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**Evaluation of Drug Information Centre Services Along The User
Utilization and Satisfaction in Jordan: A mixed Method Study**

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Abstract

Introduction: Drug information centers (DICs) are centers operated by qualified pharmacists that aim to provide technical and scientific information about drugs in an objective and timely manner to healthcare professionals (HCPs) and the public. These centers help to maximize safety, efficacy, suitability, cost-effectiveness, providing pharmaceutical education.

Aim: The aim of this study was to evaluate drug information centers in Jordan from two perspectives; qualitative assessment of DIC responses to simulated cases and assessment of users' satisfaction of each center.

Method: A mixed method study was carried involving two drug information centers in Jordan during the period of September 2019 to December 2020.

First phase:

It is determined by using six simulated cases that were measuring pharmaceutical care aspect, with varying difficulty levels (low, medium, high). Two independent individuals evaluated the responses based on predefined criteria and each criterion evaluated depending on five Likert-scale.

Second phase:

Which were determined by using satisfaction survey semi-structured questionnaires for HCP and patient were adopted, reviewed and validated through Delphi method. The sample size was 20 from each center and their total was 40. Phone calls were used to carry the interviews; they were recorded, and then translated into English using forward backward translation method.

Result: Two centers out of five centers approached accepted to participate in the study. Most of the questions received by the two centers were related to the availability of medications (41.40%) and their cost (22.80%). Depending on the result of satisfaction survey 76.47% of the HCPs were Very satisfied from the DIC services and 23.53% were satisfied. 86.96% of patients (users of the DICs) were also Very satisfied from the Drug Information Center services, 13.04% were satisfied .

The simulated cases presented by phone call were all answered while only 25% of those presented by e-mail were answered.

Conclusion: The evaluation of DIC in Jordan by simulation cases and satisfaction survey showed that both HCPs and patients users of the centers were generally satisfied from the services offered by the centers.

Keywords: Simulation Patients; Drug Information Center; Healthcare; Quality Assurance.

DEDICATION

This thesis is dedicated to my parents for providing me with unfailing support and continuous encouragement throughout the years of my study and through all the research and thesis writing period. This accomplishment would not have been possible without them. Thank you.

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ABBREVIATIONS

Table 1. Abbreviations.

Abbreviations	Explanation
ADR	Adverse Drug Reaction
DIC	Drug information center
EM	Essential Medicine
EML	Essential Medicine list
FDA	Food and drug administration
FIP	International Pharmaceutical Federation
GP	general practitioners
HCAHPS	Hospital Consumer Assessment of Healthcare Providers and Systems Score
HCP	Health care provider
IQR	Interquartile range
IRB	Institutional Review Board
MI	Medicines information
PROMs	patient-reported outcome measures
RUM	Rational Use of Medicines
SD	Standard Deviation
SP	Simulated patients
SPSS	Statistical Package for the Social Sciences
UKMI	United Kingdom medicines information
WHO	World Health organization

1 INTRODUCTION

Drug information centers (DICs) also called Medicines Information Center (MIC) are centers operated by qualified pharmacists that aim to provide technical and scientific information about drugs in an objective and timely manner to healthcare professionals (HCPs) and the public (Kannan, S. M. 2012).

The World Health Organization (WHO) addresses/emphasizes that setting up a DIC is a fundamental component of national programs to encourage rational drug usage (WHO Regional Office for South-East Asia; 2011).

In Jordan, The Jordanian University of Science and Technology DIC was the first drug information center to be founded in Jordan in 2005; there are currently five different drug information centers in Jordan. (Namely; Pharmacy One drug information center, Jordan University of Science and Technology drug information center, JUH-National Drug and Poison Information Center, Jordan Drug Information and Toxicology Center at the Royal Medical Services, and the King Hussein Cancer Center Drug information center.

The International Pharmaceutical Federation (FIP) advises DICs to conduct quality assurance practices such as regular response analysis facility and procedures examination annually. Since drug information centers have been established in Jordan, no data is available in the literature about the nature and performance of the services offered by these centers in Jordan, as well as the utilization of HCPs and patients of the information provided by DICs and its impact on patient outcomes (FIP, 2005).

Evaluation of the health care services lead to improve health care and patient outcomes. As far as DICs are concerned, the satisfaction of HCPs and patients in terms of quality, comprehensibility, timeliness and easy access to the service is essential as a measurement of quality control for DICs, resulting in positive outcomes for the patients. Several methods for evaluating the services and impact of DICs have been adopted, including quantitative evaluations of a number of services provided and queries received by the DIC, surveys evaluating patients' satisfaction. Although Simulation is used widely in health education to develop healthcare providers'

knowledge and skills, yet simulation was rarely used to evaluate DICs (Schulz, M. 2007; Keane, Franklin & Vaughan, 2019).

Assessing the effect of drug information centers through quantitative methods however, has only provided a fairly superficial understanding of how prescriber decision-making and subsequent patient care is influenced by medical information guidance. Thus, carrying out a qualitative analysis will help to gain more information and evidence to allow a better understanding (Rutter, 2015).

Qualitative interviews are intensive or in-depth interviews that collected more data and information. Questions that used in qualitative are open-ended and the primary objective is to learn from participants what they think about the topic and to hear it in their own terms (Qualitative Interview Techniques and Considerations, 2019).

In health care, a simulated patient (SP) is an individual trained to act as a real patient to mimic a set of symptoms or problems, SP is also known as a standardized patient, sample patient, or patient instructor. Simulated patients have been successfully used for education, healthcare specialist evaluation, as well as fundamental, applied and translational medical researches (Isaak et al., 2016).

In the recent years, the use of simulated patients to evaluate current practice or to obtain outcome measures for research into pharmacy practice has also gained much attention. However, it is not common to evaluate DIC by simulated patient (WHO Regional Office for South-East Asia, 2011).

The simulated patient/simulated HCP has been used to evaluate the health services provided for quality assurance purposes and to examine rational processes through health professions (Granias, A., 2006; Benjamin F. Crabtree, 2008).

In the first part of this thesis project we review literature on the concepts of rational drug use and evaluation of healthcare services. We also address the information role of pharmacist and services provided by drug information centers along their assessment methods; in the second part we present the study methods, results discussion and conclusion.

The aim of the study was to evaluate the drug information centers in Jordan from two perspectives: quality evaluation of the responses to standardized simulation cases and assessment of the user satisfaction for each center.

2 BACKGROUND

2.1 Rational Drug Use

The definition of Rational Use of Drugs according to the World Health Organization is “The rational use of drugs needs that patients receive drugs fitting to their clinical needs, in doses that meet their own individual requirements, for a suitable period of time, and at the cost should be lowest to them and the community” (WHO, 2005).

Paul Rutter (2015) also defined the rational use of drugs as patients receiving drugs appropriate to their clinical condition with doses that meet their personal needs for an adequate period of time, at the lowest cost for them and the community.

The issue of rational use of medicines has been appeared since decades and the essential medicine concept has been outcropped for almost a quarter century. The essential medicine list (EML), accessibility, affordability and availability of EM have been some of the important issues in RUM (Thawani, 2010).

Pharmacists provide many services that have the role in providing rational drug use such as ;providing proper information to patients about prescribed drug, the appropriate indication of the drug according to the disease also considering suitability, efficacy, safety, and appropriate dosage form and duration of the treatment as well as Patient adherence to treatment (Paul Rutter, 2015).

Optimization of All the above steps lead to rational drug use. So, shortening of any step could lead to irrational use of drugs (Rational use of medicines and role of pharmacists, 2019).

2.1.1 Challenges in drug use

World-wide, medication use is increasing. This can be explained as a result of production of more types of medications by the advancing pharmaceutical industries and also increasing types of diseases that amplified needs of pharmaceuticals industries (Bhalla N, 2003).

Drug related problem (DRP) is defined as an event or circumstance that involves a patient's drug treatment that actually, or potentially, interferes with the achievement of an optimal outcome (Rexburg A, 2008).

Examples of irrational drug: useoveruse of medicine, multi-drug use or polypharmacy – the quantity of medicine in prescription is commonly over required, incorrect drug use - the incorrect drug for a selected condition, self-medication – resulting in inappropriate drug use (Rational use of medicine and pharmacist role, 2019).

The results of inappropriate or irrational use of drugs have the subsequent effects on health: adverse, effects ranging from mild to severe, e.g. owing to antibiotic misuse or inappropriate use of medicine in self-medication. Restricted effectively e.g. within the case of under-therapeutic indefinite quantity of antibiotics, infectious disease or Hansen's disease medicine. Antibiotic resistance, owing to widespread overuse of antibiotics likewise as their use in under-therapeutic indefinite quantity. IN 1978 Drug dependency was already described e, due to daily use of painkillers, and still exists today. Risk of infection, owing to the improper use of injections: injection-related disorders are, among others, abscesses, polio, hepatitis, and AIDS. The inappropriate use of drugs will have a noticed adverse result on the standard of health care and considerably, build health care needlessly, also its adverse impact on the standard of patient care (Rational use of medicine and pharmacist role, 2019).

Inappropriate use of drugs leads to low quality of medical and public health care's and therefore wasting human and financial resources and can be harmful for patient and community health and finance. Experiences and achievements of rational drug use committees' activities in many different and important fields like as public education, physicians education, control the use of drugs in hospitals during the last 10 years have taught us that there are many possible approaches for policy-makers and health system managers to encourage improved and promoted use of medicines (Soleymani, Valadkhani & Dinarvand, 2009).

2.1.2 Strategies to encourage rational use

Irrational use of medicines is a worldwide main health challenge. The WHO promotes many key interventions to encourage more rational use:

- Establishment of a multidisciplinary national body to coordinate policies on medicine use.
- Use of clinical guidelines. The guidelines provide a benchmark of satisfactory diagnosis and treatment at all levels of health care. The guidelines need to be developed systematically, based on evidence and through a consensual procedure. They should be enhanced by formularies.
- Antibiotic stewardship (ABS) programs should and can assume this responsibility in combination with policies and programs for infection prevention. The aim of ABS programs in hospital is to continuously improve the quality of anti-infective prescribing with regard to agent selection, dosing, administration and duration of treatment in order to maximize clinical outcomes while minimizing toxicity to the patient as well as the emergence of resistance and costs (de With et al., 2016).
- Establishment of drug and therapeutics committees in districts and hospitals.
- Inclusion of problem-based pharmacotherapy training in undergraduate programs.
- Continuing in-service medical education as a licensure requirement, Avoidance of perverse financial incentives.
- Use of independent information on medicines.
- Public education about medicines.
- Development and use of national essential medicines list and establishment of DICs to help HCP and patient to have better treatment outcome.
- Use of appropriate and enforced regulation, Supervision, audit and feedback Sufficient government expenditure to ensure availability of medicines and staff ('WHO | Rational use of medicines', 2015).

2.1.3 Information role of pharmacist's

A pharmacist is playing an important role between patient and other healthcare providers. Pharmacists, are mostly the first contact with the public for any illness in hospital and community. All the community faith in them and find them simply accessible (Rational use of medicine and pharmacist role, 2019).

Pharmacists play key role in establishing a rational use of medicine through effective drug management, overcoming chronic shortages of essential medicines, combating problems with false and lower quality medicines, and educate community to promote compliance with drug therapy (Rational use of medicine and pharmacist role, 2019).

Pharmacists are considered a vital part of the health care team (Sanghera N et al., 2006). On the other hand, the pharmacist's role in medication adherence was increased by simplifying the medication regimen, preparing a dosing card containing only the most essential elements of the patient's medications can be highly beneficial. Including the name of the pill, an image (if possible), the condition it is for, and time of day taken can be extremely helpful for patients who take many medications or who have cognitive barriers (The Pharmacist's Role in Medication Adherence).

Pharmacist medication review, patient counseling, and telephone follow-up were associated with a lower rate of preventable ADEs 30 days after hospital discharge. Medication discrepancies before and after discharge were common targets of intervention (Schnipper et al., 2006).

The roles of pharmacists in patient care have expanded from the traditional tasks of dispensing medications to providing medication counseling and collaborating/communicating with other healthcare professionals. Systematic reviews have recently identified the benefits of pharmacist-provided services in terms of patient outcomes and have included the effect of pharmacists in developing country (Pande, 2013).

Medication adherence is a complex behavior which can be influenced by patients, providers, and health system factors. A single method cannot improve medication adherence. Instead, a combination of various adherence techniques should be implemented to improve patient's adherence to their prescribed treatment. Several interventions including reminder systems, follow-up programs by health care providers, and information technology tools have been developed to overcome patient and health care provider-related barriers (Jimmy et al., 2011; Sarayani et al., 2013).

Pharmacists are poised to play an important role in improving medication management during transitions of care and reducing readmission rates. Pharmacist's interventions (also known as pharmaceutical care plans) are means of solving the drug therapy problems identified in pharmaceutical care. Pharmaceutical care requires direct relationship between a pharmacist and an individual patient (Sanii et al., 2016; Ezeudo et al., 2013).

