervals should be reported. If the distribution of the data is not described, it must be assumed that the estimates used were appropriate and the question should be answered yes.	Yes = 1 No = 0
8	*Have all important adverse events that may be a consequence of the intervention been reported?* This should be answered yes if the study demonstrates that there was a comprehensive attempt to measure adverse events. (A list of possible adverse events is provided).	Yes = 1 No = 0
9	*Have the characteristics of patients lost to follow-up been described?* This should be answered yes where there were no losses to follow-up or where losses to follow-up were so small that findings would be unaffected by their inclusion. This should be answered nowhere a study does not report the number of patients lost to follow-up.	Yes = 1 No = 0
10	*Have actual probability values been reported (e.g. 0.035 rather than <0.05) for the main outcomes except where the probability value is less than 0.001?*	Yes = 1 No = 0
External validity		
11	*Were the subjects asked to participate in the study representative of the entire population from which they were recruited?* The study must identify the source population for patients and describe how the patients were selected. Patients would be representative if they comprised the entire source population, an unselected sample of consecutive patients, or a random sample. Random sampling is only feasible where a list of all members of the relevant population exists. Where a study does not report the proportion of the source population from which the patients are derived, the question should be answered as unable to determine.	Yes = 1 No = 0 Unable to determine = 0

12	*Were those subjects who were prepared to participate representative of the entire population from which they were recruited?* The proportion of those asked who agreed should be stated. Validation that the sample was representative would include demonstrating that the distribution of the main confounding factors was the same in the study sample and the source population.	Yes = 1 No = 0 Unable to determine = 0
13	*Were the staff, places, and facilities where the patients were treated, representative of the treatment the majority of patients receive?* For the question to be answered yes the study should demonstrate that the intervention was representative of that in use in the source population. The question should be answered no if, for example, the intervention was undertaken in a specialist center unrepresentative of the hospitals most of the source population would attend.	Yes = 1 No = 0 Unable to determine = 0
Internal validity - bias		
14	*Was an attempt made to blind study subjects to the intervention they have received?* For studies where the patients would have no way of knowing which intervention they received, this should be answered yes.	Yes = 1 No = 0 Unable to determine = 0
15	*Was an attempt made to blind those measuring the main outcomes of the intervention?*	Yes = 1 No = 0 Unable to determine = 0
16	*If any of the results of the study were based on "data dredging", was this made clear?* Any analyses that had not been planned at the outset of the study should be clearly indicated. If no retrospective unplanned subgroup analyses were reported, then answer yes.	Yes = 1 No = 0 Unable to determine = 0
17	*In trials and cohort studies, do the analyses adjust for different lengths of follow-up of patients, or in case-control studies, is the time period between the intervention and outcome the same for cases and controls?* Where follow-up was the same for all study patients the answer should be yes. If different lengths of follow-up were adjusted for by, for example, survival analysis the answer should be yes. Studies where differences in follow-up are ignored should be answered no.	Yes = 1 No = 0 Unable to determine = 0
18	*Were the statistical tests used to assess the main outcomes appropriate?* The statistical techniques used must be appropriate to the data. For example nonparametric methods should be used for small sample sizes. Where little statistical analysis has been undertaken but where there is no evidence of bias, the question should be answered yes. If the distribution of the data (normal or not) is not described it must be assumed that the estimates used were appropriate and the question should be answered yes.	Yes = 1 No = 0 Unable to determine = 0
19	*Was compliance with the intervention/s reliable?* Where there was non-compliance with the allocated treatment or where there was contamination of one group, the question should be answered no. For studies where the effect of any misclassification was likely to bias any association to the null, the question should be answered yes.	Yes = 1 No = 0 Unable to determine = 0
20	*Were the main outcome measures used accurate (valid and reliable)?* For studies where the outcome measures are clearly described, the question should be answered yes. For studies which refer to other work or that demonstrates the outcome measures are accurate, the question should be answered as yes.	Yes = 1 No = 0 Unable to determine = 0
Internal validity - confounding (selection bias)		
21	*Were the patients in different intervention groups (trials and cohort studies) or were the cases and controls (case-control studies) recruited from the same population?* For example, patients for all comparison groups should be selected from the same hospital. The question should be answered unable to determine for cohort and case-control studies where there is no information	Yes = 1 No = 0 Unable to determine = 0

	Concerning the source of patients included in the study.	
22	*Were study subjects in different intervention groups (trials and cohort studies) or were the cases and controls (case-control studies) recruited over the same period of time?* For a study which does not specify the time period over which patients were recruited, the question should be answered as unable to determine.	Yes = 1 No = 0 Unable to determine = 0
23	*Were study subjects randomized to intervention groups?* Studies which state that subjects were randomized should be answered yes except where method of randomization would not ensure random allocation. For example alternate allocation would score no because it is predictable.	Yes = 1 No = 0 Unable to determine = 0
24	*Was the randomized intervention assignment concealed from both patients and health care staff until recruitment was complete and irrevocable?* All non- randomized studies should be answered no. If assignment was concealed from patients but not from staff, it should be answered no.	Yes = 1 No = 0 Unable to determine = 0
25	*Was there adequate adjustment for confounding in the analyses from which the main findings were drawn?* This question should be answered no for trials if: the main conclusions of the study were based on analyses of treatment rather than intention to treat; the distribution of known confounders in the different treatment groups was not described; or the distribution of known confounders differed between the treatment groups but was not taken into account in the analyses. In non-randomized studies if the effect of the main confounders was not investigated or confounding was demonstrated but no adjustment was made in the final analyses the question should be answered as no.	Yes = 1 No = 0 Unable to determine = 0
26	*Were losses of patients to follow-up taken into account?* If the numbers of patients lost to follow-up are not reported, the question should be answered as unable to determine. If the proportion lost to follow-up was too small to affect the main findings, the question should be answered yes.	Yes = 1 No = 0 Unable to determine = 0
Power		
27*	*Did the study have sufficient power to detect a clinically important effect where the probability value for a difference being due to chance is less than 5%?* Sample sizes have been calculated to detect a difference of x% and y%.	Yes = 1 No = 0 Unable to determine = 0

*Item has been modified

Appendix C

Table.2:

Characterizations of the studies (n= 132) included in this scoping review

Authors/ Year	Location	Design	Hospital characterization	Intervention by	Unit	Data collection	Data analysis	PCs Implemented	Quality rating	Name of Journal	Impact Factor
Attalla Saleh Abu-Oliem et al. (2013)	Jordan	Randomized control trial	This ICU has 37 beds. An average of 35 patients was admitted every week from internal medicine, surgery, and traumatic patients (for example, road traffic accidents).	Clinical pharmacist	ICU	-The database was collected from patients' medical files. -Interview with patients. - Facilitated discussion with physicians.	Thematic analysis	Resolving and preventing DRPs.	High	Jordan Journal of Pharmaceutical Science	0.35
Linda M Tahaineh et al. (2018)	Jordan	A prospective parallel randomized trial.	Outpatients clinics	Clinical pharmacist	Outpatients clinics	Data collected through patients' interviews and verbal recommendations to physician's concerning the intervention group management plan.	Thematic analysis	Managing iron deficiency anemia patients.	High	International Journal of Pharmacy Practice	0.391
Yasmeen AbuNaba'a et al. (2019)	Jordan	A parallel randomized trial.	Not determined	Clinical pharmacist	Psychiatric clinic	Data collected through patients' interviews and recommendations discussed with physicians and quaternary was made.	Descriptive analysis.	Counseling and education regarding treatment, adherence, and self-care activities	High	Journal of Evaluation in Clinical Practice	1.681
Chung-Ying Lin et al. (2017)	Iran	Randomized control trial	(Five academic centers in Tehran, two in Qazvin and Ahvaz	Well prepared practitioners.	5 multiple centers	Facilitated discussion groups and focus group	Multilevel linear mixed models	Medication adherence, improving QoL,	High	Drugs and Aging Journal	2.381

			each, one in Semnan, Zanjan, and Tabriz each).					and reducing the mortality rate.			
Salma M Bahnasawy et al. (2017)	Egypt	A prospective randomized study.	Not determined	Clinical pharmacist	Pediatric clinic	By using the Generic Core Scale Questionnaire and an interview with patients.	Statistical analysis	Increasing awareness regards iron overload and enhancing the patient's outcome.	High	Basic and Clinical Pharmacology and Toxicology	3.176
Rajaa A Al-Qudah et al. (2020)	Jordan	A prospective randomized study.	Outpatient clinic setting of the Jordan University Hospital in Amman, Jordan, the main health care provider in Jordan, with 600 beds and serving over 500 000 outpatients annually.	Clinical pharmacist	Outpatient clinic	Patient interview method via a questionnaire	Statistical analysis	Resolving TRP among patients with chronic diseases.	High	Journal of Evaluation in Clinical Practice	1.681
Zahra Jahangard-Rafsanjani et al. (2015)	Iran	Randomized control study	Not determined.	Community pharmacist	Endocrine clinic	5 follow-up visits and 5 phone calls) and recommended physician visits when necessary.	Statistical analysis	Developing and delivering a diabetes support program for patients	High	The Science of Diabetes self-management and Care Journal	2.087
EylemIlktac Korcegez et al. (2017)	Cyprus	Randomized control study.	The study was conducted with 152 patients at a 186-bed public hospital's outpatient diabetes clinic in Gazimagusa, Northern Cyprus.	Clinical pharmacist	Outpatient diabetic clinic	Data were collected using questionnaires, medical reports, and the hospital's record system.	Statistical analysis	Achieving treatment goals in patients with DM, improving patient outcomes, and medication adherence.	High	Journal of Managed Care and Specialty Pharmacy	2.713
Maguy Saffouh El Hajj et al. (2017)	Qatar	Prospective randomized control study.	Not determined.	Pharmacist	Ambulatory pharmacies	Face to face structure interview.	Statistical analysis	Implanting and delivering the smoking program, reducing the rate of death, and	High	BMC Public Health	2.948

