

## PHARMACEUTICAL CARE IMPLEMENTATION: PHYSICIANS' KNOWLEDGE, AWARENESS, ATTITUDE, AND PRACTICE STUDY, GEZIRA STATE, SUDAN

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### ABSTRACT

Pharmaceutical care, basically targets improvement of patients' therapeutic outcomes and quality of life. This study aimed to explore physicians' awareness, attitude, knowledge and practice of pharmaceutical care implementation in four public Hospitals in Central Sudan. A prospective-hospital-based study was carried out in which a pre-structured and pretested questionnaire consisting of twenty one (21) closed - ended questions was used to address 150 physicians. Response rate was 74(49%). A bare majority 39(53%) of respondent physicians were familiar with the term pharmaceutical care; whose majority 41(55%) appreciated its importance and its goals 67 (90.5%). A clear majority of respondents 57 (77%) mentioned that pharmaceutical care was not practically implemented in their area of

practice. Most of the respondent physicians 47 (63.5%) agreed that there were many barriers impairing the implementation of pharmaceutical care, such as: lack of pharmacists personnel and their poor clinical training, pharmacist role and responsibilities were not well defined. Moreover, respondents showed poor trust in pharmacists' knowledge of medications, though 27(36.6%) of them considered pharmacists as their main sources of medication information and a majority of respondent physicians 47(63.5%) usually refer to pharmacists when facing drug problems. Respondents occasionally 41(55.4%) ask pharmacists' for generic

substitutions. That reflected and pointed to respondents' rather unsatisfactory inter-professional collaboration with pharmacists. It could be concluded that inter-professional collaboration and cooperation between physicians, pharmacists and national health care authorities, must be well instituted and all the barriers for the full implementation of pharmaceutical care be removed. Cross tabulation done showed no significant correlations.

**KEYWORDS:** Physicians, Pharmaceutical Care, Implementation, Sudan.

## INTRODUCTION

Pharmacists play an important role in any community as they take responsibility for patient's medicine related needs, and are recognized as the most available, freely and easily accessible healthcare care team members.<sup>[1]</sup> However, the classical practice and responsibilities of pharmacists was only the availability, storage, compounding, dispensing of medicines and providing patients with information about their drugs' uses.

Recently, there is a global increase in the aging population, co-morbidities, and lifestyle chronic diseases which led to 50% increase in deaths.<sup>[2]</sup>

Moreover, there is a global increase in antibiotics resistance and their irrational use, as well.<sup>[3-5]</sup>

There is also a global increase in poly-pharmacy, and its ensuing drug- interactions, irrational use of costly medications, prescribing faults, prescription errors, preventable adverse drug events, poor patients' adherence and a substantial global increase in the volume of medicines use. All that led to an increase in the physicians' work load, deterioration in patients' health outcomes, and an overall economic toll of disease management for both the individual patients and their communities.<sup>[6-10,7,11-14]</sup>

All that called for a new pharmacy practice to respond to patients' needs of actualizing their treatment therapeutic outcomes and improvement of quality of life.

This accordingly led to the introduction of the pharmaceutical care as a new mode of pharmacy practice, which gives the pharmacist the open stage for contribution as an important member of the healthcare team. Accordingly, pharmacists started assuming increasingly critical roles in modern health care, providing education, direct patient care and advocacy. To patients this means that pharmacists are there to help improve their health and

quality of life. It is well known that pharmacists are the most accessible health care professionals in every community.

They provide free education, medication management and professionally responsible service to patients.<sup>[15]</sup> Based on this new change in pharmacy practice, and according to the new pharmacists' accepted responsibilities, which are stipulated by the pharmaceutical care new mode of pharmacy practice, the role of the pharmacists is no longer limited to dispensing the proper medication and the mere provision of medication information. He/she is responsible for actualizing the targeted therapeutic outcomes of the patient's treatment, while securing patients' safety and education and quality of life.<sup>[16]</sup>

These new responsibilities call for inter-professional collaboration between all the members of the healthcare team specially the pharmacists, physicians, patients and nursing staff.<sup>[17,18]</sup>

The term pharmaceutical care (PC) was born and first introduced in 1980, but the definition and the concepts which are most widely used today were formulated and presented by Hepler and Strand at the "Pharmacy in the 21<sup>st</sup> Century Conference" in 1989.<sup>[19]</sup> Hepler and Strand defined pharmaceutical care as "the responsible provision of drug therapy for the purpose of achieving definite outcomes that improve a patient's quality of life".<sup>[20]</sup>