Several studies have highlighted the value of supervision of pharmacist in the therapeutic outcome, so to support patient, pharmacist should ensure about the appropriateness of the pharmacotherapy plan and in addition to that patient must be aware of the costs, side effect and monitoring plan regarding the treatment. Education about the correct and proper use of inhalers is the main point in prescribing these drugs. To optimize the efficacy of medicines, doctors and other health care providers must educate patients (Sanii et al., 2016).

2.1.4 Drug information center services

Drug information centers (DIC) are centers operated by qualified pharmacists that aim to provide accurate drug information to healthcare professionals and the public (Sreekanth SK, 2015). The World Health Organization (WHO) stated that establishing a DIC is a core component of national programs to promote the rational use of drugs (World Health Organization, 2011).

National Drug Information Centers around the world are recently established to promote rational medicine use and disseminate unbiased drug information. Drug information covers all from identification cost and pharmacokinetics to dosage and

adverse effects of drugs (Taher EM, 2014; Mohamed, 2018).

Drug information is a provision of unbiased, accurate and exact information of any information related to drug. Usually it is provided by a clinical pharmacist or pharmacist practitioner to healthcare professionals. Provision of such information is one of the professional responsibilities of a clinical pharmacist in healthcare system (Bhavsar R., 2012; Rajanandh, M.G., 2013).

By providing drug information service, pharmacists can assist medical practitioner and other healthcare professionals in individualizing patient therapy as a part of pharmaceutical care or a group of patients as part of a disease management program². As that of other clinical pharmacy services, the provision of drug information service is also limited in India due to various factors such as unawareness and un-acceptance of clinical pharmacy services in developing countries (Mohan J.P, 1998; Chhetri A.K, 2008).

It is concluded that the drug information center is providing useful information to health professionals, the information is being applied to patient-specific problems and use of the information is having a positive impact on patient care (Cardoni & Thompson, 1978).

Drug information services provided by the Department of pharmacy practice, were useful, beneficial to the health care professionals to provide better patient care and to update knowledge (Kumar et al., 2013).

DIC service has the potential to minimize the barrier of evidence-based medicine practice in developing as well as developed countries (Harish et al., 2019).

These centers were intended to be utilized as source of information, where people can call or contact health-care professionals and ask medicine-related questions. DICs aim to achieve the rational use of medicines by providing timely, accurate, balanced and comprehensive information on drugs and their usage (Aida AA, 2013; Chhetri AK, 2008).

Drug information sources have been traditionally classified in three different categories: primary, secondary, and tertiary. Primary literature contains of clinical research studies and reports, both published and unpublished. Not all literature published in a journal is classified as primary literature, for example, review articles or editorials are not primary literature, secondary literature refers to references that either index or abstract the primary literature, with the goal of directing the user to relevant primary literature, a tertiary source presents summaries or condensed versions of materials, usually with references back to the primary and/or secondary sources (Muthumari, P. 2013).

2.2 Evaluation of Pharmaceutical Services and DIC

The word of evaluation contains several definitions, all of which specify that this process aims to determine the value or worth (Health Foundation, 2015; Cambridge English Dictionary, 2016). The purpose of the evaluation is often to determine whether the desired changes have taken place and to determine whether provided services have improved. It also allows the assessment of a service from its clients to determine whether the service is cost-effective and justify further investment to permit others to learn from sharing information (Health Foundation, 2015; Denscombe M, 2003).

In 2014, a study was conducted by a group of researchers in Jordan titled ‘The evaluation of drug-prescribing patterns based on the WHO prescribing indicators in outpatient clinics of five hospitals in Jordan’ and showed a high average number of prescribed drugs per encounter and a low percentage of generic prescribing (Al-Azayzih, 2017).

The evaluation of the pharmaceutical services is considered to be an important key of improving the quality of healthcare, improving the pharmaceutical services and ensuring the continuity of the pharmaceutical services. Therefore, there are many methods used in this field, which included the qualitative method (it gives more accurate and comprehensive information), quantitative method and the mixed method.

Both methods offer essential facts for assessment and evaluation and both of them can facilitate community engagement. These methods are usually used in combination to give the best diagram overview of the project. Figure 1 show examples of quantitative and qualitative questions according to stage of assessment (Holland et al., 2005; Steckler et al., 1992).

TYPES OF EVALUATION QUESTIONS		
Evaluation Stage	Quantitative	Qualitative
Planning	What is the prevalence of the problem?	What are the values of the different stakeholders? What are the expectations and goals of participants?
Implementation	How many individuals are participating? What are the changes in performance? How many/what resources are used during implementation?	How are participants experiencing the change? How does the program change the way individuals relate to or feel about each other? To what extent is the intervention culturally and contextually valid?
Outcome	Is there a change in quality of life? Is there a change in biological and health measures? Is there a difference between those who were involved in the intervention and those who were not?	How has the culture changed? What themes underscore the participant's experience? What metaphors describe the change? What are the participant's personal stories? Were there any unanticipated benefits?

Figure 1. Types of evaluation questions

2.2.1 Quantitative method

Quantitative information can be gathered by studies or surveys, pre-tests and post-tests, perception, or assessing of existing records, documents and databases or by gathering clinical data. Surveys may be self- or interviewer-administered and conducted face-to-face or by phone call, mail, or online. Investigation of quantitative information includes statistical analysis, from basic descriptive statistics to complex one. Quantitative data measure the profundity of an implementation (e.g. the quantity of individuals who took an interest, the quantity of individuals who finished the program). Quantitative data can be collected when an intercession can show its results and effect before and after an intervention. The strengths of quantitative data for evaluation purposes include their generalizability if the sample represents the population, the ease of analysis is their consistency and accuracy whenever gathered

dependably (Holland et al., 2005; Garbarino et al., 2009).

There are however, limitations of using quantitative method for evaluation such as difficulty obtaining documents, the poor responses rates to surveys, and difficulties or problems in a validity of measurements. In addition, quantitative data do not give an understanding of the program's context and may not be robust enough to clarify complex issues, matters or interactions (Holland et al., 2005; Garbarino et al., 2009).

2.2.2 Qualitative method

“What is the further worth, who was responsible about this, and when did this occur” are examples of qualitative data. Qualitative data are gathered through immediate, straight or participant observation, interviews, focus groups, and case studies and from written documents. Observing, comparing, contrasting, interpreting patterns, identification of themes, clustering similar or identical data, and reducing data to meaningful or expressive and important points, are utilized by analyzing qualitative data (Patton, 2002).

Observations may help clarify behaviors as social context and meanings, because the evaluator sees what is truly occurring. Observations can include watching a participant or program, videotaping an intervention, or recording people who have been asked to “think aloud” while they work (Ericsson et al., 1993).

Interviews may be conducted with people alone or with gatherings of individuals and are particularly valuable for investigating complex issues. Interviews may be conducted under estimated conditions, or they might be led with a free arrangement of inquiries posed in an open-ended type. It may be useful to tape-record interviews, with suitable consents, to encourage and inspire the investigation of themes or content. Other interviews have a specific focus, such as an acute incident that an individual re-calls and describes in detail. The strong point of this method is that group discussion can offer ideas and motivate memories with topics cascading as discussion happens (Krueger et al., 2000; Morgan, 1997).

There are numerous qualities of qualitative data incorporate giving relevant information to explain complex issues and supplementing quantitative information by clarifying the "why" and "how this" behind the "what" and "where". There are a few points of confinement of qualitative data for assessment that incorporate the absence of generalizability, consuming of the time and costly nature of data collection, and the difficulty of data analysis and interpretation (Patton, 2002).

Qualitative method has many benefits including taking human skills and ability into account it is a significant profit of qualitative research. Most of the researchers operate system that assesses all information sources before concluding. Qualitative research focuses on the human features and characters after that makes their observation based on individual's experiences. It luckily embraces the gut instinct to collect any form of data (Benefits of qualitative research explained).

Open-ended process; people are normally trained from birth to give shallow responses to typical questions without taking the required time to evaluate them. A key profit of qualitative research is that it is an open-ended process. The framework allows the researcher to collect information by observing outside the surface of rational thoughts and superficial answers. It is an abundant way to know about the emotional replies of any person. Remember emotions are what drives a person to act in the way they do and are the driving force behindhand his choice and behavioral pattern and it is through qualitative research that you have straight access to the emotional data (Benefits of qualitative research explained).

A vital advantage of qualitative research is that it can simply turn from normal ways and operate within fluid structures. Works within fluid structures; if you are conducting normal research, you will be bound within several parameters. The researchers gather their data established on experiences and observation. Which they have the authority to ask additional questions to improve and progress their overall reports (Benefits of qualitative research explained).

People are normally trained from birth to give shallow responses to typical questions without taking the required time to evaluate them, this is another benefits to a qualitative research which is Open-ended process. The outline allows the researcher to collect information by observing outside the surface of rational thoughts

and superficial answers. It is an abundant way to know about the emotional replies of any person. So the open-ended process is a key profit of qualitative research by remembering emotions which drives a person to act in the way they do and are the driving force behind hand his choice and behavioral pattern and it is through qualitative research that you have straight access to the emotional data (Benefits of qualitative research explained).

Also, another benefit of qualitative research is evaluating in detail by collecting comprehensive data to ask open-ended questions and reach to their accurate complete replies through the data and recordings. It is difficult to get data as there are time barriers in place that can stimulus the findings to a great deal. The real aim of these roadblocks is to form a sure consequence so that every one of the measurements is in their proper spot (Benefits of qualitative research explained).

Saves money; because qualitative research usually has small sample size for conducting their research for the reason that it gathers information from every separate person on a one-to-one basis. The profit of qualitative research is that it results in smallest research costs and helps in saving money (Benefits of qualitative research explained).

Human prefer facts and statistics which can be verified and of course, certified. In-depth conclusion also considered as a benefit of qualitative research. Where it is not possible to remove the experiences of publics from any part of equation because everyone has a different viewpoint on the facts of a specific incident. Our insights differ with the way we look at even same data. The complexities lead to produce and create an accurate and in-depth conclusion that proves and shows beneficial for everybody and is considered an additional value of qualitative research (Benefits of qualitative research explained).

There are three main types of interview in qualitative research will be further clarified. Also, the methods used in the qualitative research to evaluate the pharmaceutical services is satisfaction method and the simulated patient both will be further clarified.

Types of interviews in qualitative research:

The goal of the qualitative interview study is to study and understand the experiences, views, or belief of an individual on a specific subject or issue. In qualitative research strategies and methods, interviews are helping you to hook and have a profounder and strong understanding of social tendencies as comparison to data that collected by using quantitative methods (strategies) such as surveys and questionnaires (Types of interviews in Qualitative Research - Qualitative Research, Hitesh Bhasin).

So, interviews are suitable in those circumstances where you have essential information about the research topic and you need to find a profound comprehension of it. Interviews can also be utilized to conduct information about such topics where the respondent is very shy or does not feel comfortable to discuss about his opinion in front of a group of people. There are three types of interviews; you can see the difference between them below (Interviews types in Qualitative Research, Hitesh Bhasin).

- **Structured interview:**

Structured interviews are kind of orally questionnaire. A list of pre-determined questions is requested to the respondent in structured interviews. The questions are not changed through the interview and there is no follow-up questions are requested to progress a clarification on a certain response. These interviews can be shown fast result because there is almost no chance for both interviewer and respondent to get deviated from the topic. The replies and answers can be compared and analyzed without difficulty because of the uniformity of the questions requested (Interviews types in Qualitative Research, Hitesh Bhasin).

- **Unstructured interview:**

However, unstructured interviews are shown with a limit or no training at all. Unstructured interviews are kind of somewhat efficient discussion between two individuals. Unstructured interviews can begin with an opening question like "Would you be able to enlighten me concerning your experience" and then the interviews will move to and afterward the meetings will move to pose inquiries based on the

appropriate response of the primary inquiry.

These interviews also need your abilities and skills to form questions in such a way so that they will get you a detailed reply. To understand this, you can see this example “Can you tell me about your experience in that company” This question is shaped so that it will animate the respondent to answer it in profound manner with numerous details (Interviews types in Qualitative Research, Hitesh Bhasin).

- Semi-structured interview:

Semi-structured interviews are a mixture of structured and unstructured interviews such as, a researcher will have a list of inquiries and questions to be requested in the interview, but he can also ask the respondent follow-up questions to get deep information and have more details or explanation on the basis of his/her response. This type of interview is frequently applied in research related to health care field, where interviewer will be the leader to guide the participants about what they should talk. This aids the participant to deliver correct and profounder information (Interviews types in Qualitative Research, Hitesh Bhasin).