								preventing respiratory disease.			
Amir Sarayani et al. (2018)	Iran	Parallel randomized control study.	Tehran University of Medical Sciences (conference hall and the drug information call center). This pharmacy is in the midtown area of Tehran, the capital city of Iran, and is the main pharmacy among 7 educational pharmacies affiliated with the College.	Pharmacist	DIC	Phone calls and discussion with physicians	Statistical analysis	Improving patient care activity, medication adherence, and DM parameters.	High	International Journal of Clinical Pharmacy	1.692
Mera Ababneh et al. (2019)	Jordan	Prospective randomized control study.	Not determined	Clinical pharmacist	Urology clinic	Verbal communication with patients, questionnaires, and some discussion was with physicians	Statistical analysis	Increasing medication adherence, education of patients, and improving lifestyle.	Low	International Journal of Clinical Pharmacy	1.616
Maryam Mehrpooya et al. (2018)	Iran	Randomized control study	Not determined.	Pharmacists	Cardiac unit	Face to face and Morisky questionnaire	Statistical analysis	Increasing adherence to medications and educating the patients about their medications and disease.	Low	Journal of Applied Pharmaceutical Science	0.62
Amani Zidan et al. (2016)	Qatar	Prospective randomized control study	The center is equipped with a 20-bed coronary care unit, a 12-bed cardiothoracic intensive care unit, a 24-bed surgical high dependency unit, and 60 ward beds with	Clinical pharmacist	Cardiology unit	By reviewing the HH's medical records according to the study's inclusion and exclusion criteria.	Statistical analysis	Reviewing and reconciling patient's discharge medications, Documenting and resolving any identified discrepancies and	High	BMJ Open	2.496

			continuous telemetry monitoring rooms.					DRP, and Providing the usual general discharge counseling.			
Haitham Saeed et al. (2020)	Egypt	Randomized control study.	Not determined.	Well prepared practitioners	3 different clinics	A smartphone application was recorded with verbal communication.	Statistical analysis	Improving and educating patients about their use of the selected device.	Low	Journal of Respiratory Care	2.012
Maryam Mousavi et al. (2013)	Iran	Randomized control study	Not determined.	Clinical pharmacist	Transplantation ward.	Daily services were applied to patients according to the patient's health status	Statistical analysis	Providing well PN, maintain the natural status of patients, and improving clinical outcomes.	High	Journal of Support Care in Cancer	2.698
Amna Al-Hashar et al. (2018)	Oman	Randomized control study.	A tertiary care academic hospital in Oman with a bed capacity of 500.	Pharmacist	Internal medical ward	Electronic health records and interviews.	Statistical analysis	Reducing medication errors and reconciliation on admission and discharge.	High	International Journal of Clinical Pharmacy	1.692
Ruba A Wishah et al. (2015)	Jordan	Randomized control study.	The diabetes clinic at JUH provides usual care services to more than 90 patients daily with regular follow-up clinic visits every 1–3 months, depending on the glycemic control for each patient.	Clinical pharmacist	Diabetes clinic	By using the structured interview guide, medical charts, and hospital computers.	Descriptive analysis	Controlling diabetic type 2 patients and evaluating patients' adherence to medication.	High	Diabetes and Metabolic Syndrome: Clinical Research and Review	0.672
K Aljumah et al. (2015)	Saudi Arabia	Randomized control study	This city has a total population of more than 5,000,000 and one psychiatric hospital (Al-Amal Hospital; a total of 500	Pharmacist	Psychiatric clinic	Applying intervention by a pharmacist and using a questionnaire.	Descriptive and comparative analysis	Improving adherence to medication, patient's outcome, and improving	High	BMC Psychiatry	1.369

			beds) is the main provider of psychiatric care for the entire population.					patient's knowledge.			
Lana K. Salameh et al. (2019)	Jordan	Randomized control study	At the Jordan University Hospital (JUH), a 550 beds' tertiary teaching hospital located in Amman, the capital of Jordan.	Pharmacist	Internal medical ward	Data collected from the patients' medical records, followed by interviewing the patient	Statistical analysis	Reducing medication discrepancies and improving patients' outcomes.	High	Journal of Pharmaceutical Health Services Research	0.287
Radwa El Borolossy et al. (2014)	Egypt	Prospective randomized control study	Not determined	Clinical pharmacist	Hemodialysis clinic	Applying intervention by a pharmacist and using a questionnaire.	Statistical analysis	Reducing the risk of developing DTRPs	High	Journal of the International Pediatrics Nephrology Association	2.676
Zina Tahsin Ali et al. (2019)	Iraq	Randomized control study	Not determined	Pharmacist	Endocrine clinic	Face to face interview, telephone call, and questionnaire	Not reported	Improving, reviewing a patient's health parameters and enhancing medication adherence	High	Annual Tropical Medicine and Public Health	0.131
Dvora Frankenthal et al. (2014)	Israel	Parallel randomized control study	The facility has 384 beds and is staffed by five physicians and one chief physician who is the medical director of the facility.	Pharmacist	Geriatric unit	Reviewing patients' medications and using specific scales.	Statistical analysis	Detecting inappropriate prescription, right treatment, and medications, enhancing clinical outcome and improving QoL	High	Journal of American Geriatric Society	4.388
Eman Ahmed Casper et al. (2019)	Egypt	Prospective randomized control study	Not determined	Clinical pharmacist	Cardiac rehabilitation unit	Data collected via both patient record and patient interview	Statistical analysis	Reducing DRPs, enhancing drug therapy and clinical outcome	High	Basic and Clinical Pharmacology	2.651

										and Toxicology	
Yassin, Harb Taha et al. (2020)	Iraq	Prospective randomized clinical trial	Not determined	Clinical pharmacist	Cardiac and internal wards	Motivational interview, medication review	Statistical analysis	Reducing re-hospitalization, discrepancies and improving HRQoL and adherence to medications	Low	Journal of Systematic Review Pharmacy	2.479
Bonyan Qudah et al. (2016)	Jordan	Randomized control study	Not determined	Clinical pharmacist	Hemodialysis unit	By automatic BP monitors that were equipped with the Fresenius® dialysis machines	Statistical analysis	Managing and controlling BP in hemodialysis patients	High	International Journal of Clinical Pharmacy	1.555
Taha O. Mahwi et al. (2013)	Iraq	Prospective, randomized control study	Not determined	Pharmacist	Diabetes clinic	Data of each patient were recorded in the patient data collection forms, questionnaire.	Statistical analysis and analytical analysis.	Controlling patients' parameters and reducing DTPs	Low	International Journal of Pharmaceutical Science and Research	0.27
Hend K. Eldeib et al. (2019)	Egypt	Prospective, randomized control study	Not determined	Pharmacist	National cancer institute	Using telephone follow up	Not reported	Enhancing medication adherence, the safety of oral chemotherapy, patient survival, and utilizing health outcomes.	High	Journal of Telemedicine and e-Health	2.385
Basima A Almomani et al. (2017)	Jordan	Randomized control study	Not determined	Clinical pharmacist	Pediatrics unit	The face-to-face interview was conducted and a questionnaire.	Statistical analysis	Controlling asthmatic health status and improving QoL	High	Journal of Patient Education and Counselling	2.607
Eman Ahmed Casper et al. (2016)	Egypt	Interventional randomized clinical trial	Not determined	Clinical pharmacist	Cardiac unit	Data collected via both patient record and patient interview	Statistical analysis	Enhancing patient outcome, educating patients, and increasing	Low	Basic and Clinical Pharmacology and Toxicology	2.651

								patient adherence to medications			
Sewar S Salmany et al. (2018)	Jordan	Randomized control study	The study was conducted at a not-for-profit, 170-bed, teaching cancer center that treats about 3500 new cancer patients each year in both inpatient and outpatient settings.	Pharmacist	Oncology unit	Telephone follow up, medication chart, and Likert scale	Statistical analysis	Determining a patient's satisfaction after discharge.	High	Journal of Oncology Pharmacy Practice	1.603
Sumaya Abuloha et al. (2016)	Jordan	Prospective, randomized control study	The average number of patients visiting this clinic is about 70 patients/day, of these about 45 patients/day are diabetic, and most of them are T2DM.	Clinical pharmacist	Endocrine unit	Patients' medical records and questionnaire	Statistical analysis	Enhancing medication adherence, outcome, and educating patients about their health status and medications.	High	Jordan Journal of Pharmaceutical Science	0.35
Simin Dashti-Khavidaki et al. (2013)	Iran	Randomized control study	Not determined	Clinical pharmacist	Hemodialysis center	Patients' charts and prescriptions, interviews, and questionnaires.	Statistical analysis	Improving HRQoL, reducing the risk of hospitalization, and the rate of mortality.	High	International Journal of Clinical Pharmacy	1.25
Iman A Basheti et al. (2016)	Jordan	Prospective, randomized control study	At two community pharmacies in Amman, Jordan. On average, each community pharmacy serves 60–70 patients per day.	Clinical pharmacist	Community pharmacy	A validated pharmaceutical care tool was used, patient interviews, and by using the patient's medical records and questionnaire.	Statistical analysis	Assessing medication used by patients and managing TRPs.	High	International Journal of Clinical Pharmacy	1.555
Nour Faqee et al. (2020)	Jordan	Prospective study	KHCC is a 350-bed, internationally accredited cancer center in Amman,	Clinical pharmacist	Oncology unit	Routine review of patients' profiles and	Statistical analysis	Optimizing patient therapy and reducing DRPs.	Fair	Journal of Oncology	1.85