This definition was later published in the seminal article opportunities and responsibilities in pharmaceutical care. With that article, the concept of pharmaceutical care was understood worldwide, but its implementation is far from universal and so it remained not as highly developed in reality. This definition, to a greater degree, focused on the responsibility and commitment of the practicing pharmacist. These outcomes are, cure of a disease; elimination or reduction of a patient's symptomatology; arresting or slowing of a disease process; and/or preventing a disease or symptomatology.<sup>[21]</sup> In 1998 the World Health Organization (WHO) defined pharmaceutical care as: "a system that continually observes the short-term results of the therapy in progress and helps to make corrections to improve management outcomes". The term requires multidisciplinary approach by almost all the members of the healthcare professionals (HCPs) team, which normally consist of the patient, pharmacist, physician and nursing staff.<sup>[22]</sup> Pharmaceutical care is a practice philosophy for pharmacy. It is the way of pharmacists to educate the individual patients about their medication, and, if needed, life style changes, as well. The concept deals with the way a patient should receive and use medication and should receive education on the use of medicines. The concept also deals with

shouldering responsibilities like medication surveillance, counseling and the evaluation of all the outcomes of care.<sup>[23]</sup> Pharmaceutical care is the patient-focused care relating to medication, which is provided by a pharmacist and the pharmacy team with the aim of improving the outcomes of therapy. Pharmaceutical care is the direct responsible provision of medication related care for the purpose of the achieving definite outcomes that improve a patient's quality of life.<sup>[24]</sup> One of the main reasons for the development of this new mode of pharmacy practice was an identified need in the society for more effective and safer use of drugs, as more potent drugs are continually researched and developed, and that were coupled with high incidences of medication errors. The pharmaceutical care is a philosophy of practice in which the patient is the primary beneficiary of the pharmacist's services. Pharmaceutical care focuses the attitudes, behaviors, commitments, concerns, ethics, functions, knowledge, responsibilities and skills of the pharmacist on the provision of drug therapy with the goal of achieving definite therapeutic outcomes toward patient health and quality of life.<sup>[25]</sup> From the other hand pharmaceutical care involves the process through which a pharmacist cooperates with a patient and other healthcare professionals in designing, implementing, and monitoring a therapeutic plan that will produce specific therapeutic outcomes for the patient. This in turn involves three major functions: identifying potential and actual drug-related problems; resolving actual drug-related problems; and preventing drug-related problems.<sup>[26]</sup> Accordingly, pharmaceutical care is a necessary element of health care that should be integrated with other elements. Recently there is an international definition to Pharmaceutical care; "it's a patient-centered practice in which the practicing pharmacist assumes responsibility for a patient's medicines-related needs and is professionally held accountable for this commitment".<sup>[27]</sup> There are many researches and statements which explain the concept of pharmaceutical care. The first of them was introduced in 1993 by the American Society of Hospital Pharmacists (ASHP) statement on pharmaceutical care.<sup>[28]</sup>

This statement was reviewed in 1998 by the Council of Professional Affairs and the ASHP Board of Directors and was found to be still appropriate.<sup>[29]</sup> Another statement was also approved by American Society of Consultant Pharmacists (ASCP) explained the term above. Another statement coined in Europe explained and reviewed the pharmaceutical care in the community pharmacy and in hospitals setting and how to develop it in the future.<sup>[30]</sup> In the year 2011, The International Pharmaceutical Federation (FIP), and The World Health Organization (WHO) adopted an updated version of Good Pharmacy Practice entitled "Joint

FIP/WHO guidelines on good pharmacy practice: standards for quality of pharmacy services". This made a frame work and good qualification for the implementation of PC.<sup>[31]</sup> An important research done by one Sudanese pharmacist in Malaysia, explored and gathered baseline information that was necessary for the implementation of pharmaceutical care (PC) practice in Malaysia. It mainly focused on those possible barriers that may impede the implementation of the PC practice, and it also described the current pharmacy practice situation from the context of PC implementation.<sup>[21]</sup> Other researches done in the University of Tromsø, in Norway, by Christensen Bergheim, explained the pharmaceutical care and its plan, and clarified the new roles and the responsibilities of the pharmacists in their pharmacy practice.<sup>[32]</sup> However, there was still a need to continuously improve the work that was done. This should be designed in a way that easily shows what the pharmacists is implementing and contributing towards patient care. In Sudan, the practice of pharmaceutical care is still not mandated by law, lacks basic provisions, and knowledge of both community and hospital pharmacists about pharmaceutical care are low. Sudanese pharmacists need to improve their clinical knowledge, more of clinical training during both undergraduate and postgraduate terms, together with substantial organizational and structural changes. A study by Abdehamhamid *et al.*, 2008, concluded that pharmacists' intervention (counseling) of asthmatic patients showed positive impact on asthma-related outcomes in patients. It confirmed the need for the introduction and practice of pharmaceutical care in Sudan.<sup>[33]</sup> It, as well, underscored the importance of inter- professional collaboration between pharmacists, physicians and the nursing staff, though Sudanese nurses, who are members of the HCPS team, are reported to be poorly skilled.<sup>[34]</sup>