2.2.2.1 Simulated patient

The current literature is related to the use of standardized patients in medical education and physical therapy education and the impact of evaluating the pharmaceutical services by using simulation patient. There is a lack of standardized modes of assessing communication and interpersonal skills of health professionals during educational preparation.

A variety of strategies are currently being utilized by healthcare educators to prepare students for clinical practice (Doherty & Tivener, 2014; Yeung & Carnahan, 2013). The number and quality of learning experiences provided through clinical education can vary, leaving programs the task of providing adequate and appropriate experiences that replicate clinical practice. Simulations, with varying levels of realism, can be used to provide students with patient encounters or experiences which may or may not be seen during clinical education. A simulation is defined as the engagement of learners in life-like experiences which mimic real clinical encounters (McGaghie, Issenberg, Cohen, Barsuck, & Wayne, 2011).

Simulations provide a risk-free environment for learners to master skills that are relevant and vital to successful clinical practice (Maran & Glavin, 2003). Simulation includes activities such as role play, standardized patient encounters, as well as technology such as partial task trainers or other simulators of varying fidelity (Walker & Thrasher, 2013; Yeung et al., 2013). Additionally, simulations can be standardized for a group of learners or created on an individual basis and specific to the needs of the learner (Walker, Weidner & Armstrong, 2008). One form of simulation involves the use of standardized patients to provide valuable realistic encounters for a learner in an environment that reduces the risk of harm to the patient. A standardized patient (SP) is an individual who has been trained to portray a particular injury or illness in a consistent manner to multiple learners (Armstrong & Jarriel, 2013; Barrows, 1987; May, Hyun Park, & Lee, 2009; Walker et al., 2008).

Margaret Watson, Jennifer Cleland and Christine Bond (2009) found that Simulated Patient visits with feedback were okay to pharmacists as a method of developing the quality of consultations for OTC medications. The procedure which pharmacists and their staff add their recommendations, in terms of data gathering, could be improved. So a large-scale study is required to judge the effectiveness and cost-effectiveness of SP visits with feedback.

Other studies used simulated patient like: Using the simulated patient method to Assess Paracetamol-Related Counseling for Headache, actually this study used simulated patient in 17 community pharmacies. Two scenarios were direct product requests and Scenario 3 was a symptom-based request. The symptom-based request was scored significantly better than the direct product requests. The conclusion was the assessment of paracetamol-related counseling demonstrates room for practice improvement (Horvat, Koder & Kos, 2012).

Simulated patient (SP) methodology (mystery shopping) is a useful method in a wide range of countries and settings. It used to assess quality of pharmacy services, and evaluate impact of interventions. The most common aim for simulated method in most research was to evaluate some aspect of pharmacists' or other staff's advice and counseling. The use of SP methodology has increased in the field of pharmacy over the past decade (Watson, Norris & Granas, 2006).

An overview of the uses of standardized patients for teaching and evaluating clinical skills:

Barrows et al. (1993) defined the term of standardized patient (SP), as the umbrella term for both a simulated patient (a trained person to simulate a patient's illness in a standardized approach) and a real patient (who is trained to exhibit his/her complaint in a standardized approach). By discussing the merits of simulated patients over actual patients as teaching and assessment tools in the classroom. It was defined an additional roles and benefits of SPs that have established, including: their use in the Clinical Practice Examination created at Southern Illinois University School of Medicine and the major use that has come into being over the last ten to fifteen years; simplifying the comprehensive assessment of clinical competence using several positions in examinations such as the objective structured clinical examination. He concluded with information about latest and current work on SPs, who are becoming further and more accepted in the assessment process.

From the Department of Anesthesia Stanford University School of Medicine, Stanford, CA, they were using Human Patient Simulation to evaluate the Impact of Classroom Education on the Management of Septic Shock. Unfortunately they failed to catch an immediate impact on clinical performance in simulations of septic shock after a lecture on the management of this syndrome. Lectures are likely not a reliable sole method for improving clinical performance in the management of difficult illness processes (Lighthall, Bahmani & Gaba, 2016).

2.2.2.2 Satisfaction research

There are many studies use satisfaction in evaluation like: Evaluation of patient satisfaction in pediatric dermatology. The method that used: patient satisfaction surveys were spread after visiting to patients at 4 pediatric dermatology clinics in one children's academic health system. Data were collected and ordered into the top 30 survey variables with which patients expressed satisfaction on a 5-point Likert-scale. The conclusion of this study that the patient-physician relationship, with the environment of the practice and its sensitivity to patients' personal wants, gives most to the patient experience in pediatric dermatology (Ahmed et al., 2017).

In Germany, assessment of National Drug Information Centre, showed high level of user satisfaction in term of professional quality of advice, clarity/ understandability of advice , timeliness of response, and helpfulness regarding counseling patients and/ or physicians .Potential patient benefits could be identified in 42% of the cases that were available to follow-up (Bertsche,2007).

In 2015, United Kingdom Medicines Information (UKMI) was pharmacist-led service funded by the National Health Service providing evidence-based advice about medicines to healthcare professionals. Service evaluations have repeatedly shown high user satisfaction (Rutter, 2015). Similar outcomes of high quality of user satisfaction were also reported in Brazil and in two studies in India (Fischer & Bhavsar, 2012).

According to the study that has been done in a Brazilian Drug Information Center “User’s Satisfaction in a Brazilian Drug Information Center Evaluation under a New Approach” Seventy-four professionals were interviewed to evaluate user’s satisfaction in a Brazilian Drug Information Center (DIC). The questions were divided into 4 groups: “user’s profile”; “service quality”; “general information” and “suggestions or observations”. Service quality was divided into three subgroups: easiness of access to information (how easy it was to contact the DIC, and service hours), quality of information (clearness, objectivity, timeliness of response, if the answer helped user’s necessity, and need of information from additional sources), and concept of user about the service (the willingness of user to contact again). Overall, the service received a positive evaluation. However, the analysis utilized permitted us to recognize specific deficiencies, mainly lack of objectivity of the answers (Fischer, 2012).

Sarah Y. Mohamed used retrospective method in her study “Assessment of user satisfaction of service provided by Khartoum Medicines Information Centre (KhMIC)” which the interviewed done by telephone using a specially designed semi-structured questionnaire (Sarah et. al., 2018).

Flores reported in his study “drug information center: challenges of the research process to answer enquiries in hospital pharmaceutical practices” that a quarter of the answers did not exhibit conclusive information in the consulted sources. Answers to

information requests from the hospital environment exhibited the greatest extent of limited information, and off-label use was responsible for most cases (Flôres et al., 2018).

In this study it was used two ways the simulated patient and satisfaction questionnaires to have accurate result even in satisfaction questionnaires it was used two types of questions; open ended questions and close ended questions (qualitative method).

The measurement of client satisfaction has become extensive in both healthcare and social care services, and is informative for performance monitoring and service development. The measurement of satisfaction has been problematized, and present satisfaction measures are known to be under-theorized. The process of making an assessment of satisfaction with social care services is first informed by a literature review of the theoretical background, and second examined through qualitative interviews conducted in 2012-2013 with 82 service users and family care in Hampshire, Portsmouth and Southampton. The results illustrate that the majority of members chosen a positive satisfaction rating even though both positive and negative experiences with services were defined in their narratives. It is suggested that surveys offer chance for service users and family cares to elaborate on their satisfaction ratings (Willis et al., 2016).

The uses of satisfaction to the burden of anticoagulation treatment affect patient satisfaction, which in turn affects adherence to treatment. Thus, to understand the advantages of direct oral anticoagulants (DOACs) over vitamin K antagonists (VKAs) / warfarin given for stroke prevention in patients with atrial fibrillation (AF) they use compared satisfaction with anticoagulation therapy between 654 DOAC and 821 warfarin users enrolled in the SAKURA AF Registry. Satisfaction was assessed by means of the Anti-Clot Treatment Scale (ACTS), which includes 12-item burdens and 3-item benefits scales, and the treatment satisfaction questionnaire for medication II ,which includes 2-item effectiveness, 3-item side effects, 3-item convenience, and 2-item global satisfaction domains (Okumura et al., 2018).

Patient satisfaction is an important component of the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) Score. To improve

patient satisfaction that will lead to happier healthcare and more compliant patients, also improved HCAHPS scores, increased compensation, improved hospital ranking, better publicity and patient volume. Satisfaction, while always an important factor when delivering any kind of a service, has recently gained notoriety in the healthcare space (Piper & Tallman, 2016).

Many hospital systems find to progress patient satisfaction as evaluated by the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) surveys. A systematic review of the current experimental evidence could update these efforts, the conclusion was there are a few studies that demonstrate some enhancement in HCAHPS score through numerous interventions, they conclude that more challenging research is needed to recognize the effective and generalizable interventions to increase and develop patient satisfaction (Davidson et al., 2017).

3 MATERIAL AND METHOD

3.1 Study Design

A mixed method study was carried involving five drug information center (DIC) in Jordan during the period of September 2019 to December 2020.

3.2 Demographic Data of Centers

Data were collected during several visits to the DICs, demographic information related to the center such as (who work on the center, the number of people who work there, official working hours) and also the number of inquiries that reached them per year for the last four-five years were all gathered. Based on this information, a list of randomly chosen users was taken to contact and ask them about their satisfaction of the DIC they use. Sample size in the common of qualitative studies should normally follow the concept of saturation when the collecting and gathering of new data does not shed or lean-to any further light on the issue under investigation (Keller, 2014).

Usually the sample size in qualitative studies is 12, and according to the systemic review for the last 15 years, the sample size in these studies is between 20 to 30. The sample size of our study was 20 from each center and their total was 40. The saturation was reached from the tenth sample for each center, but the number has been increased to 20 to assure absence new themes.

The questionnaires were written according to some studies and expert panel, in which two types of questions were written; open-ended questions and close-ended questions. Also, inquiries were put into categories according to their types and each category of inquiries percentage was found.

3.3 First Phase

The first phase of the study involved an objective assessment using simulated cases. Six simulated cases that were measuring pharmaceutical care aspect, with varying difficulty levels (low, medium, high). The cases were written according to some studies, and according to the information collected from the DIC in the Near

East Hospital in Cyprus. These simulation cases were revised and evaluated by an expert panel, taking in consideration the trade names of drugs in Jordan.

The queries were presented to the centers by a phone call or by mail. After the receipts of answers, two independent investigators evaluated the responses using a five Likert scale check-list based on predefined criteria, each criterion was scored from 0 (poorest quality) to 4 (highest quality) Supplementary Tables 17, 18 in the result section.

3.4 Second Phase

The second phase of the study has assessed enquirer satisfaction and utilization of the obtained Drug Information. A qualitative method using a semi-structured questionnaire was adopted, reviewed and validated through an expert panel. Usually the sample size in qualitative studies is 12, and according to the systemic review for the last 15 years, the sample size in these studies is between 20 to 30. The sample size of our study was 20 from each center and their total was 40. The saturation was reached from the tenth sample for each center, but the number has been increased to 20 to assure absence new themes. As mentioned before Phone calls were used to carry the interviews, which were recorded, then translated into English using forward back word translation method. After that, themes were developed and data was presented accordingly.

The questionnaires were written according to several studies, as well, an expert panel composed of five professors. The first questionnaire was written for patients and the second one was written for health care providers. The questionnaires consisted of two types of questions; open-ended questions and closed-ended questions, which they can be found in the appendix.

After the targeted people consents were taken, they were contacted and asked how much they are satisfied of the DICs they use. Twenty people were contacted from each DIC by phone and all calls were recorded, then the answers were presented after translation.

Validation of questionnaires:

The initial draft of the questions was prepared based on literature review. Both closed-ended and open-ended questions were included. Two formats of the questions were prepared, a patient friendly version and one for health care providers. Following a Delphi method was carried to review and validate the developed questionnaires to suit the study purpose. The expert panel included five participants (the researcher and two professors (clinical pharmacists) from the Near East University and two professors (clinical pharmacist and pharmacologist) from the University of Jordan). After reviewing the questionnaire several times, the final assessment was reached.

3.5 Sampling

Six simulated cases from each center were collected for the first phase and 20 people with different life backgrounds (doctors, patients, elders, etc...) From each center were asked some questions according to the questionnaires for the second phase.

3.6 Data Management and Statistical Analysis

3.6.1 Qualitative data manipulation and analysis

Data analysis involved three stages, transcription - translation - and analyzing. The first stage involved the transcription of the answers of the satisfaction questionnaire carried by the principal researcher. Following transcription, the script was in Arabic and translated into English using backward and forward translation method done by the principal researcher (bilingual English, Arabic); then by a professional translator (bilingual with Arabic as a first language). Following translation, the third stage involved content analysis of the data sets to develop categories and themes.