			Jordan, which provides comprehensive care to adult and pediatric patients for all types of cancer in Jordan and the region.			recorded CPIs, recording forms				Pharmacy Practice	
Naemeh Nikvarz et al. (2019)	Iran	Cross-sectional study	The study was conducted in a 20-bed nephrology ward of a tertiary teaching hospital affiliated to Kerman University of Medical Sciences (KUMS).	Clinical pharmacist	Nephrology ward	Survey	Statistical analysis	Improving VTE prophylaxis administration	Good	Europe Journal Hospital Pharmacy	0.892
Mesut Sancar et al. (2015)	Turkey	Pre-post intervention study	Not determined	Clinical pharmacist	Hospitalized and chest clinic	Using a list of accurate inhaler device use steps according to GOLD (the Global initiative for chronic Obstructive Lung Disease).	Statistical analysis	Increasing patient adherence to regular therapy and educating COPD patients on using inhalers in a hospital setting	Fair	Europe Journal Hospital Pharmacy	0.432
Tahrir Alnawayseh et al. (2020)	Jordan	Pre-post intervention study	Not determined	Clinical pharmacist	Internal medicine clinic – respiratory ward	A structured interview was conducted and Morisky Medication Adherence Scale	Statistical analysis	Educating on their use of inhaler device, enhancing medication adherence, and improving QoL	Good	Jordan Journal of Pharmaceutical Science	0.270
Ahmet S Boşnak et al. (2018)	Cyprus	Prospective study	The study was performed in the oncology department on in- and outpatients at Near East University Hospital, which is the biggest and leading medical	Clinical pharmacist	Oncology department	Appropriate interventions for each identified DRP were interviewed and discussed with the prescriber directly.	Statistical analysis and Graph Pad In Stat (version 3.00 for Windows 95, Graph Pad Software, San Diego California	Identify the prevalence and nature of the DRPs encountered with the relevant factors and to understand the benefits to the treatment of the oncology	Good	Journal of Oncology Pharmacy Practice	1.484

			facility in Nicosia, Northern Cyprus.				USA, www.graphpad.com).	pharmacists in this process.			
Birand Nevzat Et al. (2019)	Cyprus	Prospective study	Near East University Hospital is an institution affiliated with Near East University, Nicosia, and North Cyprus.	Clinical pharmacist	Oncology department	Patient education was provided face-to-face, and written information was tailored to the individual patient's chemotherapy protocol. Beliefs about Medicines Questionnaire (BMQ) and The Morisky Green Levine Test (MGLT) were used	Statistical analysis	Evaluate patient medication adherence and beliefs and the potential impact of counseling by a pharmacist on cancer patient medication beliefs and adherence.	Good	Journal of Oncology Pharmacy Practice	1.85
Majdoleen AL Alawneh. Et al. (2020)	Jordan	Randomized Control Study	The study was conducted in three large Jordanian cities: Amman, Zarqa, and Mafraq, where The majority of the refugees from Syria residing in these cities.	Clinical Pharmacists	Syrian refugees	From the information collected, the pharmacist was able to identify the s for each participant. Besides, during home visits, two questionnaires were completed by the participants themselves, thus self-evaluating their QoL and anxiety scores	Statistical analysis	Evaluating Syrian refugee's QoL and anxiety scores.	High quality	Pharmacy Practice Journal	1.49
Yara R. Al Tall, Et al (2020)	Jordan	An exploratory qualitative study	The study was conducted at Forearms of Change Centre.	Trained researcher and qualified clinical Pharmacist	The center of HIV/ AIDS patients	A semi-structured questionnaire, so open and semi-structured questions were used in the interviews. Face-to-face interviews	-Recorded interviews were transcribed verbatim.	The barriers and facilitators of adherence to ART among HIV positive patients in Jordan and to	Fair	The International Journal of Clinical Practice	2.444

			The Forearms of Change Center is located in Amman/Jordan and works on encouraging HIV/AIDS patients to cohabit with their disease and give them positive support and help.			were conducted in private rooms to avoid any interruptions or distractions and to make participants comfortable.	- Descriptive statistics	assess their need for pharmaceutical care services.			
Fadi Jarab, Et al. (2020)	Jordan	Retrospective study	Data were collected by referring to information technology departments at King Abdullah University Hospital.	Pharmacist	In patients who were clinically stable and received IV antibiotics for more than 24 hours	Data were collected retrospectively using electronic medical records and clinical notes, which included patient's file number, age, gender, height, weight, vital signs at admission, WBC count and serum creatinine at admission time, name of prescribed IV antibiotic and its dose regimen and duration, microbiology reports and sites of infection.	Descriptive statistics	Ensuring appropriate use of antibiotics in different hospital settings	Fair	The International Journal of Clinical Practice	2.444
Kinda T. Alkoudsi, Et al. (2019)	Jordan	Randomized control trial.	Community pharmacies (five pharmacies in Amman and five in Damascus).	Clinical pharmacists	Women diagnosed with PCOS	An intervention was done by Clinical pharmacists and then the Beck Anxiety inventory questionnaire was distributed.	Statistical analysis	The effect of a PCOS pharmaceutical care service on QOL for women diagnosed with PCOS living in Syria and Jordan	High	Journal of Education in Clinical Practice	1.681
Bushra Abdul	Jordan	Randomized control trial.	Specialty hospital in Jordan.	-Surgeon	All the children were assessed for	- Provided the patients with simple information about the disease and drug	Statistical analysis	This study applied a pharmaceutical	High	International Journal of	1.339

Hadi, Et al (2015)			All the children were assessed for their ASA physical status.	-Clinical Pharmacist	their ASA physical status.	therapy pre-, intra-and post-operatively. - All patients received a standard anesthetic protocol. - Quantitative measurements made during the operation		care intervention to tonsillectomy.		Clinical Pharmacy	
Hailah Aldosari, Et al. (2020)	Kuwait	Cross-sectional study	All governmental hospitals and polyclinics and private pharmacies in all the five health regions of Kuwait (Capital, Hawalli, Ahmadai, Farwaniyah, and Jahra).	Researchers	Pharmacists working in governmental and private sectors	Data were collected via self-administered questionnaires.	Statistical analysis	Pharmacists' attitudes towards continuing education and to investigate the perceived barriers that hinder pharmacists from being involved in continuing education activities	Fair	Saudi Pharmaceutical Journal	2.879
Salmeen D Babelghaith , Et al. (2020)	Saudi Arabia	Retrospective study	This retrospective study was conducted among inpatients at the Ministry of Health hospital in Jazan, a region in southwestern Saudi Arabia.	Pharmacists	Ten departments: medical, surgical and orthopedic, pediatric, obstetric gynecology, delivery, operation room, anesthesiology , recovery room, adult intensive care,	Data collected depending on the implementation of Inpatient Pharmacy Intervention Reports File (IPIRF).	Descriptive statistics	The incidence of drug-related problems (DRPs) in different inpatient departments along with the medical team response to pharmacist's action	Good	Journal of Risk Management and Healthcare Policy	0.968

					and neonatal intensive care.						
Esra Kucuk, Et al. (2020)	Turkey	Prospective study	This study was conducted at the Hacettepe University Hospital oncology outpatient clinic which provided care to around 80–100 patients per day and ran for five days between 8 am and 4 pm	Clinical pharmacists	Oncology department	-On each visit to the clinic during the study period, a clinical pharmacist would review the patients' medical records and ask the patient questions about their health status and drug therapy while they were receiving their treatment infusions. - Identified DRPs were categorized using the Pharmaceutical Care Network Europe (PCNE) v.7 classification system	Descriptive statistics	The incidence of drug-related problems in patients receiving targeted chemotherapy and/or immunotherapy, and demonstrate the impact of a clinical pharmacist in an outpatient oncology care setting.	Fair	Journal of Oncology Pharmacy Practice	1.85
Nesligul Ozdemir. Et al. (2020)	Turkey	Cross-sectional study	This study was carried out in a tertiary care hospital's pediatric bone marrow transplantation unit	Clinical pharmacists	Pediatric bone marrow transplantation unit	Drug-related problems in this study were identified by using Pharmaceutical Care Network Europe.	Statistical analysis	To demonstrate the importance of clinical pharmacists' participation in the detection, prevention, and management of drug-related problems	Fair	Journal of Clinical and Experimental Health Science	2.644
Lobna S Mostafa, Et al. (2020)	Egypt	Prospective pre–post-interventional study	-The study was conducted at the emergency hospital within Ain Shams University Hospital.	Clinical pharmacists	Emergency sector	-Reviewing medications orders - Categorizing errors according to the National Coordinating Council for	Statistical analysis	Evaluate the impact of pharmacist-led educational implementations in	Fair	Journal of Public Health	1.648