What adds more to the importance of instituting pharmaceutical care pharmacy practice in Sudan is the proved poor and irrational prescribing of Sudanese doctors poly –pharmacy, and the provision of incomprehensive, imbalanced, low quality and deficient medication information to patients are quite rampant, poor communication skills, poor adherence rates<sup>[35,36]</sup>, and pharmacists' poor academic competencies and poor knowledge of drug interactions are also quite rampant."<sup>[37-40]</sup>

In delivering health care, an effective teamwork can immediately and positively affect patient safety and outcome. The need for effective teams is increasing due to increasing co-morbidities and increasing complexity of specialization of care".<sup>[41]</sup> Unfortunately many Sudanese studies reported unsatisfactory levels of inter-professional collaboration between

HCPs. Collaboration between doctors, pharmacists, and nurse though it is an essential element in the practice of pharmaceutical care. Despite the importance of inter-professional collaboration between pharmacists and physician. The authors of one Sudanese study reported that their studied community pharmacists reflected very poor inter-professional relationship with doctors (3%), and equally they were not establishing communication with other health team members.<sup>[42]</sup>

Moreover, Sudanese medical doctors' inter-professional collaboration with pharmacists, which is essential for pharmaceutical care institution, is reported to be poor. Almost 50% of doctors had no interaction with pharmacists with regard to patients' medications.<sup>[43]</sup>

Moreover, there is a global increase in antibiotics resistance and their irrational use, which is also reported in Sudan partially as a results of gross TC dispensing.<sup>[44]</sup>

Even storage and dispensing of pharmaceutical in Sudan were reported to be inadequate.<sup>[42]</sup>

Studies about the dispensing practices in Sudan reported that the mean dispensing time in the two top major teaching hospital pharmacies in Khartoum State, was 46.3 seconds; and only 37.6% of dispensed drugs were adequately labeled.<sup>[45]</sup>

The score for the quality of medicines stores and dispensing rooms by Sudanese pharmacists were reported to be deficient, 56% and 65% respectively.<sup>[42]</sup>

Of very great importance to mention is that the proper implementation of pharmaceutical care necessitates a high level of inter-professional collaboration between physicians, pharmacists, patients and, when needed, the other health providers team members. This needed collaboration shall be based on trust, recognition and respect of each of the other interacting health care team members' knowledge practice and competencies. The counseling pharmacists when counseling patients they needs quite much of information about the medications prescribed or recommended and the diagnosis of the patient to help them detect, and correct any possible mistake to ensure the intended patient's therapeutic outcomes, including affordability of medication by patient and any needed life style changes. If for any possible reason the prescribing physician is not cooperative, then the whole process may be difficult to be actualized or even be wrecked down altogether.

Both pharmacists and physicians agree that their collaboration leads to improved patients' health outcomes. Despite that, however, both the pharmacists and physicians need to increase their level of awareness, knowledge, specific training, communication skills, mutual respect, and experience necessary for that needed collaborative teamwork. They also are struggling for time and resources, and an accommodating legalized and flexible health care system that defines roles and responsibilities of the different healthcare team members (role specification).<sup>[46,47]</sup>

Such standard pharmacy practice guidelines are lacking in the developing countries.<sup>[48]</sup>

In defense of their historical professional role and power, the Physicians, question the pharmacists' knowledge about diseases, clinical competencies, diagnosis, treatment options and handling of co-morbidities, especially when lacking patients' records.<sup>[49]</sup> From the other hand, the pharmacists question the physicians' knowledge of medications' pharmacological effects, contraindications, warnings, precautions, and drug – interaction, as they quite frequently come across many prescription errors of all forms which necessitate communication with physicians, to secure patient's safety. That mutual accusation invited disrespect, poor trust and even conflict between the two professions.<sup>[50-53]</sup>

Historically the relationship between pharmacists and physicians had been a tenuous one, since physicians consider that patients' care to be their own prime responsibility.<sup>[54]</sup>

Despite this unbalanced view for patients' care responsibility, physicians broadly, expect the pharmacists to be knowledgeable drug experts who take personal responsibility about discovering preventing, and correcting drug related problems such as prescription medication errors related to doses, length of treatment, missed dose, over dose management, drug-interactions, and advise doctors about cost of treatment, drug- interactions and cost effectiveness, help them in designing drug therapy, educate patients about the appropriate use of their medications, and advise them to adhere to their prescribed medications regimens. However, physicians are uncomfortable with pharmacists recommending changes in prescribed therapy without their consultation and endorsement.<sup>[55–58]</sup>