Inductive thematic analysis of the transcripts was undertaken based on six steps: becoming familiar with the data; generating initial codes; searching for themes; reviewing themes; defining and naming themes and finally producing the report. The principal researcher reviewed all the transcripts several times, coded the data and

extracted the main emerging themes. A second investigator reviewed the transcripts and the key themes thus strengthening the validation of study results. All authors discussed the themes, codes, similarities, and differences until agreement was reached on the key themes and subthemes.

3.6.2 Statistical Analysis of Quantitative Data

Data entry and analysis were conducted using Microsoft Excel and SPSS version 20. Detected errors were corrected as appropriate. Categorical variables, such as gender, age, nationality and future plan, were presented in frequencies and percentages. The **Manwitney test** was used to assess the statistical significance of observed differences between centers. **kruskal wallis test** was used to compare the differences between case difficulty . A p-value ≤ 0.05 was considered significant. **T-test** was used to compare the differences between criteria and a p-value ≤ 0.05 was considered significant.

Table 2. Tests by using SPSS software

The comparison between	Statistical Test	P value
Center 1 and Center 2	Manwitney	0.937
Case difficulty (easy, medium, difficult)	kruskal wallis	0.01
Criteria (1-9)	T-tests	0.01

3.7 Ethical Approval

Ethical approval for this study was obtained from the Institutional Review Board (IRB) of King Abdullah University Hospital, and Pharmacy One. Privacy was taken in consideration by the researchers.

4 RESULT

4.1 Demographic Information of The Centers

According to the number of employee in the centers the is one In one of the centers there is one employee who is pharmacist and the working hours in this center is from 8 am to 4 pm, while for the other center there was a full staff contains 5 pharmacists who answering inquiries by phone or email and the working hours for this center is from 8 am to 7 pm.

The following tables (3-5) show the total number of inquiries received for each center during the past four years in addition to the percentage of each type of questions received such as drug-drug interactions or side effects and others.

Table 3. The total number of inquiries for the last 5year in DICs

Year	Total number of inquiries center 1	Total number of inquiries center 2
2016	14600	71
2017	10266	90
2018	16300	136
2019	30460	121

Table 4. The percentages of the types of questions for DICs

Request class	Percentage for center1	Percentage for center2
Indications of medications	3.00%	4.00%
Storage conditions	2.00%	3.00%
Dose administration	8.60%	37.00%
Availability of medications and cost	53.80%	29.00%
General information	10.70%	7.00%
Side effects	6.70%	4.00%
Therapeutic choice	4.10%	6.00%
Drug interactions	3.50%	5.00%
Pregnancy and lactation	4.60	2.00%
Others	3.00%	3.00%

Table 5. The average of percentage for the two centers of the request class

Request class	Percentage
Indications of medications	3.50%
Storage conditions	2.50%
Dose administration	22.80%
Availability of medications and cost	41.40%
General information	8.85%
Side effects	5.35%
Therapeutic choice	5.05%
Drug interactions	4.25%
Pregnancy and lactation	3.30%
Others	3.00%

Evaluation of The Satisfaction Questionnaires

After reviewing the questionnaires four times by the experts' panel, Table 6 shows the final evaluation of the questionnaire.

Table 6. The evaluation of questionnaires

The number of experts	The evaluation out of 5
Expert 1	5
Expert 2	5
Expert 3	5
Expert 4	4
Expert 5	5

Table 7 shows the evaluation of simulation cases.

Table 7. The evaluation of Simulation cases

The number of experts	The evaluation out of 5
Expert 1	5
Expert 2	5
Expert 3	5

4.2 The Result of Satisfaction Questionnaires

According to HCPs satisfaction survey the results that were as follow: 17 HCP answered the survey. 41.18% of them were male while 58.82%, were female. All of them were Jordanian with different academic qualification (Diploma 11.76%, BSc 82.35%, MSc 5.88%).

Physician represented 29.41% of the respondents, Pharmacist 23.53%, and Nurse 47.06%. 29.41%, of them work in private setting and 70.59% in public setting . in the following departments (Dermatology unit 11.76%, Emergency unit 47.06%, in patient pharmacy 5.88%, internal unit 17.65%, Surgery unit 11.76%, Gynecology unit 5.88%).

Around 88.24% of the HCPs said they will highly recommend the drug information center to a friend or colleague. Also, Figure 2 shows the percentage of the services of DIC meet their needs.

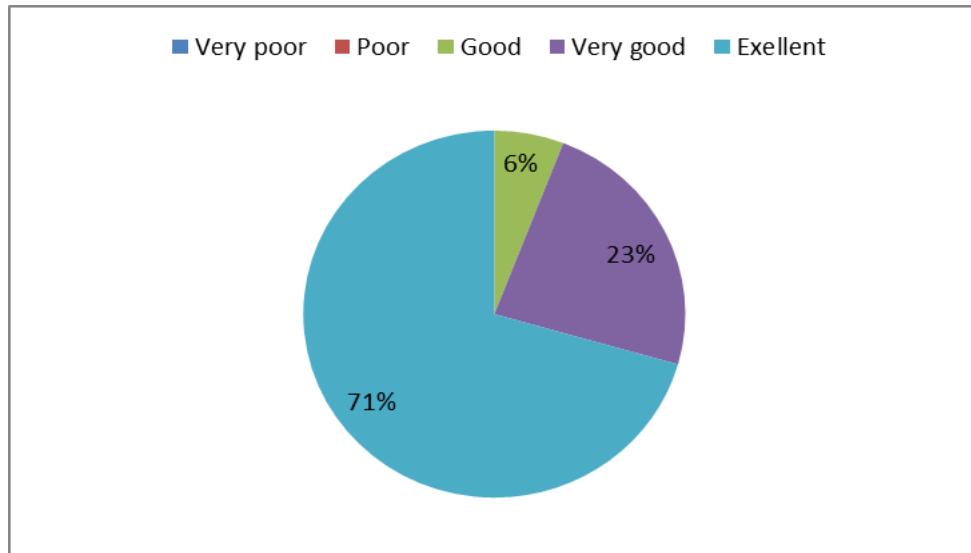


Figure 2. Describe the percentage of DIC services that meet (HCP) needs

82.35% of HCP are Very likely to seek any of the DICs services again, and 11.76% are Likely to seek any of their services again while only 5.88% are Neutral to seek any of their services again. All of HCP received enough information regarding their question/s and the information was clear and understandable. All of them use the information got from the DIC.

Regarding the suitability of terminology used by the DIC employee during their communication, 64.71% of the HCPs found the terminology Very suitable, 29.41% found it suitable, and 5.88% found it Neutral).

94.12% of the respondents found their problem totally solved and only 5.88% found their problem partially solved. Table 8 shows some of HCP responses to the questions related to the problem solving.

Table 8. HCP responses to the questions related to the problem solving

HCP	Answer
HCP 1	so excellent, I call them if I need any helping
HCP 2	I feel better ,excellent center
HCP 12	they help me especially in doses, excellent center
HCP 15	they help us to know the suitable antidote and suitable doses
HCP 17	the problem not totally solved

All respondents contacted the DIC by phone, 17.65% of their questions were answered directly, and 64.71% needed 10 minutes to be answered, while 17.65% needed 30 minutes. There are many types of questions received by the DIC such as inquiries regarding indication and appropriate use of drugs, 47.06% were related to doses, 17.65% to toxicity, 5.88% to availability, 5.88% to side Effect, 5.88% to administration, 17.65% to drug -drug interaction.

HCPs were also asked about how long they have been using the Drug Information Center;17.65% were using it since less than 6 months, 52.94% since 6 months - 1 year, 23.53% said from 1 year - 4 years, and 5.88% said from 4 years - 7 years.

Figure 3 shows that 76.47% of the HCPs recruited in the study were Very satisfied of the Drug Information Center services and 23.53% were satisfied.

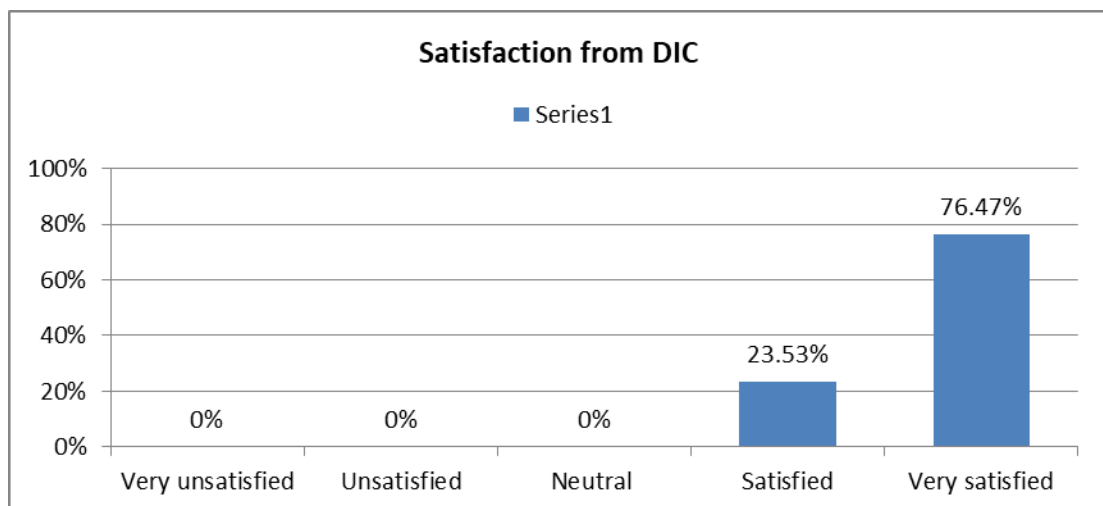


Figure 3. The satisfaction of (HCP) from DIC services

On the same line Figure 4 shows that 76.47% describe the DIC services to be Excellent, and 23.53% describe the services to be Very good.

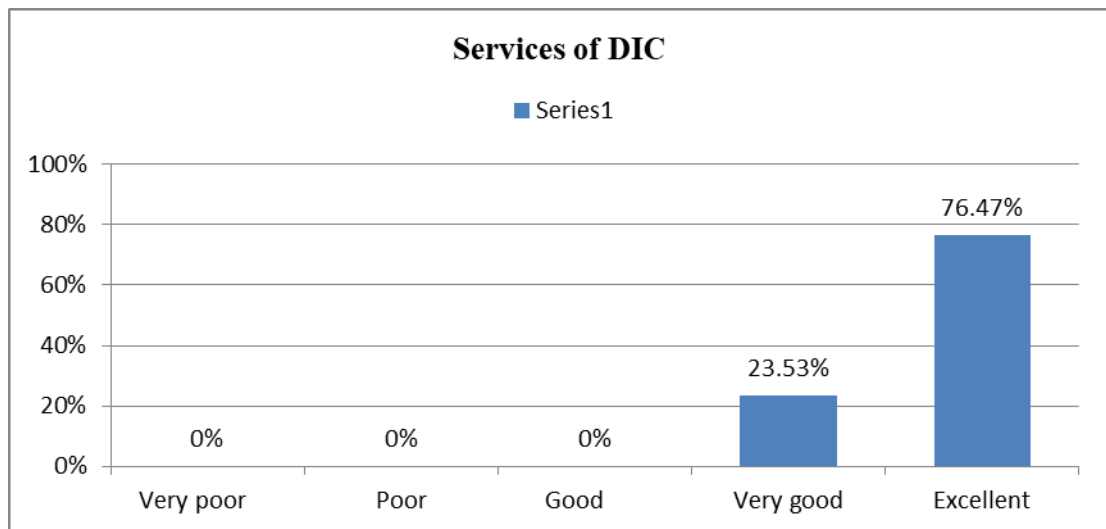


Figure 4. The description of DIC services by (HCP)

After trying to see if there is any significant difference between the members medical team (Physician, Pharmacist and Nurse) in their willingness to Seek the DIC services again in the future the results showed no significant difference (the p value >0.05). Table 9 shows the difference between the medical team (Physician, Pharmacist and Nurse) in their seeking the services again related to DIC.

Table 9. The Difference between the medical team in seeking the DIC services again

	Neutral	Likely	Very likely
Physician	0.0%	20.0%	80.0%
Pharmacist	0.0%	0.0%	100.0%
Nurse	12.5%	12.5%	75.0%

Table 10 shows the difference between the medical team (Physician, Pharmacist and Nurse) in the suitability of terminology, there was no significant difference in the suitability of terminology between HCP (P value >0.05).

Table 10. The Difference between the medical team in the suitability of terminology

	Neutral	Suitable	Very suitable
Physician	0.0%	40.0%	60.0%
Pharmacist	0.0%	50.0%	50.0%
Nurse	12.5%	12.5%	75.0%

Table 11 shows the percentage of Male and Female in the describing of DIC services (HCP).

Table 11. The difference between male and female in the description of DIC services (HCP)

	Very good	Excellent
Male	28.6%	71.4%
Female	20.0%	80.0%

Table 12 shows the percentage of Male and Female satisfaction of DIC (HCP).