			- The emergency hospital, which includes a variety of surgical disciplines, is designed for the care of patients who are admitted for surgical purposes without prior appointment, either by their means or by ambulance.			Medication Error Reporting and Prevention (NCC MERP).		reducing medication errors			
Linda Tahaineh, Et al. (2020)	Jordan	Two methodologies: a structured interview technique and a pre-and post-intervention	Obstetrics and gynecology clinics as well as family-planning clinics in public health centers in North Jordan	Clinical pharmacists	Obstetrics and gynecology clinics as well as family-planning clinics	A validated closed-and open-ended questionnaire and educational session	Statistical analysis	Measuring the effect of clinical pharmacist's intervention regarding the risks and benefits associated with the use of combined oral contraceptive (COC) pills.	Fair	Jordan Journal of Pharmaceutical Science	0.270
Sayer I Al-Azzam, Et al. (2016)	Jordan	The study was a non-randomized trial	-At Alsarih Medical Health Center in the north of Jordan. -This health center is a comprehensive governmental healthcare facility that provides primary healthcare services to a population of about 65 000. -Services include emergency care, specialized outpatient clinics in family medicine, internal	Clinical pharmacists	The research interviewed randomly selected patients	Interview	Statistical analysis	Assessing patients' DRPs, proposed appropriate clinical interventions to physicians, and provided appropriate patient counseling to promote adherence and patient safety.	Good	Journal of International Health	1.797

			medicine, pediatrics, dermatology, and obstetrics/gynecology. -The staff at the center comprises 10 physicians and 15 nurses and supporting staff. It services an average of 100 patients per day.								
Shadi Farsaei, Et al. (2014)	Iran	Prospective pre–post-interventional study	The study setting was a 60-bed infectious diseases ward of Imam Khomeini hospital, a multispecialty health care university facility, affiliated to Tehran University of Medical Sciences, Tehran, Iran.	Clinical pharmacists	Infectious diseases ward	- Interventions including insulin, hypoglycemic, and nutritional management were written in the chart of patients by clinical pharmacists. -Then all data were filled into the specific questionnaire.	Statistical analysis	The impact of the clinical pharmacist interventions on the glycemic control	Good	Journal of Infection in Developing Countries	0.703
Iman A Basheti, Et al. (2018)	Jordan	Randomized control trial.	Jordan University Hospital, Amman, Jordan.	Clinical pharmacists	Outpatient clinic	- The clinical pharmacist interviewed patients in both groups at their homes. For patients who refused the home visit, assessments were completed at the clinic. -Questionnaire	Statistical analysis	Identifying treatment-related problems (TRPs) through home visits, assessing type and frequency of TRPs, and eventual effect of resolving TRPs	High	Journal of Pharmaceutical Health Services Research	0.189
Iman A Basheti, Et al. (2016)	Jordan	Randomized control trial.	Jordan University Hospital, Amman, Jordan.	Clinical pharmacists	Outpatient clinic	- The clinical pharmacist interviewed patients in both groups at their homes. For patients	Statistical analysis	Identifying treatment-related problems (TRPs) through home visits, assessing	High	Journal of Pharmaco-therapy	3.196

						who refused the home visit, assessments were completed at the clinic. -Questionnaire		type and frequency of TRPs, and eventual effect of resolving TRPs			
Kamel Abdelaziz, Et al. (2015)	Egypt	Prospective study	In a general ICU that contains 22 beds in Riyadh Care Hospital, Saudi Arabia.	Consultants	ICU	Data collected by recording patients' info, DRPs, the cause of admission, and other related information.	Statistical analysis	Identifying and categorizing drug-related problems (DRPs)	Fair	Europe Journal of Hospital Pharmacy	0.892
Amal Akour, Et al. (2017)	Jordan	Randomized control trial.	Women who were visiting community pharmacies or fertility, obstetrics, and gynecology outpatient clinics	Pharmacists	Community pharmacies or fertility, obstetrics, and gynecology outpatient clinics	Booklet and through the questionnaire.	Statistical analysis	The effect of a pharmacist-provided information booklet on increasing the knowledge of Jordanian women about safe and effective OCP use.	High	The European Journal of Contraception and Reproductive health Care	1.382
Ayla M. Tourkmani, Et al. (2018)	Saudi Arabia	Randomized control trial.	-The study was conducted in Al-Wazarat Chronic Diseases Center, a division of the Al-Wazarat Health Care (WHC) Family Medicine Center. -The Chronic Diseases Center consists of 12 specialized clinics, primarily for patients with T2DM, hypertension, dyslipidemia, and	Clinical pharmacists and physicians.	The Chronic Diseases Center.	The integrated care program by reviewing the patient charts and arranging appointments with specialties.	Statistical analysis	Assessing the impact of such a program on glycemic control and cardiovascular risk factors.	High	BMC Family Practice	1.332

			bronchial asthma, in addition to a procedures room and support services such as pharmacy, laboratory, and radiology.								
Razan Adnan Batta, Et al. (2018)	Jordan	Randomized control trial.	Not determined	Clinical pharmacist	Pregnant patients of gestational age 20–28 weeks with diabetes (type 1, type 2, or GDM)	By using questionnaire and face-to-face interviews	Statistical analysis	Evaluate the role of a clinical pharmacist in the selection of the appropriate medical intervention for patients with hyperglycemia in pregnancy	High	International Journal of Clinical Pharmacy	1.692
Abdulaziz Saleh Almulhim, Et al. (2019)	Saudi Arabia	Retrospective pre-post intervention study	Banner-University Medical Center South is a tertiary care teaching hospital with annual ED visits of 45,000.	pharmacists	Emergency department (ED)	Reviewing the patient's charts, then a structured data collection tool (Excel) was used to perform data collection.	Both descriptive and inferential statistics	Evaluating the performance of our ED pharmacist urine culture follow-up and compare it to the nurse practitioner (NP)-driven follow-up in terms of the appropriateness of chosen antibiotics and, inappropriately treated asymptomatic bacteriuria.	Good	Journal of Pharmaceutical Policy and Practice	0.644
Mohammed Almzeiny,	Saudi Arabia	Cross-sectional study	The study was conducted at PSMMC, a 1,350-bed tertiary care referral hospital	pharmacists	The neonatal intensive care unit (NICU), the high	Questionnaire	Descriptive statistics	Exploring the perceptions and satisfaction of stakeholders	Fair	Tropical Journal of	0.504

Et al. (2020)			for members of the Saudi Arabian armed forces and their families. PSMMC is in Riyadh, Saudi Arabia.		dependency unit (HDU), and pediatric nephrology			(physicians, nurses, and pharmacists) regarding services provided by the patient care area pharmacist (PCAP) initiative.		Pharmaceutical Research	
Adil A. Mahmoud, Et al. (2017)	Saudi Arabia	An interventional, non-randomized, uncontrolled study	King Faisal Hospital in Taif City, Kingdom of Saudi Arabia.	pharmacists	Outpatient cardiology clinic	Questionnaire and face to face interview.	Descriptive statistics	Assessing the impact of the practice of PCs on patient outcomes: blood pressure control, knowledge of the disease, and adherence to medications.	Fair	International Journal of Pharmaceutical Science Review and Research	0.22
Majdoleen Al Alawneh, Et al. (2019)	Jordan	Prospective randomized single-blinded intervention-control study	In three main cities in Jordan (Amman, Mafraq, Zarqa), where the majority of the Syrian refugees reside.	Clinical pharmacists	Syrian refugees' clinics in Jordan	Data were collected via 2 home visits.	Statistical analyses	Identifying the type and frequency of TRPs amongst Syrian 92 refugees living in Jordan, and exploring the impact of the HMMR service on reducing the 93 number of the identified TRPs.	Good	Research in Social and Administrative Pharmacy	2.844
Mohamad Ali Hijazi, Et al. (2020)	Lebanon	Cross-sectional study	Community pharmacies	Pharmacists	Community pharmacies	Face to face interview and questionnaire.	Statistical analyses	The role of community pharmacists in weight management	Fair	BMC Health Service Research	0.995

Bushra Hassan Marouf, Et al. (2020)	Iraq	An interventional randomized study.	At the dialysis centers of Kirkuk General Hospital- Directorate of Health in Kirkuk city; a hospital with 250 beds for hospitalization of chronic kidney disease patients.	Clinical pharmacists	Anemic patients on hemodialysis	Reviewing patients' medications and all the interventions	Statistical analyses	The effect of pharmacist interventions in optimizing management of anemia associated with chronic kidney disease	High	Journal of Young Pharmacy	0.180
Rashida Muhammad Umar, Et al. (2020)	Turkey	Prospective study	Marmara University Teaching and Research Hospital Medical Oncology.	Clinical pharmacists	Oncology department	Reviewing patients' health status and medication and using (PCNE) Classification Scheme for Drug-Related Problems V6.2.	Statistical analyses	Intervening in identified drug-related problems.	Good	International Journal of Clinical Pharmacy	1.616
Miri Potlog Shchory, Et al. (2020)	Israel	Quantitative intervention study	Three public hospitals	Researchers	Internal medicine	Questionnaire	Statistical analyses	The effect of an intervention program on the knowledge and attitudes among physicians and nurses regarding ADRs reporting.	Fair	Journal of Pharmacoepdimology and Drug Safety	2.918
MF Najjar, Et al. (2017)	Saudi Arabia	Pre-post interventional study	At King Abdulaziz Medical City in Riyadh, Saudi Arabia.	Clinical pharmacists	Medical wards for Geriatric patients	-Reviewing baseline data about the current prescribing pattern of PIMs for geriatric inpatients and an educational program	Statistical analyses	Reducing the incidence of PIMs among hospitalized geriatric patients.	Good	Journal of Pharmacoepdimology and Drug Safety	2.314
Erdem Topal, Et al. (2020)	Turkey	Cross-sectional study	Three centers located in different parts of Turkey were included.	Researchers	Community pharmacists	Face to face interview and questionnaire	Statistical analyses	Indicating that pharmacists should be included in the training program and be provided continuous training on the use	Fair	Journal of Asthma	1.899

								of pMDIs with a spacer device.			
Fikret Vehbi İZZETTİN, Et al. (2019)	Turkey	Cross-sectional study	Not determined	Clinical pharmacists	Outpatient cardiology clinic.	An interview with the questionnaire.	Statistical analyses	Determining the effectiveness of pharmacist consultation, education, and intervention on each patient's therapeutic results.	Fair	Journal of Research in Pharmacy	3.90
Elham Alshammari. (2019)	Saudi Arabia	Prospective study	The study was conducted at Prince Sultan Cardiac Center in Riyadh, Kingdom of Saudi Arabia, a 160 full-capacity beds instituted for hospitalized patients with cardiac problems or scheduled procedures and also serve outpatient and emergency clinics.	Clinical pharmacists	Cardiac center	Reviewing and recoded hospitalized patients' files	Statistical analyses	Clinical pharmacist role in preventing or decreasing drug-related adverse events and eventually decrease hospitalization and costs	Fair	International Research Journal of Pharmacy	0.765

Kinda T Alkoudsi et al. (2020)	Jordan	Randomized control trial	Females diagnosed with PCOS, living in the national capital cities of Syria (Damascus) and Jordan (Amman), were approached while visiting community pharmacies for study recruitment.	Clinical pharmacist	Females diagnosed with PCOS	-The database was collected from patients and by using a questionnaire.	Statistical analysis	The impact of a pharmaceutical care service for PCOS on participants' anxiety and depression scores and severity.	High	Research in Social and administrative Pharmacy	2.844

Shaymaa Abdalwahed Abdulameer. (2018)	Iraq	Cross-sectional study	Three areas from two large distract zone named Al-Kharkh (west of the Tigris: four distract zone) and Al-Rusafa (east of the Tigris: six distract zones).	Pharmacist	Community pharmacies	Data collected through a face-to-face interview.	Statistical analysis	Assess the diabetes knowledge and pharmaceutical care practice among registered and unregistered pharmacists	Fair	Journal of Applied Pharmaceutical Science	0.252
Amr S. Shalaby. (2017)	Egypt	Cross-sectional study	The study was conducted in Menoufia Governorate, which is located in the Nile Delta, in the northern part of the country, and to the north of Cairo. It consists of nine administrative centers that include 10 cities.	Health care professional	Department of Neuropsychiatry	Data collected through a questionnaire.	Statistical analysis	Exploring the attitude of a sample of community pharmacists and their assistants toward psychiatric patients	Fair	Journal of Middle East Current Psychiatry	0.15
Khizra Sultana. Et al. (2016)	Saudi Arabia	Cross-sectional study	The Pharmaceutical department is divided into outpatient, inpatient, and clinical pharmacy services. In Riyadh, we have 33 clinical pharmacists and 175 pharmacists involved in outpatient, inpatient, and discharge counseling services.	Pharmacists	Saudi Pharmacists.	Data collected through a questionnaire.	Descriptive analysis	Assessing the attitude, motivators, and barriers of pharmacists to take part in PBR.	Fair	Journal of Pharmaceutical Policy and Practice	0.292
Noor Alsalimy, Et al. (2017)	Qatar	Retrospective	Rumailah Hospital (RH) is a tertiary public hospital in Qatar that provides several healthcare services for sub-acute and long-term care patients, including surgical services for ear, nose, and throat (ENT),	Pharmacists	All ADR reports from all RH units.	A paper-based reporting form.	Descriptive and inferential statistics	Reviewing ADR reports	Fair	Journal of Drugs and Therapy perspective	0.21

			ophthalmology, and plastic surgery.								
Mohamed E. K. Amin. Et al. (2014)	Egypt	Cross-sectional study	All practicing community pharmacists in Alexandria, Egypt.	Pharmacists	Community pharmacies	Data was collected by using a survey	Descriptive and Exploratory analyses	Identifying the Egyptian community pharmacists' knowledge of evidence-based recommendations for diabetes management during Ramadan.	Good	International Journal of Clinical Pharmacy	1.348
Ramzi Shawahna. (2020)	Palestine	Cross-sectional study	Healthcare facilities.	Pharmacists	Patients admitted to or visiting healthcare facilities	Questionnaire	Statistical analysis	Developing and achieving consensus on what activities and services to use as KPIs to capture and measuring the impact of pharmacists in integrative healthcare facilities.	Fair	Evidence-Based Complementary and Alternative Medicine	2.64
Hani MJ Khojah. (2019)	Saudi Arabia	Cross-sectional study	Private community pharmacies (353 pharmacies) and their locations in Madinah	Pharmacists	Private community pharmacies	Questionnaire	Descriptive analysis	Investigating the level of provision of customer education regarding the effects of sedating antihistamines on driving skills by private community pharmacies	Fair	Journal of International Medical Research	1.287
Eman Alefishat. Et al. (2020)	Jordan	Cross-sectional study	University of Jordan Hospital in Amman	Clinical pharmacists	Outpatient clinics (cardiology and internal medicine)	Questionnaire	Statistical analysis	Assessing HRQOL in patients with hypertension and the variables associated with poor health-related	Fair	The International Journal of Clinical Practice	2.444

								quality of life in hypertensive patients.			
Anan S Jarab Et al. (2020)	Jordan	Cross-sectional study	Queen Alia Heart Institute at Royal Medical Services (RMS). This clinic is considered as one of the largest hospitals in Jordan that provides healthcare services to more than 100 angina patients daily. All patients who had IHD for at least 1 year	Clinical pharmacists	Outpatients cardiac clinic	Questionnaire	Descriptive analysis	Evaluating HRQOL and to explore the factors associated with poor HRQOL among patients with angina	Good	Quality of Life Research Journal	2.392
Rania E. Ghanem, Et al. (2020)	Palestine	Cross-sectional study	Community pharmacies located in cities, villages, and refugee camps in different governorates were visited.	Pharmacists	Community pharmacies	Questionnaire	Descriptive analysis	Exploring their knowledge, attitude, and practice for acne management.	Fair	The International Journal of Dermatology	1.794
Nour Makkaoui, Et al. (2020)	Lebanon	Cross-sectional study	Licensed community pharmacies in Lebanon	Pharmacists	Community pharmacies	Data was collected through an interview and questionnaire	Statistical analysis	Exploring the knowledge, attitude, and practice that community pharmacists of Lebanon hold concerning checking for drug interactions.	Fair	Journal of Public Health	1.648
Anan S. Jarab, Et al. (2020)	Jordan	Cross-sectional study	Queen Alia Heart Institute in the Royal Medical Services. This clinic is considered as one of the largest hospitals in Jordan that provides healthcare services to more than 100 angina patients daily.	Pharmacists	Outpatients cardiac clinic	Questionnaire	Descriptive analysis	Evaluating medication adherence and exploring the factors associated with medications non-adherence among patients with angina	Fair	Jordan Journal of Pharmaceutical Science	0.270

Dhfer Mahdi AlShayban, Et al. (2020)	Saudi Arabia	Cross-sectional study	Hospital pharmacies of King Fahd Hospital of the University located in the city of Khobar and, Al Zahra Hospital in Qatif city, as well as community pharmacies located in cities of Khobar, Dammam, and Qatif served as venues.	Pharmacists	Hospital and community pharmacies.	Questionnaire	Descriptive analysis	Evaluating patients' satisfaction and WTP for pharmacist counseling	Fair	Journal of Frontiers in Pharmacology	4.225
Maria Abdul Ghafoor Raja, Et al. (2020)	Saudi Arabia	Cross-sectional study	Not determined	Pharmacists	General hospital	Questionnaire	Descriptive analysis	-Determining side effects occurrence among Saudi patients taking statins. -Evaluating drug drug interactions in Saudi Patients taking statins.	Fair	Journal of Pharmaceutical Research International	0.07
Kholoud Dweib, Et al. (2020)	Palestine	Cross-sectional study	MOH primary health-care clinics of Bethlehem and North Hebron	Pharmacists	Kidney transplant clinic	Questionnaire	Descriptive analysis	Measuring QoL among renal transplant patients	Fair	Saudi Journal of Kidney Disease and Transplantation	0.72
F I Al-Saikhan. (2020)	Saudi Arabia	Prospective, Cross-sectional study	Prince Sattam Bin Abdulaziz University Hospital in Alkharj.	Clinical pharmacist	Outpatient anticoagulation clinic	Questionnaire	Descriptive analysis	Examining the association between WTA and HRQOL in patients being treated with warfarin in Saudi Arabia.	Fair	Nigerian Journal of Clinical Practice	0.634

Günay Arsoy, Et al. (2018)	Cyprus	Cross-sectional study	The included only experienced community pharmacists with 5 or more years' experience as stipulated by Turkish and Northern Cyprus Pharmacists' Association's norms.	Trained pharmacists	Community pharmacies	-The database was collected from patients and by face-to-face interview and questionnaire	Statistical analysis	Evaluating the effectiveness of the pharmacist-led educational intervention for improving patients' QoL and perceived symptom severity.	Good	Medicina Journal	2.861
Maram Gamal Katoue. (2020)	Kuwait	Cross-sectional study	Kuwait's governmental healthcare system is organized into three levels of healthcare delivery: they are primary, secondary, and tertiary. Primary healthcare is delivered through healthcare centers distributed across the different areas of the State. Secondary healthcare is provided through six general hospitals, while tertiary healthcare is delivered through many specialized hospitals and health centers.	Pharmacist	Governmental hospital	Data were collected from participants using focus group interviews	Thematic analysis	Exploring the perceptions of hospital pharmacists about the enablers and challenges to expanding their scope of practice to include direct patient care.	Fair	Journal of Evaluation in Clinical Practice	1.684
Elif Ertuna, Et al. (2019)	Turkey	Retrospective	In the acute geriatric ward (10 beds) of a government-run 1,800-bed tertiary university hospital in Turkey.	Clinical pharmacists	Geriatric ward	Data were collected by reviewing medication reports	Statistical analysis	Defining and classifying DRPs, pharmacist interventions, and frequently prescribed medications concerning possible DRPs in patients	Fair	Journal of Clinical Intervention in Aging	1.0