Table 12. The difference between male and female in satisfaction of DIC (HCP)

	Satisfied	Very satisfied
Male	28.6%	71.4%
Female	20.0%	80.0%

In regards to patients' satisfaction survey that the results were gotten: 23 users to DIC were included from patient the percentage of male were 30.43% and for female were 69.57%, 95.65% of them are Jordanian and 4.35% from others nationality with different academic qualification (2ry/1ry 8.70%, Diploma/ BSc ,78.26% MSc/PhD ,13.04%).

Around 73.91% said they will highly recommend the drug information center to a friend or colleague and 26.09% said they will recommend the drug information center to a friend or colleague. Also, Figure 5 shows in general how DIC services meet patient needs.

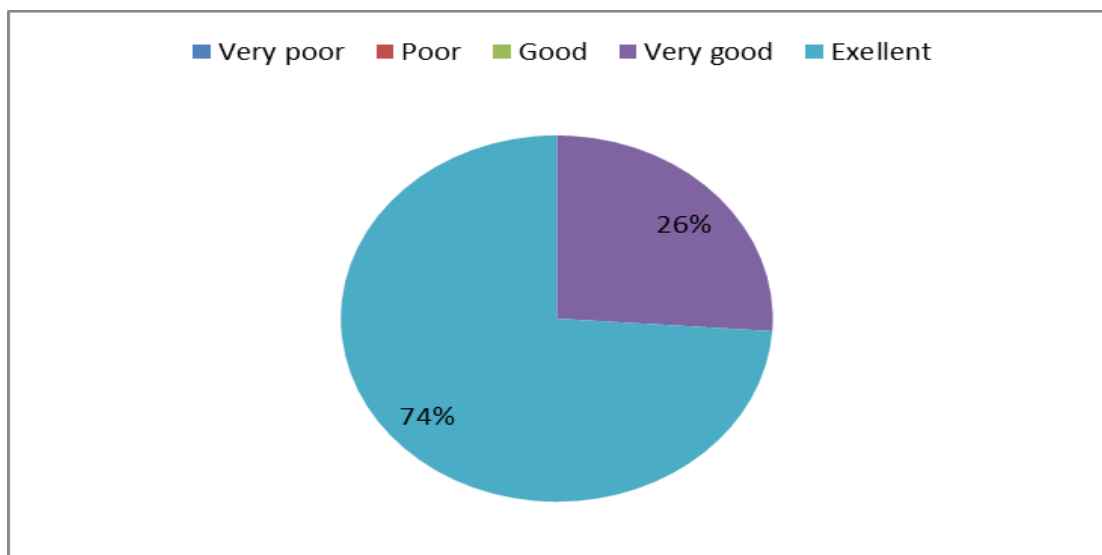


Figure 5. Describe the percentage of DIC services that meet patient needs

91.30% of patient said they will be Very likely to seek any of DIC services again, 8.70% said they will be Likely to seek any of their services again. All patients said that they receive enough information regarding their question and the information is clear and understandable and all of them use the information that got from the DIC.

According to the suitability of terminology used by DIC employee during their communication the answers were like this: (95.65% of patient said that the terminology is Very easy, 4.35% said that the terminology is Easy).

According to solving of problem 91.30% of patients their problem totally solved and 8.70% their problem partially solved. Table shows 13 some answers of patients according to solving of problem:

Table 13. Patients responses to questions according to solving of problem

Patient	Answer
Pat 1	I knew the suitable drug to avoid gluten allergy
Pat 2	I feel better
Pat 9	The UTI not totally disappeared
Pat 11	I used the doses and vitamins, excellent result
Pat 15	I knew the suitable education as a pregnant and I did not face any problem

All of patients contact the DIC by phone .Related to the time that DIC took to answer the questions reach from patients: 43.48% of patients were answered directly, 47.83% of patients were needs 10 minutes for answering, 4.35% of patients were needs 30 minutes for answering, and 4.35% of patients were needs one day for answering,. There are many types of questions received to DIC from patients such as take the indication and the appropriateness of drugs and doses 43.48%, Toxicity 17.65%, Availability 4.35%, Side Effect 13.04%, Drug -drug interaction 21.74%, also 4.35% for pregnancy and 13.04% for allergy.

About how long the patients have been using the Drug Information Center, 56.52% said less than one year, 39.13% said from 1 year - 4 year, 4.35% said from more than 4 years.

Figure 6 shows overall how patients are satisfied with DIC services; 86.96% of patients were Very satisfied from Drug Information Center services and 13.04% of patients were satisfied.

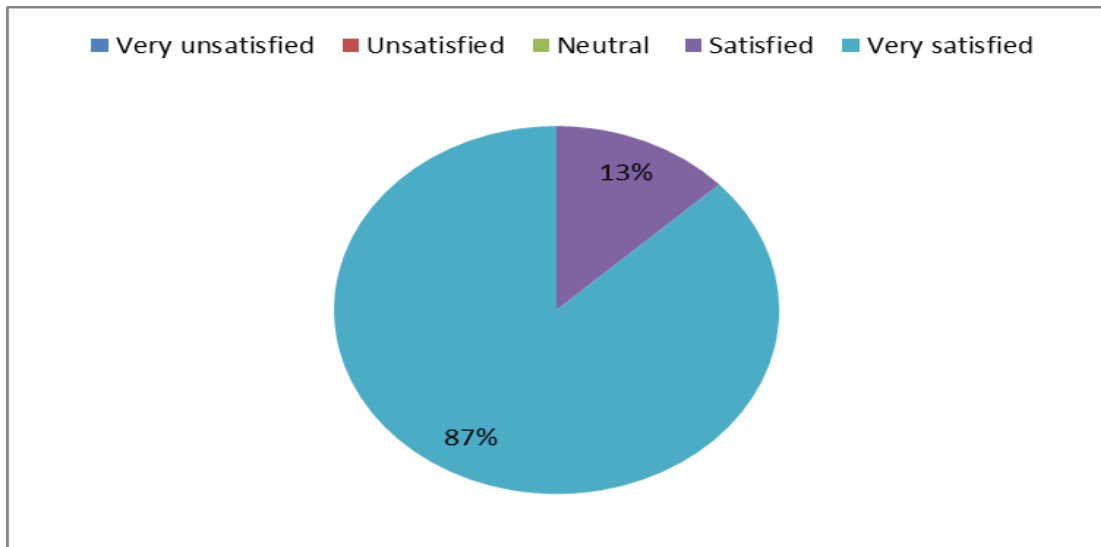


Figure 6. The satisfaction of patient from DIC services

Figure 7 shows in general, how patients would describe the DIC services; 86.96% of patients describe the DIC services is Excellent and 13.04% of patients describe the DIC services is Very good.

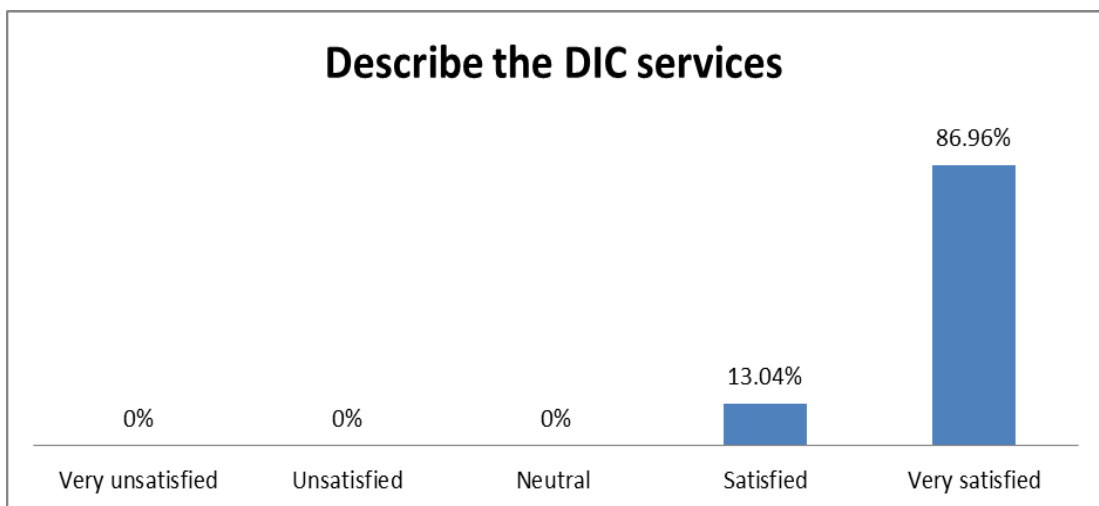


Figure 7. The description of DIC services by patient

Table 14 shows the difference between the patient (male and female) in describing the DIC services. Table 15 shows the patient (male and female) satisfaction percentage from DIC.

Table 14. The difference between male and female in the description of DIC services (patient)

	Very good	Excellent
Male	0%	100.0%
Female	18.8%	81.3%

Table 15. The difference between male and female in satisfaction of DIC (patient)

	Satisfied	Very satisfied
Male	0%	100.0%
Female	18.8%	81.3%

4.3 Simulation Cases

Simulation cases were submitted per each center with different levels of difficulty (easy, medium, and complicated). Table 16 shows the score of simulation cases after evaluation them according to the criteria that mention before.

Table 16. The assessment of simulation cases

Center number	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6
Center 1	0.00%	69.44%	69.44%	77.78%	83.33%	80.56%
Center 2	0.00%	0.00%	75.00%	77.78%	83.33%	94.44%

There were criteria for oral responses and for written responses. Table 17 and 18 shows the criteria for oral and written responses and their assessment score respectively. According to the criteria used in simulation cases there was a significant difference between criteria the P value <0.05 and T value <0.05.

Table 17. Criteria for oral responses and their assessment

Criteria number	Criteria	Mean score	Median score (0–4)
1	Does it need many times to reach the center by email or it respond from the first time?	4	4.00
2	Did the pharmacist who answers write him/her name?	4	4
3	Does the response have a discrete structure?	3.5	3.00
4	Are the concepts used in the inquiry, repeated in the reply?	3.75	3.5
5	Are words and concepts well explained or defined?	2.75	3.00
6	Is it easy for the reader to understand who should perform the described actions?	3.75	4.00
7	Are answers to the query given distributed or as one common conclusion?	3.75	4.00
8	Is it easy to find a concrete answer?	3.5	3.00
9	Did the pharmacist write the name of the reference that used?	0.75	0.00

Table 18. Criteria for written responses and their assessment

Criteria number	Criteria	Mean score	Median score (0–4)
1	Does it need many times to reach the center by email or it respond from the first time?	4	4.00
2	Did the pharmacist who answers write him/her name?	4	4
3	Does the response have a discrete structure?	3.5	3.00
4	Are the concepts used in the inquiry, repeated in the reply?	3.75	3.5
5	Are words and concepts well explained or defined?	2.75	3.00
6	Is it easy for the reader to understand who should perform the described actions?	3.75	4.00
7	Are answers to the query given distributed or as one common conclusion?	3.75	4.00
8	Is it easy to find a concrete answer?	3.5	3.00
9	Did the pharmacist write the name of the reference that used?	0.75	0.00

Table 19 shows the Median (Min-Max) for centers and there was no significant difference between them the P value >0.05.

Table 19. The difference between center 1 and center 2 in simulation cases

Center name	Number of cases	Median	Minimum	Maximum
Center 1	6.00	26.50	0.00	30.00
Center 2	6.00	27.50	0.00	34.00

Table 20 shows the Mean (+SD) of cases difficulty and there was a significant difference between them the P value <0.05.

Table 20. The difference between the levels of difficulty in simulation cases

	Case difficulty	Number of cases	Mean	SD
Total out of 36	Difficult	4	19.2500	12.86
Total out of 36	Medium	6	29.8333	2.22
Total out of 36	Easy	2	0.00	0.00

5 DISCUSSION

This is the first study evaluating the DIC services in Jordan. According to demographic information the total numbers of inquiries increases each year, an indication of the increased awareness to ward these centers and their importance in providing information to the community. The aim of this study was to evaluate the DIC by two methods (satisfaction survey and simulation cases) using qualitative data to collect more accurate and comprehensive results. Depending on the result from the satisfaction survey answered by HCPs, 76.47% were Very satisfied from the Drug Information Center services in Jordan and the rest were satisfied, moreover, 76.47% described the service provided as excellent and 23.53% described it as Very good.

On the other hand, the result of satisfaction survey answered by patients was as follow: 86.96% were Very satisfied from Drug Information Center services and the rest were satisfied. 86.96% described the DIC service as Excellent, and 13.04% described it as Very good. This shows that most of users were generally very satisfied from the DIC.