								admitted to the geriatric ward.			
Afsaneh Vazin, Et al. (2018)	Iran	Prospective	Namazi Hospital, affiliated to Shiraz University of Medical Sciences (Shiraz, Iran) is a general tertiary referral center with 50 wards and nearly 1000 beds.	Trained pharmacist and Clinical pharmacists	Clinical wards of Namazi Hospital	Data collected from the Hospital Information System and patient records.	Statistical analysis	Evaluating the impact of an intervention by the pharmaceutical care unit on the use pattern of high-value medications and their direct costs in a referral hospital.	Fair	BMC Health Service Research Journal	1.057
Mostafa A Sayed Ali, Et al. (2018)	Egypt	Prospective	Assiut University Hospital. The inpatient wards have a capacity of 48 beds and the ICU unit comprises 18 beds.	Clinical pharmacists	In-patient wards and intensive care unit of the Department of Neurology	By reviewing all patients' drug charts.	Statistical analysis and descriptive analysis	Identifying common DRPs in neurology and document clinical pharmacists' medication-related interventions.	Fair	International Journal of Clinical Pharmacy	1.692
Reem A Bahmaid, Et al. (2018)	Saudi Arabia	pre-test/post-test quasi-experimental interventional study	Not determined	Trained research coordinator	Three tertiary care settings: King Fahad Medical City, King Faisal Specialist Hospital and Research Center, and Prince Sultan Cardiac Center	Data were collected by using a questionnaire	Statistical analysis	Assessing the impact of research educational intervention on knowledge, attitudes, perceptions, and pharmacy practices towards evidence-based medicine	Fair	Cureus	1.15

Pallivalapilla Abdul Rouf, Et al. (2018)	Qatar	Cross-sectional study	Not determined	Pharmacists	Hospitals, community pharmacies	Data were collected by using a questionnaire	Descriptive analysis	Determining the knowledge and practice characteristics of pharmacists in Qatar about medicines use in pregnancy.	Fair	Estran Mediterranean Health Journal	0.694
Abdikarim Mohamed Abdi, Et al. (2018)	Cyprus	Prospective	Community pharmacists working in pharmacies in North Cyprus. There was 190 licensed pharmacies majority operating in the 5 main cities in North Cyprus	Clinical pharmacists	Community pharmacies	Data were collected by using a questionnaire	Statistical analysis	Assessing community pharmacist's perceptions and practice of pharmaceutical care	Fair	Journal of Pharmaceutical Research International	0.07
Ata Mahmoodpoor, Et al. (2018)	Iran	Cross-sectional study	Shohada University Hospital. Not determined	Clinical pharmacists	ICU	Questionnaire	Descriptive statistical analysis	Assessing clinical pharmacy services in the intensive care unit (ICU)	Good	Journal of Research in Pharmacy Practice	0.00
Muath Fahmi Najjar, Et al. (2018)	Saudi Arabia	Prospective and Pre-Post interventional study.	Department of Medicine at King Abdulaziz Medical City. Not determined	Clinical pharmacists	Medical wards (Hospitalized geriatric patients)	Data was reviewed baseline data about the current prescribing pattern of PIMs for geriatric inpatients data obtained from the Hospital Information System	Statistical analysis	Assessing the effectiveness of a combined intervention program comprising an educational and clinical pharmacist intervention to reduce the incidence of PIMs among hospitalized geriatric patients.	Good	Therapeutic and Clinical Risk Management	0.725

Shaymaa Abdalwahed Abdulameer. (2018)	Iraq	Cross-sectional study	Baghdad city has two large district areas named Al-Kharkh and Al-Rusafa. The random cluster sampling method was used to select three areas from each.	Pharmacist	Community pharmacies	Data were collected by using a questionnaire	Statistical analysis	Assessing the pharmaceutical care practice among registered pharmacists.	Fair	International Journal of COPD	3.157
Huda G El-Refae, Et al. (2017)	Jordan	Prospective	The University of Jordan Hospital. Not determined	Clinical pharmacists	Cardiology ward	By telephone call or hospital visit for a medication refill.	Statistical analysis	Assessing physician acceptance of clinical pharmacist suggestions; and determining the impact on costs to patients.	Good	Tropical Journal of Pharmaceutical Research	0.48
Haider Al-Baghdadi, Et al. (2017)	Cyprus	Prospective	Near East University Hospital, which is the largest and leading medical facility in Nicosia, Northern Cyprus. The services of the hospital are performed within a compound comprising over 56 thousand square meters of indoor space including 209 private, single-patient rooms, 8-operating theatres, 30-bed Intensive Care Unit, 17-bed Neonatal Intensive Care Unit, and advanced laboratory.	Clinical pharmacists	Cardiology and cardiovascular surgery departments	By reviewing patients' medications using PCNE to identify DRPs	Statistical analysis	Assessing the implementation of ward-based clinical pharmacy services in cardiovascular clinics and describing the prevalence and nature of encountered DRPs with the associated factors.	Fair	International Journal of Clinical Pharmacy	1.508

Ziyad Alrabiah, Et al. (2017)	Saudi Arabia	Prospective cross-sectional study	Not determined	Clinical pharmacists	Community pharmacists	Data were collected by using a questionnaire	Both descriptive and analytic statistics	Evaluating knowledge of CPs about medication safety during pregnant	Fair	Saudi Pharmaceutical Journal	3.11
Rana Abu Farha, Et al. (2017)	Jordan	Cross-sectional study	Jordan University Hospital. Not determined	Clinical pharmacists	Cardiac outpatient clinic	Data were collected by using a questionnaire	Both descriptive and statistical analysis	Identifying the influence of different types of DRPs on the HRQOL of hypertensive patients.	Fair	Journal of Pharmacy Practice	0.451
Turki Assiri, Et al. (2017)	Saudi Arabia	Prospective	-At Prince Sultan Cardiac Center (PSCC). - PSCC is a specialized healthcare center that provides comprehensive cardiovascular services to all armed forces personnel, their dependents, and other patients referred to the center for further evaluation and specialized treatment and includes about 190 beds dedicated to adult and pediatric cardiac patients.	Pharmacists	Cardiac center	Data were collected by reviewing the patient's records, medical and medication history, diagnosis, and discharge (treatment) plan.	Descriptive analysis	Determine the impact of pharmacist's counseling and review of discharge prescriptions for patients discharged from a specialized cardiac center	Fair	Tropical Journal of Pharmaceutical Research	0.444

Aida Sefidani Forough, Et al. (2017)	Iran	Prospective	Amiral Momenin General Hospital	Pharmacists	Elderly diabetic patients (visited the hospital's outpatient department	Data were collected through interviews using researcher-administered questionnaires as well as patients' medical records.	Descriptive statistical analysis	Evaluating the impact of pharmacist-conducted educational intervention on reducing errors related to inappropriate insulin pen use.	Fair	Journal of Research in Pharmacy Practice	0.00
Ali A. ALMITWAZI, Et al. (2017)	Saudi Arabia	Retrospective	At Prince Sultan Cardiac Center (PSCC). - PSCC is a specialized healthcare center that provides comprehensive cardiovascular services to all armed forces personnel, their dependents, and other patients referred to the center for further evaluation and specialized treatment and includes about 190 beds dedicated to adult and pediatric cardiac patients.	Clinical pharmacists	Cardiac center	Data were extracted from the hospital's electronic documentation.	Descriptive statistical analysis	Assessing the clinical pharmacist interventions and probable impact of these interventions in cost minimization by reducing direct medication costs at a specialized cardiac center.	Fair	Latin American Journal of Pharmacy	0.401
Nibal R Chamoun, Et al. (2016)	Lebanon	Retrospective	At a teaching hospital	Clinical pharmacists	Cardiology and infectious diseases departments	By reviewing patients' documentation and reporting sheets	Descriptive statistical analysis	Showing the impact of pharmacy interventions in reducing MRPs	Fair	International Journal of Clinical Pharmacy	1.555

Khawla Abu Hammour, Et al. (2016)	Jordan	Cross-sectional study	At four tertiary hospitals (two private and two teaching hospitals)	Pharmacists	Two private and two teaching hospitals	Data was collected by using a questionnaire	Descriptive analysis	Gaining an insight into hospital pharmacists' current practice and perceptions towards medicine reconciliation and identifying common challenges	Fair	Journal of Evaluation in Clinical Practice	1.25
Farzaneh Foroughinia, Et al. (2016)	Iran	Prospective cross-sectional study	Shahid Faghighi Hospital	Clinical pharmacists	Neurology ward	Checked the patients' files and pharmacotherapy sheets and categorized DRPs using PCNE.	Descriptive analysis	The role of the clinical pharmacist in the detection and prevention of these drug problems and evaluated the frequency and type of DRPs	Fair	Journal of Research in Pharmacy Practice	0.00
Laika Gökçekuş, Et al. (2016)	Cyprus	Prospective	Four community pharmacies in North Cyprus.	Clinical pharmacists	Community pharmacies	Data was collected by using form and PCNE classification.	Statistical analysis	Investigate the role of the community pharmacist in identifying, preventing, and resolving drug-related problems (DRPs)	Good	Tropical Journal of Pharmaceutical Research	0.48
Hani Abdelaziz, Et al. (2016)	Qatar	Retrospective	Hamad General Hospital. Not determined	Clinical pharmacists	Emergency department	Data were collected by reviewing patient profiles and an electronic system was used to record the interventions recommended	Descriptive analysis	Characterizing the contributions of clinical pharmacists in a short stay unit of ED to implement and scale-up the service to all ED areas in the future.	Fair	International Journal in Clinical Pharmacy	1.555