The mode of communications with the centers identified in our study is generally telephone-based, it is not surprising that most questions were asked and answered by the telephone device; Telemedicine appeared to be both a time and cost-saving alternative to clinic follow-up without compromise of the valuable patient-physician relationship. Le et al. (2019) reported that 90% of the patients that used the telemedicine service opted to use it again. Telemedicine has the potential to reduce wait times, and decrease costs.

Similar to telemedicine, Tele pharmacy has many recognizable benefits such as the easy access to healthcare services in remote and rural locations, economic benefits, patient satisfaction as a result of medication and information access in rural areas effective patient counseling and minimal scarcity of local pharmacist and pharmacy services (Poudel and Nissen, 2016)

Karimzadeh et al. (2018) reported that in university hospital DPIC most of the questions (80%) were asked and responses were provided by the telephone device.

The percentages of inquiries from HCP and patients that need 10 minutes for answering were 64.71% and 47.83% respectively. While the inquiries from HCP and patients were answering directly were 17.65% and 43.48% respectively. Also the inquiries from HCP and patients that needs 30 minutes for answering were 17.65% and 4.35% respectively. On the other hand the inquiries from patients that needs one day for answering were 4.35% but the inquiries from HCP that we got did not need one day for answering.

In our study the inquires that come from patient needs longer time to get answered in comparison to the HCPs questions Contrary to other observation. Aydin et al. (2019) reported that queries by physicians were identified to be the ones that took a longer time to answer (1 day or longer).

Patient counseling was reported to be rarely carried out in hospitals and community pharmacies in North Cyprus (Gültekin et al., 2019). In the absence of sufficient patient counseling, patients may tend to acquire their information from other resources, including DICs in North Cyprus, so most patient use the DIC in Cyprus for counseling. On the other hand, the number of community pharmacies in Jordan is rapidly growing, as is the number of registered pharmacists. This makes it easy for patients to get a consultation and access a wide range of healthcare services. It is therefore not surprising that 69.4% of the respondents indicated that pharmacists are their preferred source of information about medications. So most of questions and inquiries from patient to DICs in Jordan are more complicated and need more time for answering (Mukattash et al., 2018).

About 98% of queries in the Loghman-Hakim hospital DPIC in Tehran were answered within 30 min but in our study 64.71% were answered within 10 minutes for HCP and 47.83% were answered within 10 minutes for patients (Karimzadeh et al. 2018).

In India, 34% of queries were answered within 2-4 hours, 30% within the same day, and 23% within 1-2 days 32, while in Ethiopia only 41% were reported to be answered within the same day (Hailu et al., 2019).

There was a significant increase in the number of queries by years in Jordan. The average monthly queries in 2019 was 1374 per month; this rate is much higher than numbers reported from other developing countries (32 per month in north Cyprus DIC , 5-11 queries per month in 5 Ethiopian DIC's, 12 in Saudi Arabia, 27 in Uganda and 27 in Nepal).

There are many types of questions received to DIC in Jordan per year the majority of quires were about the availability of medication and their cost 41.40% , followed by dose administration 22.80% .On the other hand Zachariah et al. study in a rural secondary level care hospital, where they reported that the majorities of queries were about indication (68, i.e., 27%) and adverse effects (59, i.e., 24%) (Zachariah et al., 2012).

According to the satisfaction survey for HCP related for solving of problem the percentage of whom their problem totally solved was 94.12% and for whom their problem partially solved was 5.88%.Here some answers from the HCP; HCP1 responded “they help me especially in doses, excellent center”, HCP 2” this center is very good but the problem for my patient not totally solved”.

According to the satisfaction survey for patient related for solving of problem the percentage of whom their problem totally solved was 91.30% and for whom their problem partially solved was 8.70%. Here some answers from the patient; patient 1 said “I knew the suitable drug to avoid gluten allergy”, patient 2 said” I feel better”, patient 9 said ” The UTI not totally disappeared”.

Regarding to simulation cases, there were different levels of difficulty (easy, medium, and complicated) there was significant difference between levels of difficulty P value = 0.011, medium cases were the most cases that answered in correct way. It is expected that the easy cases will be answered more than other, the reason for this, that easy cases were not answer at all. The reason for that, the easy cases were sent by mail and the centers did not respond to the inquires send by mail. The cases that done by phone call all were answered otherwise the cases that done by mail 25% were answered.

The references that used to answer queries was mentioned once in one case, but the rest of the cases that were asked the references that used were not mentioned and this is considered to be a weakness. Because by mention the reference that used for answering the inquirer will generate a state of confidence between the center and inquirer. Aydin et al. reported that Electronic resources, i.e. Rxmedia, Drugs.com, and Up-to-date, were the most commonly utilized references for the provided responses (Aydin et al., 2019).

6 STRENGTH AND LIMITATION OF THE STUDY

The present study has some Strengths like: using different level of difficulty in the simulation cases which was more challenging, using two methods of evaluation for the DIC, and using Qualitative method for evaluation which giving more accurate and comprehensive information. On the other hand it has limitations like: two DICs agreed to participate in the study out of five; results cannot be extrapolated to the other centers, the study did not evaluate the awareness of the general community in Jordanians toward the DI centers in Jordan, and the study did not evaluate the impact of the provided DI on solid outcomes e.g. DRPs, BP, HbA1c, etc.

7 CONCLUSION

The evaluation of DIC in Jordan by Users experience and satisfaction survey and simulation cases, it is express that the users are satisfied from these centers. Also based on simulation cases with evaluating the centers two of centers did not mention the reference that used to answer the inquiries which is one of weak point to these Centers. Queries mostly involved availability of medications and cost, dose administration, general information, side effects, therapeutic choice, drug interactions, indications of medications, pregnancy and lactation. Most queries were asked by phone call and answered within 10. Future studies may show the importance of DIC and how to increase the awareness regarding DIC for HCP and patient.

Pharmaceutical services must be continually evaluated to maintain their development and updating and to achieve the best treatment outcomes.

Future studies should show the importance and the positive impact of these centers for medical staff and patients and their stakeholder and for all society, as well as a study on the how to increase the awareness about these centers to assure rational drug use and to achieve better treatment outcomes.

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9 APPENDICES

Appendix 1. Satisfaction survey for patient

Title: Evaluation of Drug Information Centre services along with the user utilization and satisfaction in Jordan: a mixed method study							
Questionnaire aim: To assess satisfaction of patients in terms of quality, understandability, timeliness, and easiness to reach alongside the impact of this type of informatics and decision support on patient outcomes and care provided.							
Variables:							
Dependent: Overall Satisfaction, Satisfaction related to (quality, understandability, timeliness, and easiness to reach), patient outcomes (unknown, problem solved, partially solved, unsolved)							
Independent: Gender, Age, Education level?							
Questionnaire Items: Open ended	Mode of Answers L: likert (specify e.g 5-1 extremely satisfied - not satisfied) O: Open Ended	Relavence , accuracy/specific, clarity, wording					Comments
		Excellent	Very Good	good	poor	Inappropriate	
1. What is your age in year?	a. 20-30 b. 31-40 c. 41-50 d. >50						Reference [1]
2. What is your gender?	a. Male b. Female						Reference [1]
3. What is your nationality?	a. Jordanian b. Others (Specify)						Reference [1]
4. What is your current academic qualification/literacy level?	a. Illiterate b. 2ry/1ry c. Diploma/BSc d. MSc/Phd						Reference [1]
5. What was the purpose of your last DI query? Whom was it concerning ?	O						Reference [3]
6. How likely you would recommend drug information center to a friend or colleague?	L:5 1. Highly unrecomnded	5	4	3	2	1	Reference [4]

		2.Unrecommended							
		3.Neutral							
		4.Recommende							
		5.Highly recommended							
7.	In general, how well do their services meet your needs?	L:5 1.very poor 2.Poor 3.Good 4.Very good 5.Excellent	5	4	3	2	1		Reference [4]
8.	For how long have you been using the Drug Information Center?	O							Reference [4]
9.	How likely are you to seek any of their services again?	L:5 1. Very unlikely 2. Unlikely 3. Neutral 4.Likely 5. Very likely	5	4	3	2	1		Reference [3]
10.	Do you feel you receive enough information regarding your question when you communicate with the drug information center ?	a.Yes b.No							Reference [3]
11.	Was the information you received from the drug information center clear and understandable?	a.Yes b.No							Reference [2]
12.	How do you find the terminology used by DIC employee during your communication?	L:5 1.Very difficult	5	4	3	2	1		Reference [2]
2									

		2.Dificult							
		3.Normal							
		4.Easy							
		5.Very easy							
13.	Did you use the information you had got from the DIC ? DIC?	1.Yes 2.No							Reference [3]
14.	What happened when you used the information provided from the DIC?	a. Problem solved b. Partially solved c. Not solved (specify why).....							Reference [4]
15.	How usually do you contact the DIC?	a. Email b. Phone call c. Social media d. Others (Specify)							Reference [3]
16.	When you contacted the DIC, did they respond directly or you needed to try multiple times before you reached them?	O							Reference [3]
17.	When you contacted the DIC, how much time did they take to answer your questions?	a. Directly b. 10 minutes c. 30 minutes d. 45 minutes e. One day f. Others (Specify)							Reference [3]
18.	Overall, how satisfied are you with Drug Information Center services?	L:5	5	4	3	2	1		Reference [4]
3									

		1. Very unsatisfied						
		2. Unsatisfied						
		3. Neutral						
		4. Satisfied						
		5. Very satisfied						
19.	In general, how you would describe their services?	L:5						
		1. Very poor						
		2. Poor						
		3. Good	5	4	3	2	1	Reference [4]
		4. Very good						
		5. Excellent						

Appendix 2. Satisfaction survey for (HCP)

Title: Evaluation of Drug Information Centre services along with the user utilization and satisfaction in Jordan: a mixed method study							
Questionnaire aim: To assess satisfaction of HCPs (Health care provider) in terms of quality, understandability, timeliness, and easiness to reach alongside the impact of this type of informatics and decision support on patient outcomes and care provided.							
Variables:							
Dependent: Overall Satisfaction, Satisfaction related to (quality, understandability, timeliness, and easiness to reach), patient outcomes (unknown, problem solved, partially solved, unsolved)							
Independent: Gender, Age, Profession?							
Questionnaire Items: Open ended	Mode of Answers L: likert (specify e.g 5-1 extremely satisfied - not satisfied) O: Open Ended	Relavance , accuraty/specific, clarity, wording					Comments
		Excellent	Very Good	good	poor	Inappropriate	
1. What is your age in year?	a.20-30 b.31-40 c.41-50 d.>50						Reference [1]
2. What is your gender?	a. Male b.Female						Reference [1]
3. What is your nationality?	a. Jordanian b. Others (spesify)						Reference [1]
4. What is your current academic qualification/ literacy level?	a.Diploma b.BSc c.MSc d.PhD						Reference [1]
5. What is your current job?	a.Physician b. Pharmacist						Reference [1]
1							

	c. Nurse d. Others (Specify)						
6. How much experience (work) in the medical field?	0						Reference [1]
7. What is the place where you work is it private or public hospitals?	1.Privat hospitals 2.Public hospitals						Reference [1]
8. In which unit or department do you work?	0						Reference [1]
9. What was the purpose of your last DI query?Whom was it concerning ?	0						Reference [3]
10. How likely you would recommend drug information center to a friend or colleague?	L:5 1.Highly unrecomended 2.unrecomended 3.neutral 4.recomended 5.Highly recomended	5	4	3	2	1	Reference [4]
11. In general,how well do their services meet your needs?	L:5 1. Very poor 2. Poor 3. Good 4. Very good 5. Excellent	5	4	3	2	1	Reference [4]
12. For how long have you been using the Drug Information Center?	0						Reference [4]
2							

13.	How likely are you to seek any of their services again?	L:5 1. Very unlikely 2. Unlikely 3. Neutral 4. Likely 5. Very likely	5	4	3	2	1	Reference [3]
14.	Do you feel you receive enough information regarding your question when you communicate with the drug information center ?	a.Yes b.No						Reference [3]
15.	Was the information you received from the drug information center clear and understandable?	a.Yes b.No						Reference [2]
16.	How do you find the terminology used by DIC employee during your communication as you are one of the health care provider team ?	L:5 1.Very suitable 2. Suitable 3.Neutral 4. Unsuitable 5.Very unsuitable	5	4	3	2	1	Reference [2]
17.	Did you use the information you had got from the DIC ?	1.Yes 2.No						Reference [3]
18.	What happened when you used the information provided from the DIC?	1.Problem solved 2.Partially solved 3. Not solved (specify why).....						Reference [4]
19.	How usually do you contact the DIC?	1. Email						Reference [3]
3								

		2. Phone call 3. Social media 4. Others (Specify)						
20.	When you contacted the DIC, did they respond directly or you needed to try multiple time before you reached them?	O						Reference [3]
21.	When you contacted the DIC, how much time did they take to answer your questions?	a. Directly b. 10 minutes c. 30 minutes d.45 minutes e. One day f. Others (Specify)						Reference [3]
22.	Overall, how satisfied are you with Drug Information Center services?	L:5 1. Very unsatisfied 2. Unsatisfied 3. Neutral 4. Satisfied 5. Very satisfied	5	4	3	2	1	Reference [4]
23.	In general,how you would describe their services?	L:5 1. Very poor 2. Poor 3. Good 4. Very good 5. Excellent	5	4	3	2	1	Reference [4]
4								

Appendix 3. Simulation cases


Simulation Cases

No	Who will ask	The level of case	The scenario	The answer	Evaluation of the case out of 5
1	physician	complicated case	<p>I have pregnant woman (7week +4 days) who has been using multiple medications. She is 28 years old pregnant women reported to have a history of hypothyroidism, Diabetes, and severe depression (2 previously recorded suicide attempts),she is using the following medication:</p> <ul style="list-style-type: none"> • Levothyroxine(Levothyroxine 100mcg) • Aspirin(Acetylsalicylic acid)100mg • Vitamin B12 • Metformin • Omega 3 and multivitamin • Paroxetine(Paroxat 40mg) <p>I want to ask about the teratogenicity of each other?</p>	<ul style="list-style-type: none"> • Levothyroxine ((category A, save in pregnancy)) • Aspirin ((category C:low dose use indicated as antiplatelet in patients with low risk condition)) • Vitamin B12((category C :it is not known whether vitamin-12 will harm an unborn baby, literature recommend in presence of deficiency)) • Metformin((category B ; studies don't show risk of harm • Omega 3 and multivitamin ,category B Studies don't show risk of harm • Paroxetine category D/X studies show positive evidence of human fetal risk ,use recommended only if potential 	

				<p>outweigh potential risk</p> <p>An attempt to tapering Paroxetine was reported within the 7 th weeks yet not succeeded due to patient incomppliance and potential for depression worsening.</p>	
2	physician	easy case	<p>My patient male(50 years old has DM,HTN,Glaucoma) takes multimедication: Crestor(Rousvastatin 10 mg),Cadiovan(Valsartan,Hydrochlorothzide 80/12.5 mg),Metformin(1000 mg) ,Xalatan(Lansoprazol 30mg),Vesicare (Solifenacin5mg),Xalatan(Lantoprost),Carteol(Carteolol)</p> <p>I want to ask about any drug-drug interaction between his drugs?</p>	<p>There is no drug-drug interaction</p>	
3	patient	easy case	<p>My name is (Mr.x)and I using two eye drops; they have different brand names I want to be sure that I can use them together. (I have a bacterial inflammation in my eyes started before 2 days, the physician prescribed me one of them and my friend gave me the second so I want to be sure (Tobracin,Tobrastill)</p>	<p>The eye drops are have the same scientific name should stop one of them</p> <p>Tobramycin is the active ingredient</p>	
4	patient	Medium level	<p>I want to ask about adverse the drug reaction to Paxil (Paroxetine)?</p>	<p>Constipation, diarrhea, dizziness, drowsiness and, insomnia so you should take it in morning. Please know that you might not experience any of these adverse</p>	

				effects. You might experience any of them; remember to inform your doctor.	
5	pharmacist	Medium level	A patient has opened the insulin (vial?) and kept it at room temperature for 24 hours. Can the patient use the insulin again or it should be discarded?	Yes, he can use it. Insulin can be kept at room temperature for 4 week and use it, after that it should be discarded.	
6	nurse	Medium level	What is the shelf life of liquid amoxicillin? How should I store amoxicillin suspension?	Once water is added at the pharmacy the suspension has a shelf life of 14 days for most brands. It is best stored in the refrigerator. However, most types of plain amoxicillin will be ok at room temperature.	

Appendix 4. IRB approval


General Director Office
مكتب المدير العام
هاتف: (٩٦٢-٢) ٧٢٠٠٦٠٠ | فاكس: (٩٦٢-٢) ٧٠٩٥٧٧٧ | البريد الإلكتروني: ٢٢١١٠@kauh.jo

Ref: 13/3 / 2134

Date: 10-9-2019

To: Assist. Prof. Dr. Abdikarim Abdi
Near East University
Department of Clinical Pharmacy
Email: abdikarim.abdi@neu.edu.tr

الرقم :
التاريخ :
للتوافق :

Dear Doctor,

In reference to the scientific research which is presented by **Roua Awni Al Dalaeen**, who is a MSc Clinical Pharmacy candidate/ Near East University, North Cyprus, under supervision of Dr. Abdikarim Abdi/ Near East University, and Dr. Oriana Awwad/ University of Jordan, entitled:

Evaluation of drug information Centre services along the user utilization and satisfaction in Jordan: a mixed method study

We would like to inform you that the IRB Committee has granted **Roua Al Dalaeen** the approval to conduct her proposal in the Jordanian Community for the purpose mentioned above, in coordination with Pharmacy Department at KAUH, under the following conditions:

1. Commitment to the Scientific Research Policy at Jordan University of Science and Technology and King Abdullah University Hospital.
2. Maintaining data confidentiality and using it only for scientific purposes.
3. Consent form is required.
4. This approval will be canceled if the principle investigator doesn't provide IRB with the final executive study report about the results of the research after six months.

Sincerely,



Prof. Mohammad Al-Ghazo

CEO KAUH

Ref: 35/126/2019, date 05.09.2019

Date: ٥ . ٩ . ٢٠١٩

CEO/ King Abdullah University Hospital

In reference to the scientific research which is presented by **Roua Awni Al Dalaeen**, who is a MSc Clinical Pharmacy candidate/ Near East University, North Cyprus, under supervision of Dr. Abdikarim Abdi/ Near East University, and Dr. Oriana Awwad/ University of Jordan, entitled:

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1. Commitment to the Scientific Research Policy at Jordan University of Science and Technology and King Abdullah University Hospital.
2. Maintaining data confidentiality and using it only for scientific purposes.
3. Consent Form is required.
4. This approval will be canceled if the principle investigator doesn't provide IRB with the final executive study report about the results of the research after six months.

Regards,

Prof. Yousef Al-Gaud

Chairman of the Institutional Review Board

M.R/ Committee Coordinator

Tel.: 962-2-7200610 Fax: 962-2-7095777 P.O. Box: 63000 Irbid 22110 Jordan Email: irb@kauh.jo

Appendix 5. Open-ended question for (HCP) in arabic

يشكل عام هل ترى خدمات المركز تلبية رغباتك؟	مركز ممتاز جدا	مركز ممتاز جدا
ماذا حصل عندما استخدمت المعلومات الدوائية التي حصل عليها من المركز ؟	ساعدوني في تجنب التفاعلات الدوائية	مشكلتي حلت
بالمجمل ما مدى رضاك عن خدمات مركز المعلومات الدوائية؟	انا راضي جدا عن المركز	جيد جدا
عندما تتصل بمركز المعلومات الدوائية, هل تحتاج أن تتصل فيهم أكثر من مرة أم من المرة الأولى تتم الإجابة عليك؟	منذ المرة الأولى	منذ المرة الأولى
منذ متى تتصل بمركز المعلومات الدوائية ؟	تقريبا شهر	منذ سنة واحدة
ما هو سبب استفسارك وسؤالك ولمن كان هذا السؤال؟	من اجل التفاعلات الدوائية لاحد المرضى	الجرعات الدوائية لبعض الادوية وبدائل بعض الادوية للمرضى
في أي قسم تعمل؟	قسم الجلدية	قسم الجلدية
كم مدة خبرتك بالقطاع الطبي؟	سنتان	سنتان
Open Ended Question	1	2

مركز ممتاز جدا انا راض عنهم	مركز ممتاز جدا	مركز ممتاز جدا انا راض عنهم	مركز جيد بالمجمل	ممتاز
لقد ساعدونا لمعرفة نواة مضاء السمية و الجرعة المناسبة له للمرضى	المشكلة لم تحل تماما	لقد عرفت اهم التفاعلات الدوائية وتجنبها مركز ممتاز	مشكلتي حلت	المشكلة حلت
كثير من رائع	اكثر من رائع	راضي جدا	مركز ممتاز جدا سوف اتصل فيهم بحال اختجهم مرة اخرى	مركز رائع
منذ المرة الاولى	منذ المرة الاولى	منذ المرة الاولى	منذ المرة الاولى	منذ المرة الاولى
سنة واحدة تقريبا	سنة واحدة تقريبا	سنة واحدة	منذ خمسة اشهر تقريبا	منذ اربع سنوات
من اجل الجرعات وسمية الادوية	سبب استخدام بعض الادوية وجرعاتها للمرضى	التفاعلات الدوائية لادوية والذي	سؤال من ممرضة عن الجرعة للحامل D المناسبة لفاتيمن	مناخا لتفاعلات الدوائية
قسم الطوارئ	قسم الطوارئ	قسم الطوارئ	صيدلية المرضى الداخلية	قسم الباطني
خمس سنوات	خمس سنوات	27 سنة	11 سنة	سنوات 10
3	4	5	6	7

ممتاز جدا	جيد جدا	ممتاز جدا	ممتاز جدا	ممتاز جدا
المشكلة حلت	المشكلة حلت تماما	المشكلة اختفت	المشكلة حلت	لقد علمت المضاد السمي المناسب لدواء معين لطفل صغير
لقد ساعدوني خاصة في معرفة الجرعات المناسبة للأدوية مركز ممتاز	المركز جيد جدا	ممتاز جدا	مركز رائع جدا	ممتاز جدا
من المرة الثانية	من المرة الاولى	من المرة الاولى	من المرة الاولى	من المرة الاولى
منذ سنتان	قبل اسبوع	سنة واحدة	3 سنوات	ست سنوات
معلومات عن الجرعات الدوائية للمرضى	عن وجود هرمون الذكورة	هل يستطيع اعطاء ابني دواء لانه يعاني من (nexium) نوع معين من الحساسية	عن سمية دواء معين وما حل المشكلة	عن سمية بعض الادوية للاطفال
قسم النسائية	قسم الجراحة	قسم الطوارئ	قسم الباطنية	قسم الطوارئ
4 سنوات	30 سنة	شهر	3 سنوات	8 سنوات
8	9	10	11	12

ممتاز	ممتاز جدا	ممتاز جدا	جيد جدا بالمجمل	جيد جدا بالمجمل
لقد انتهت مشكلتي	لقد ساعدوني لحل مشكلتي	مشكلتي حلت	المشكلات حلت	المشكلات حلت
اتمنى ان يكون هناك العديد من هذه المراكز ولايتها تساعد كثيرا	ممتاز جدا	انا معجب بخدماتهم	مركز جيد جدا	مركز رائع
منذ المرة الاولى	منذ المرة الاولى	منذ المرة الاولى	منذ المرة الاولى	منذ المرة الاولى
سنة واحدة	سنة واحدة	سنتان	سنة واحدة	سنة واحدة
الادوية المناسبة لمريض عنده نقص في الازيم G6PD	الجرعات المناسبة لادويته	معلومات عن الجرعات الدوائية للمرضى	كيفية اعطاء التغذية الوريدية الكلية لاحد المرضى	التاثيرات الجانبية لادويته
طبيب عام في قسم الباطنية	قسم الطوارئ	قسم الطوارئ	قسم الطوارئ	قسم الطوارئ
سنة واحدة	سنة واحدة	سنة ونصف	10 سنوات	سنتان
13	14	15	16	17

Appendix 6. Open-ended question for patient in arabic

يشكل عام هل ترى خدمات المركز تلي رغباتك؟	نعم كثيرا	مركز ممتاز يستحقون الافضل دائما يساعدونني	مركز ممتاز جدا
ماذا حصل عندما استخدمت المومومة الدوائية التي حصل عليها من المركز ؟	اشعر بتحسن كبير	مشكلتي حلت تماما	لقد عرفت الجرعات المناسبة لاطفالي لقد ساعدوني بحل مشكلتي
بالمجمل ما مدى رضائك عن خدمات مركز المعلومات الدوائية؟	مركز ممتاز جدا	لو استطيع ان اعطيهم اكثر من تقييم 5 سوف اعطيهم مركز رائع جدا	ممتاز جدا
عندما تتصل بمركز المعلومات الدوائية، هل تحتاج أن تتصل فيهم أكثر من مرة أم من المرة الأولى تتم الإجابة عليك	من المرة الأولى	من المرة الأولى	من المرة الأولى
منذ متى تواصل مع مركز المعلومات الدوائية ؟	4 سنوات	سنة واحدة	سنتان
ما هو سبب استفسارك وسؤالك ولمن كان هذا السؤال؟	الجرعات الدوائية لاطفالي	عن الاثار الجانبية	الجرعات الدوائية لاطفالي
Open Ended Question	1	2	3