Maguy Saffouh El Hajj, Et al. (2016)	Qatar	Cross-sectional study	Public and private ambulatory care clinics, in outpatient hospital pharmacies, and community pharmacies	Pharmacists	Public and private ambulatory care clinics, in outpatient hospital pharmacies, and community pharmacies	Data was collected by using a questionnaire	Statistical analysis	Describing pharmacists' attitudes towards their involvement in CVD prevention and to assess their perceived barriers to the provision of CVD prevention services	Fair	International Journal in Clinical Pharmacy	1.555
Amal K. Suleiman, Et al. (2016)	Saudi Arabia	Cross-sectional study	Not determined	Pharmacists	Community pharmacists	Data was collected by using a questionnaire	Descriptive analysis	Exploring pharmacists' attitudes regarding pharmaceutical care in chronic kidney disease (CKD) and end-stage renal disease (ESRD) patients.	Fair	Archives of Pharmacy Practice	0.252
Maguy Saffouh El Hajj, Et al. (2016)	Qatar	Cross-sectional study	Community Pharmacies	Clinical Pharmacists	Community Pharmacies	Data was collected by using a questionnaire	Statistical analysis	Examining the extent of pharmaceutical care practice and the barriers to pharmaceutical care provision	Good	Journal of Evaluation in Clinical Practice	1.681
Gholamhossein Mehralian, Et al. (2015)	Iran	Cross-sectional study	Community Pharmacies	Pharmacists	Community Pharmacies	Data was collected by using a questionnaire	Descriptive analysis	Evaluating pharmacists' practice and attitude toward pharmaceutical care (PhC) and present barriers	Fair	Journal of Pharmaceutical Health services Research	0.270

Niaz Al-Somai, Et al. (2014)	Saudi Arabia	Retrospective	The hospital is a tertiary center that provides CCU, CSICU, Cardiac, Hematology, ICU, Medical, Neuroscience, Oncology, and specialized surgery services.	Clinical pharmacists	CCU, CSICU, Cardiac, Hematology, ICU, Medical, Neuroscience, Oncology, and specialized surgery services	Data were collected by reviewing the medical chart, lab tests, and culture reports	Statistical analysis	Evaluating the role of clinical pharmacist and ID interventions in optimizing antimicrobial therapy.	Fair	Saudi Pharmaceutical Journal	1
Richard Hooper, Et al. (2014)	Qatar	Prospective	The study was conducted in four primary health care clinics	Pharmacists	Primary health care clinics	Data were collected by reviewing documented information of patients and by using PCNE classification.	Statistical analysis	Characterizing and analyze interventions documented by pharmacists in outpatient pharmacies	Fair	International Journal Clinical Pharmacy	1.616
Dalal M. Al-Taweel, Et al. (2013)	Kuwait	Cross-sectional study	Community pharmacies	Pharmacists	Community pharmacies	Data were collected using a questionnaire and an interview.	Descriptive and thematic analysis	Identifying pharmacists' potential contributions to the delivery of pharmaceutical care to patients with type 2 diabetes	Fair	International Journal of Diabetes in Developing Countries	0.525
Salah M AbuRuz, Et al. (2013)	Jordan	Pre-Post intervention	At the nephrology wards (10 beds) of one of the largest general teaching hospitals in Jordan.	Clinical pharmacists	Nephrology wards	Data were screened patients' medical files	Statistical analysis	Implementing and evaluating the impact of pharmaceutical care service for hospitalized chronic kidney disease (CKD) patients	Good	International Journal of Clinical Pharmacy	1.25

Mohammed S. Alsultan, Et al. (2013)	Saudi Arabia	Cross-sectional study	Hospital pharmacy	Clinical pharmacists	Hospital pharmacy	Data were collected by a questionnaire	Descriptive statistical	Describing and characterize the trends in pharmacist's monitoring of medication therapy, and describe the monitoring activities of pharmacists.	Fire	Saudi Pharmaceutical Journal	1
Hossein Khalili, Et al. (2013)	Iran	Prospective	At 60-bed infectious diseases ward of Imam Hospital, a multispecialty health care university setting in Tehran, Iran.	Clinical pharmacists	Infectious diseases ward	Data were collected by a questionnaire and medical charts of the patients	Descriptive statistical analysis.	Impact of clinical pharmacy interventions on decreasing direct medication costs	Fair	European Journal of Internal Medicine	3.66
Maram G Katoue, Et al. (2013)	Kuwait	Cross-sectional study	Community pharmacies	Pharmacists	Community pharmacies	Data were collected via a face-to-face structured interview of the pharmacists using a pre-tested questionnaire.	Descriptive and comparative analysis	The role of community pharmacists in the care of patients with metabolic syndrome.	Fair	International Journal of Clinical Pharmacy	1.25

Nadir Yalçına, Et al. (2019)	Turkey	Prospective study	University hospital. Not determined	Clinical pharmacist	Psychiatric ward	The data was collected by using a specific scale and an interview.	Statistical analysis	Evaluating whether drug education during the discharging period affects compliance.	Fair	International Clinical Psycho-pharmacology	3.098
Emre KARA, Et al. (2019)	Turkey	A prospective, cross-sectional study	At the Infectious Diseases Outpatient Clinic of the Hacettepe University Adult Hospital. Not determined	Clinical pharmacist and physician	Infectious Diseases Outpatient Clinic	A face-to-face interview with a clinical pharmacist. PCNE Classification V 7.0 was used to classify incident drug-related problems (DRPs).	Statistical analysis	Determining DRPs and to evaluate clinical pharmacist interventions among PLWHA	Fair	Turkish Journal of Medical Science	0.717
Ceylan Paksoy, Et al. (2018)	Turkey	Prospective study	At the oncology outpatient clinic located in Istanbul. Not determined	Clinical pharmacist	Oncology outpatient clinic	Data was obtained from the patient's records and medication.	Statistical analysis	Evaluating potentially inappropriate medication use in elderly patients with cancer.	Fair	Journal of Oncology Pharmacy Practice	1.85
Kamer TECEN-YUCEL, Et al. (2018)	Turkey	A descriptive, cross-sectional, prospective study	At the medical oncology outpatient clinic of a University Oncology Hospital. The clinic is run by two consultant doctors	Clinical pharmacist	Oncology outpatient clinic	Data was obtained from the patient's records.	Descriptive analysis and statistical analysis	To identify and evaluate drug-drug interactions and adverse effects related to TKIs in patients	Fair	International Journal of Hematology and Oncology	1.992

Fikret V. Izzettin, Et al. (2017)	Turkey	Prospective study	At the oncology unit in one of the Teaching and Research Hospital in Istanbul. Not determined	Clinical pharmacist	Oncology unit	Data were collected from the medical records of the patients and face- to – face interview.	Statistical analysis	Assessing the occurrence of drug-related problems and the importance of the effective provision of patient education and appropriate recommendations	Fair	Marmara Pharmaceutical Journal	0.31
Songül Tezcan, Et al. (2016)	Turkey	Prospective study	At the outpatient chemotherapy unit of Marmara University Pendik Training and Research Hospital	Clinical pharmacists	Outpatient chemotherapy unit	Data was obtained from the patient's records and an interview.	Statistical analysis	Determining and evaluate the pharmaceutical care needs and quality of life of patients with colorectal cancer.	Fair	Europe Journal of Hospital Pharmacy	0.538
SuleApikoglu-Rabus, Et al. (2016)	Turkey	Prospective study	Not determined	Pharmacists	Pharmacy	Data were collected by using a questionnaire, patients records, and a face-to-face interview	Statistical analysis	Describing drug-related problems in patients with asthma and COPD	Fair	Journal of Respiratory Medicine	3.237
A. Selcuk, Et al. (2015)	Turkey	Retrospective study	Not determined	Clinical pharmacists	Internal medicine	Data was obtained from the patient's records.	Statistical analysis	The impact of services, including medication reconciliation and medication review, on the hospital admission process for elderly patients	Fair	Pharmazic	1.37

Abdelrahman G. Tawfk, Et al. (2020)	Egypt	Simulated client random study	Community pharmacies	Pharmacists	Community pharmacies	Data obtained from the interviews	Descriptive analysis	Investigate the quality of community pharmacies management of self-medication requests of tetracycline for pregnant women.	Good	International Journal of Clinical Pharmacy	1.616
Bashayr Alsuwayni, Et al. (2020)	Saudi Arabia	Prospective study	At an academic hospital. Not determined	Clinical pharmacists	Diabetes clinic	Data was collected by using patient electronic health records.	Descriptive analysis	Evaluating diabetes-related health outcomes in a pharmacist-led diabetes clinic in terms of HgbA1C level, guideline-recommended routine screenings, medication adherence, and biomarkers of other comorbidities.	Fair	Saudi Pharmaceutical Journal	2.879
Abdel-Hameed I. Ebid, Et al. (2020)	Egypt	Prospective study	Ahmed Maher Teaching Hospital, in Cairo, Egypt. The outpatient clinic provides usual care services daily with regular follow up clinic visits every 1 to 3months,	Clinical pharmacists	Diabetes outpatient clinics.	Data was collected for each patient through an interview, lab reading, and hospital records.	Descriptive analysis and statistical analysis	Investigating the impact of the clinical pharmacist interventions on glycemic control and other health-related clinical outcomes in patients with type 2 diabetes	Good	Hospital Pharmacy Sage Journal	0.55