انا راضي جدا عن المركز	جيد جدا	خدمات ممتازة	خدمات ممتازة	جيد جدا	خدماتهم جيدة جدا
لم اواجه اي مشكلة تتعلق بالتفاعلات الدوائية	سؤالي واستفساري تمت الاجابة عليه	لقد استخدمت الفايتمات بالجرعات الممطاة فتحسننت كثيرا	المشكلة حلت	الحساسية اختفت	المشكلة حلت
انا راض عن المركز وممتن لهم	اقدر عملهم وجهدهم	خدمات ممتازة	رائع	اكثر من رائع	رائع جدا
منذ المرة الاولى	منذ المرة الاولى	منذ المرة الاولى	منذ المرة الاولى	منذ المرة الاولى	منذ المرة الاولى
ثمنة واحدة	6 اشهر	3 سنرات	5 اشهر	3 اسابيع	5-6 اشهر
التفاعلات الدوائية لادويتي	الجرعات الدوائية لو الادي	الفايتمات والجرعات المناسبة لاطفالي	العناية بوجهي وجماله	حساسية في وجهي	التفاعلات الادوية لادويتي
4	5	6	7	8	9

مركز ممتاز جدا	جيد جدا	جيد جدا	بالمجمل مركز جيد جدا	خدماتهم رائعة جدا
لتخبروني بالادوية الخالية من الجلوتين وحلت مشكلة ابني	حفيدتي يشعر بتحسن	حلت مشكلتي	التهاب البول لم يذهب تماما	يشكرون على ادويتي الشهريه مشكلتي حلت
اكثر من رائع	معجب بخدماتهم	جيد جدا	جيد جدا	ممتاز
منذ المرة الاولى	منذ المرة الاولى	منذ المرة الاولى	منذ المرة الاولى	منذ المرة الاولى
4-5 اشهر	شهر واحد	شهر واحد	سنتان	4-5 اشهر
لمعرفة gluten حساسية الاذوية المناسبة لابنها	حفيدها مصاب بضعف دم ما هي الادوية التي يجب اعطائها بهذه hg11الحالة	التفاعلات الدوائية لدوية ابني	اعاني من التهاب البول و ارردت معرفة الادوية المناسبة لي	اعاني من السكري لاكثر من عشر سنوات يساعدونني بتشيك ادويتي الشهرية
10	11	12	13	14

اذا واجهة اى مشكلة سوف اتصل بهم لانهم مركز رافع جدا	ممتاز	ممتاز	ممتاز	ممتاز	ممتاز
اخبروني بالادوية المناسبة والخالية من الجلوتين	الشعر يتحسن	ما زال سكر الدم عالي يجب ان اذهب للطبيب	مشكاتي حلت	لم اعاني من اى اثار جانبية حلت مشكاتي	
رافع	رافع جدا	جيد جدا	جيد جدا	راض عنهم	
منذ المرة الاولى	منذ المرة الاولى	منذ المرة الاولى	منذ المرة الاولى	منذ المرة الاولى	
منذ اسبوعين	3 شهور	سنتين	3 سنوات	5 سنوات	
حساسية ابنتي من gluten	اعاني من ضعف في عضلة القلب لمعرفة التفاعلات الدوائية لادويتي وما هي الفايتمينات المناسبة لي	اعاني من السكري لتشبيك ادويتي	تفاعلات دوائية متعلقة بأدوية أمي	الاثار الجانبية لادويتي	
15	16	17	18	19	

ممتاز	ممتاز	ممتاز	ممتاز
مشكلكي حلت	حلت مشكلكي ووجدت ادويتي	مشكلكي حلت	اختروني بالادوية المناسبة لي لم واجه اي مشكلة
ممتاز	راض	ممتاز	ممتاز
منذ المرة الأولى	منذ المرة الأولى	منذ المرة الأولى	منذ المرة الأولى
اسبوع واحد	شهر واحد	سنتان	3 اشهر
لمعرفة الاثار الجانبية لادويتي النفسية	لمعرفة انا ادويتي موجودة ام مقطوعتهن السوق	كيف اخذ ادويتي	انا حامل لمعرفة الادوية المناسبة لي
20	21	22	23

Appendix 7. Open-ended question for (HCP) in english

Q8: In general, how well do their services meet your needs?	this center so excellent	this center so excellent
Q7: What happened when you used the information provided from the DIC?	help me to avoid drug-drug interaction	my problem solved
Q6: Overall, how satisfied are you with Drug Information Center services?	I am so satisfied	very good center
Q5: When you contacted the DIC, did they respond directly or you needed to try multiple times before you reached them?	from the first time	from the first time
Q4: For how long have you been using the Drug Information Center?	around one month	from 2018, for one year
Q3: What was the purpose of your last DI query? Whom was it concerning?	for drug-drug interaction for patient	doses for some medication for patients and the suitable alternative drug
Q2: In which unit or department do you work?	Dermatology unit	Dermatology unit
Q1: How much experience (work) in the medical field?	2 years	2 years
Open Ended Question	1	2

so excellent, I am so satisfied	very good actually	so excellent, I am so satisfied	yes, good center overall	so excellent
they help us to know the suitable antidote and suitable doses	the problem not totally solved	I knew the major drug-drug interaction, problem solved	my problem solved	problem solved
a wonderful center	gorgeous	I am satisfied	so excellent, I call them if I need any helping	a wonderful DIC
from the first time	from the first time	from the first time	from the first time	from the first time
around year	around year	from 2019	around 5 months	from 2016 (4 years)
for doses and toxicity	label of uses and for doses for patient	drug-drug interaction for his father	using vitamin D for pregnancy and the suitable dose for question from nurse	for drug-drug interactions
Emergency unit	Emergency unit	Emergency unit	in patient pharmacy	internal unit
5 years	5 years	27 years	11 years	10 years
3	4	5	6	7

	so excellent	very good at all	so excellent	so excellent	so excellent
	problem solved	problem totally solved	my problem disappeared	problem solved	I knew the suitable dose to the antidote for children
	they help me specially in doses, excellent center	this center is very good	excellent	a wonderful DIC	so excellent
	may be from the second time	from the first time	from the first time	from the first time	from the first time
	from 2018(2 yrs.)	before one week	1 year	3 years	6 years
	for doses for patients	availability of testosterone vial for patient	person has allergy for some drug and she need to know if she can give him Nexium	about poisoning for patient	toxicity for pediatric patient
	gynecology unit	surgery unit	Emergency unit	Internal unit	Emergency unit
	4 years	30 years	1 month	3 years	8 years
8	8	9	10	11	12

	so excellent	so excellent	so excellent	very good at all	very good at all
	problem solved	help me to solve the problem	problem solved	problem solved	problem solved
	I hope to have many of these center it will help alot	so excellent	like their services	very good center in general	a wonderful DIC
	from the first time	from the first time	from the first time	from the first time	from the first time
	1 year	1 year	2 years	1 year	1 year
	G6PD Deficiency for patient the suitable drug	right doses for him self	doses for patient	TPN for patient how to administrate	side effects for him self
	General in Internal unit	Emergency unit	General in Emergency unit	surgery unit	Emergency unit
	1 year	1 year	1.5 year	10 years	2 year
13	13	14	15	16	17

Appendix 8. Open-ended question for patient in english

Q6: In general, how well do their services meet your needs?	yes, too much	yes, of course, the desire the best because help me too much	it is excellent center
Q5: What happened when you used the information provided from the DIC?	I feel better	my problem totally solved	I knew the right doses for my children, there is no problem
Q4: Overall, how satisfied are you with Drug Information Center services?	it is excellent center	if I can give them more than 5, I will do	so excellent
Q3: When you contacted the DIC, did they respond directly or you needed to try multiple times before you reached them?	from the first time	from the first time	from the first time
Q2: For how long have you been using the Drug Information Center?	4 years	1 year	2 years
Q1: What was the purpose of your last DI inquiry? Whom was it concerning?	Doses for her children	side effects	Doses for her children
Open Ended Question	1	2	3

I am so satisfied	very good	excellent services	their services so excellent	very good services	their services very good
I don't face any problem about drug-drug interaction	my question solved	I used the doses and vitamins, excellent result	problem solved	allergy gone	problem solved
I am so satisfied and thankful	I appreciate their working	excellent services	gorgeous	a wonderful	a wonderful
from the first time	from the first time	from the first time	from the first time	from the first time	from the first time
1 year	6 month	3 years	5 month	3 weeks	5-6 month
drug-drug interaction for him self	doses for her parents	doses for her child's and the suitable vitamins	for her face beauty	allergy on her face	drug-drug interactions for her
4	5	6	7	8	9

	excellent services they give me all the information I need	very good	very good	in general, this center helps me, very good services	their services so excellent
	they told me about the drugs free of gluten and my problem solved	he felt better	problem solved	the UTI not totally disappeared	they rechecked for me; my problem solved
	gorgeous	like their services	very good center	very good center	excellent
	from the first time	from the first time	from the first time	from the first time	from the first time
	4-5 month	1 month	1month	2 years	4-5 month
	allergy for gluten to know the medication fee from gluten to her son	for her grandson his Hg 11 what should he take	drug-drug interaction for her son	she had UTI and want to know the right medication	to check the right medication for DM more than 10 years
10	11	12	13	14	

	excellent center	this center so excellent	excellent	excellent
	problem solved	problem solved I found my medications	problem solved	I knew the suitable education as a pregnant and I did not face any problem
	excellent	satisfied	excellent	excellent
	from the first time	from the first time	from the first time	from the first time
	1 week	1 month	2years	3 month
	for side effect of his medication (Psychiatric drugs)	availability of his drug	How to take her medication	she is pregnant to know the suitable medication
20		21	22	23

Appendix 9. Roua Dala'en (CURRICULUM VITAE)

Roua Dala'en

(Doctor of Pharmacy)

- Date /Place of Birth: Dec 25, 1993 /Amman, Jordan
- Nationality: Jordanian
- Marital status: Married

THE PHARM.D CURRICULUM

Is designed to produce a scientifically and technically competent pharmacist who can apply this education in such a manner as to provide maximum health care services to patients. Students are provided with the opportunity to gain greater experience in patient close cooperative relationships with health practitioners. It is the goal of all pharmacy schools to prepare pharmacists who can assume expanded responsibilities in the care of patients and assure the provision of rational drug therapy.

CONTACT

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EMAIL:
Ruaaawni1993@hotmail.com

LANGUAGES

- Arabic (Mother tongue).
- English (Speaking, writing, and reading).

EDUCATION

B.Sc. in Doctor of Pharmacy (Pharm.D.)
University of Jordan [2011 – 2017]
Faculty of Pharmacy
Amman, Jordan
Grade: Very Good

M.Sc. in Clinical Pharmacy
Near East University [2018 – 2019]
Faculty of Pharmacy
Lefkosa, Northern Cyprus
Grade: Excellent

FIELD OF INTERESTS

- Clinical Pharmacy: **[Key Words]:** Pharmacotherapy, Clinical Pharmacy, Pharmacy Practice, Pharmacy Education.

WORK AND PRACTICE EXPERIENCES

Al-Esraa hospital [Work]
[Nov 2017 – Aug 2018]

Al-Hanan hospital [Work]
[May 2017 – Aug 2017]

Ainadeen-pharmacy [Practice]
[July 2016 – Jan 2017]

Jordanian Royal Medical services [Practice]
[Jan 2015 – Feb 2015]

Mada Al-Hayah [Practice]
[June 2014 – Aug 2014]

Al-Hayah Pharmacy [Practice]
[June 2013 – Aug 2013]

RESPONSIBILITIES

- To give the patient the right drug and the right dose.
- Prepare medications and give OTC and prescribed drugs.
- Communicate with patients and make counseling.
- Marketing skills to sell a drug.

RESEARCH EXPERIENCE

- Research Group focuses on examining the possible effects of Metformin on the antidepressant and/or anxiolytic among Polycystic Ovary Syndrome (PCOS) patients.
- Research Group focuses on Evaluation of TGC Plus Cream.
- Evaluation of drug information Centre services along the user utilization and satisfaction in Jordan: a mixed method study

CERTIFICATES

- Received Certificate for attending the course of injection, University of Jordan.
- Received Certificate for attending the course of ECG, University of Jordan.
- Received Certificate for attending the course of suture wounds, University of Jordan.
- Received Certificate for attending the course with the theme entitled "Experimental Animal Models Course: From Gene to Function", Near East University.

SKILLS

- Excellent in using Computer Software (Microsoft Word, Excel, PowerPoint, Access).
- Excellent in Statistics with SPSS Software.
- Excellent communication skills (Excellent Arabic and English communication skills).
- Excellent Writing and presenting reports.
- Research experiences and technical skills in different laboratory tools, in vitro and in vivo experiments
- Excellent in Data and information collection.
- Highly organized and methodical member of a productive team.
- Ability to work under pressure and full-time work.

PS. References and Certificates are available upon request.