Appendix D

The Semi-structure Questionnaire of the Study

First part: Demographic data of respondent

No of question	Items	Mode of answer
1.	Age in year	A. 21-30 B. 31-40 C. 41-50 D. 51-60 E. Above 61
2.	Gender	A. Male B. Female
3.	Nationality	A. Bahrain J. Cyprus B. Egypt K. Iran C. Iraq L. Syria D. Jordan M. Kuwait E. Lebanon N. Oman F. Palestine O. Qatar G. Saudi Arabia P. Israel H. Turkey Q. UAE I. Yemen R. Others
4.	Educational Qualification	A. Bachelor B. Pharm.D C. M.Sc., D. PhD
5.	Academic position	A. Lecturer B. Research Assistant C. Teacher Assistant D. Assistant Professor E. Associate Professor F. Professor G. Others
6.	Practice setting (you may select one or more)	A. Academic/ University B. Hospital (Community pharmacy) C. Hospital (Clinical pharmacy) D. Regulatory Affairs E. Research Center F. Industry G. Other, Mention: …….....
7.	Employment status	A. Part time B. Full time
8.	Experience in year	A. 1-5 B. 6-10 C. 11-15 D. 16-20 E. >20

Second part: Respondents participation in pharmacy practice research

No of question	**Items** **Type of items:**	**Mode of answer:**
9.	An average number of articles you publish **PER YEAR** in the area of pharmacy practice:	a- One or Nothing b- Two / year c- 3-4 articles / year d- ≥5 articles/ year
10.	Area of interest	**……** **……**
11.	Are you affiliated with a specific pharmacy practice research center or a research group?	A. No B. Yes
12.	Did you receive financial support for research in your work setting?	A. No B. Yes
13.	How many scientific conference/s you attend annually	
14.	How often do you present in scientific conferences?	
15.	Do you have membership in any scientific society/association in your country or outside your country? If yes can you mention them	A. No B. Yes If yes, state the number of your membership/s …… ……

Third part: Description and sustainability of implemented service

No of question	**Items** **Type of items:**	**Mode of answer:** *** (C): Closed ended questions** *** (L): Likert scale** *** (O): Open ended questions**
16.	What's your role in the research entitled “”?	a) PI b) Co-PI c) Grad student d) Co-authored the manuscript or facilitated the research d) Others: ----------
17.	Is the selection of your research topics based on a series of previous research, or is it done randomly?	A. Series B. Randomly selected
18.	Was there a new service/intervention tested in your research?	A. Yes B. No, a pre-existing service was evaluated C. No other, mention please: …….
19.	Are the service/s that have been implemented/evaluated still ongoing in the study setting?	A. Not aware. B. No, please mention main reasons for service discontinuation ……..…….. C. Yes -If yes, please state main reasons for the maintenance of the service……. - If yes, is the service/s provided as effective as reported in your research: A. Not aware B. No, less effective C. Yes, as effective D. More effective than reported
20.	Has the research report/impact been circulated/presented to any stakeholder such as health institution administrators, Ministry of Health or state or any other stakeholder?	A. No B. Yes If yes, state some examples …… ……
21.	Is there any stakeholder, third party or potential sponsor in your country that expressed interest in your results?	A. No B. Yes, If yes, state some examples …… ……

Fourth part: Potential barriers/ facilitators of implemented pharmaceutical care

To what extent do you agree with the following statements as barriers in relevance to your implemented/evaluated research?						
No of question	**Items** **Type of items:**	**Mode of answer:** *** (C): Closed ended questions** *** (L): Likert scale** *** (O): Open ended questions**				
Statement		**Strongly agree**	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**
	22. Introducing services lack benefits beyond helping patient					
	23. Credibility of the benefits of the service is arguable and not clearly visible					
	24. Adaptability of implemented service/s is challenging					
	25 .Lack of effective system to monitor progress					
	26. Lack of ongoing providers involvement and training on new service to sustain it					
	27. Providers poor attitudes towards sustaining the new service					
	28. Lack of engagement and involving senior leadership					
	29. Lack of engagement and involving clinical leadership					
	30. Implemented services do not fit with the organization's strategic aims or culture or intentions					
	31. Lack of necessary infrastructure and resources for sustainability					
	32. National health/Economic/ political instabilities that impact resources allocation and prioritization					
	33. Country regulations restricting the role of a pharmacist					
	34. What other obstacles may limit the sustainability of pharmaceutical services in your country?	…… ……				
	35. What other facilitators/ motivator factors that helped and still have an impact to keep the continuity of the pharmaceutical care services in your country? (O)*	…… ……				

Appendix E

Researcher's Curriculum Vitae

PERSONAL INFORMATION

Hebah Mohammed Sallom

Nicosia-Cyprus /TRNC (Ortaköy-Lefkoşa) (Cyprus)

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hiba.mas.suloom@gmail.com

masm75675@gmail.com

POSITION: Clinical Pharmacist

EDUCATION AND TRAINING

11/2/2019- 2021 Master Program in the Clinical Pharmacy

- Near East University, Nicosia / TRNC

- 100% scholarship has been offered by Near East University to study a Master's Program in the Department of Clinical Pharmacy.

21/4/2020 Get up to speed on managing COVID-19 patients using Elsevier's evidence-based resources

Researcher Academy on Campus Certificate of Attendance (Elsevier) r, Nicosia (Cyprus)

30/3/2020 Lets Break the Chain of COVID-19 Infection

Mohammed Bin Rashid University of Medicine and Health Sciences, Dubai (United Arab Emirates)

21/11/2019 Accelerating progress towards sustainable health-related development goals

World Health Organization, Nicosia (Cyprus)

24/7/2019 Antimicrobial Stewardship: A competency-based approach

World Health Organization, Nicosia (Cyprus)

9/5/2019–10/5/2019 Experimental Animal Models Course: From Gene to Function

Research Centre of Experimental Health Sciences- Near East University, Nicosia (Cyprus)

24/3/2018–14/5/2018 Training

Ibn- Hayan Pharmacy, Sana'a (Yemen)

20/9/2017–29/11/2018 Certificate of completion and TOEFL Certificate

Yali Language Institute, Sana'a (Yemen)

4/9/2012–6/8/2017 Student Academic Records

Science and Technology University, Sana'a (Yemen)

10/3/2018–17/3/2018 Certificate of achievement

- British Board for training and consulting, Sana'a (Yemen)

- Training course in Analgesics, Antipyretics, and anti-inflammatory.

10/3/2018–17/3/2018 Certificate of achievement

- Al- Razi training center, Sana'a (Yemen)

- Training course in Analgesics, Antipyretics, and anti-inflammatory.

3/3/2018–8/3/2018 Certificate of training

- Al- Hamid Institution for Humanitarian Development, Sana'a (Yemen)

- Management of pharmacies.

10/8/2017–10/8/2017 Certificate of attendance

- Pharma Train, Sana'a (Yemen)

- Dispensing of non-prescribed drugs.

11/5/2016–12/5/2016 Volunteer certificate

- The head of clinical pharmacy and pharmacy practice department of Science and Technology University, Sana'a (Yemen)

- Women's health with pharmaceutical eyes

1/8/2015–22/12/2016 Certificate of training

- Al- Motakamelah Pharmacy, Sana'a (Yemen) General drug dispensing and consulting.

- Occupational providing patients with all information related to the uses of medications.

21/11/2015–26/11/2015 Volunteer certificate

Science and Technology Hospital, Sana'a (Yemen)

General: Antibiotics Awareness

2014–2015 Certificate of congratulations

- Science and Technology University, Sana'a (Yemen)

-The second- ranking in the university third year.

2013–2014 Certificate of congratulations

- Science and Technology University, Sana'a (Yemen)
- The second-ranking in the university second year.

2012–2013 Certificate of congratulations

- Science and Technology University, Sana'a (Yemen)

- The second-ranking in the university first year.

2012–2012 Certificate of participation

Student union of Science and Technology University, Sana'a (Yemen)

WORK EXPERIENCE

2019-2020 Qualified in performing quantitative and review studies

11/2020 Giving Lectures for Level Two Bachelor Degree (Pharmacy Students)

- Near East University- Department of Clinical Pharmacy

- Nicosia / TRNC Mersin 10 - Turkey, ZIP: 99138 Nicosia (Cyprus)

8/2019–3/2020 Hospital pharmacist- Assistant in Drug Information Centre

- Near East University- Department of Clinical Pharmacy

- Nicosia / TRNC Mersin 10 - Turkey, ZIP: 99138 Nicosia (Cyprus)

- Information and communication, Education and Providing Health Care Consultation

11/2019–12/2019 Clinical Pharmacist Assistant (Hospital Rotation)

- Faculty of Pharmacy- Clinical Pharmacy. Near East University Hospital, Nicosia (Cyprus)

- Working as an assistant in the Hospital Rotation for undergraduate students who were in their 5th year of pharmacy and the round was in "Geriatric Section"

24/3/2018–14/5/2018 Trained

- Ibn- Hayan Pharmacy, Sana'a (Yemen)

- Drug dispensing and consulting.

- Providing the patients with all information related to the use of medications.

21/11/2015–26/11/2015 Volunteer

- Science and Technology Hospital, Sana'a (Yemen)

- Antibiotics Awareness.

- Uses of antibiotics.

The difference between bacterial and viral infections.

2015–2015 Volunteer

- Shphaco Pharmaceutical Company, Sana'a (Yemen)

- Everything related to the production of drugs and all steps they used before manufacturing.

PERSONAL SKILLS

Mother tongue(s) Arabic

Foreign language(s) English

UNDERSTANDING		SPEAKING		WRITING
Listening	Reading	Spoken interaction	Spoken production	
C1	C1	C1	C2	C1

Communication skills

- Positive individual with good people skills as well as the ability to lead and to communicate effectively with people and children.

Job-related skills

Highly approachable with the ability to lead and to work to deadlines.

Digital skills

SELF-ASSESSMENT

Information processing	Communication	Content creation	Safety	Problem-solving
Independent user	Independent user	Basic user	Independent user	Independent user

ECDL Foundation

Good command of office suite (word processing, presentation, using database, managing file, and web browsing and communication.