Despite this entire gloomy picture, Sudanese community pharmacists, in one study, expressed their interest to practice the pharmaceutical care mode of pharmacy practice which may mean good news. However, they currently lack many of the basic needed provisions to actualize

that good wish. It might be a good time for the pharmacy regulators to mandate the practice of the pharmaceutical care mode (patient-centered care) provided that its various provisions such as adequate premises, undergraduate and post graduate education and training of pharmacists on therapeutics, communication and counseling skills, how to take medication history, and also training the other non-pharmacist pharmacy staff be satisfied.<sup>[59]</sup> It, accordingly, is evident that the current pharmacy practice in Sudan is poor and classical, and that puts patients safety and their appropriate use of prescription and over-the-counter medication at risk. This calls for the introduction and practice of the pharmaceutical care mode of pharmacy practice in both the public and private sector pharmacies after securing the legal mandate from the concerned health authorities, securing all its needed provisions, proper training for the concerned stake holders, namely the pharmacists, physician and nursing staff, helping the inter-professional collaboration, and removing all barriers to its implementation.<sup>[60-62]</sup>

### **Rationale**

Based on all the above, It was decided to conduct this study under the title:

Exploration of the awareness, knowledge, and practice of physicians in four hospitals in Gezira State, Central Sudan regarding pharmaceutical care implementation.

### **Main Objective**

The main objective of this study was:

To explore the awareness, knowledge and practices of Sudanese physicians of the pharmaceutical care pharmacy implementation in four selected Central Sudan public hospitals.

### **Specific objectives: this better to be omitted. General objective is enough**

To clarify the current status of pharmaceutical care and how it can be a part of the pharmacy practice in selected Central Sudan public hospitals.

To identify the barriers that may be impeding pharmaceutical care implementation and detect any possible contribution of physicians to these barriers.

## MATERIALS AND METHODS

### Study Design

This was a prospective-hospital-based study, in which a pre-structured and pre-piloted questionnaire was used to address the potential respondent physicians.

### Study Site

This study was carried out and conducted at four public hospitals of Central Sudan in Gezira State, (Wad Medani, Alhassaheissa, Rufaa and Arbagi), from April to October 2015. Each of these four hospitals has more than four medical departments and units, except for Arbagi Hospital.

### Sampling size

A convenient sample of, 150 physicians was selected.

### Data collection tools and methods

In this study, the data were collected using a pre-structured and pre-piloted questionnaire, which was designed by the researchers. The questionnaire consisted of twenty one (21) closed ended questions. The questionnaire, was used to address physicians, and was intended to collect the following information: Checking the inter-professional collaboration-relationship between physicians and pharmacists in these hospitals. Exploring the inter-professional relationship between physicians and pharmacists to secure the intended patients' treatment outcomes. Identification of the term of pharmaceutical care (PC) and the pharmaceutical care plan (PCP) and whether they were practiced in the study area or not. Identification of the possible barriers that impair the implementation of PC.

**Data analysis:** Statistical Package for Social Sciences (SPSS) version 20 was used to analyze data. Associations between the participants' Socio-demographic characteristics variables, and variables related to participants' awareness and knowledge were assessed using Chi-Square Tests. All statistical data were conducted at a prior significance level of  $p < 0.05$ .

**Ethical Approval:** Approval was obtained from ethical committees in the four hospitals (Wad Medani, Alhassahessa, Rufaa and Arbagi). Participation in this study was completely voluntary.

## RESULTS AND DISCUSSION

Study results were expressed in both frequencies and percentages.

Results showed that Only 74 (49.33%) out of the 150 targeted physicians practically participated by filling the questionnaire forms.

### Results of physicians demographic characteristics as above

#### Gender distribution

Results showed a clear dominance of females 54 (73%) among a dominant young 60(81.1%). population of respondent physicians.

#### Age distribution of respondent physicians

**Table 1: Age distribution of respondent physicians.**

Age (years)	Frequency	Percentage (%)
25-34	60	81.1
35-44	7	9.5
45-54	1	1.4
55 and above	6	8.0
Total	74	100.0

Results showed a clear majority 60 (81.1%) of young respondent physicians, and also a clear dominance of females 54(73%). This may be due to the lately high dominance of females in almost all university studies which accompanied the establishment of a very big number of new colleges and universities, both public and private, in different parts of the Sudan, following what is called: The Higher Education Revolution in Sudan.

#### Specialty of respondent physicians

Most of the respondent physicians were medical officers 30 (40.5%), registrars 20 (27%), house officers were 17 (23%), and only seven (9.5%) were specialists. Specialists are generally more inclined to migrating abroad, especially to the Gulf States where they are better paid.

#### Respondents' sources of information about prescribed drugs

**Table 2: Sources of information for respondent physicians about the medications they prescribe.**

Source	Frequency	Percent (%)
Textbooks, Reference	35	47.3
Pharmacists	27	36.5
The internet	12	16.2
Total	74	100.0

Table 2 above, shows that, most of respondent physicians 35 (47.3%) obtain their needed medications' information about the medications they prescribe from text books and other references; while only 27 (36.6%) get their needs from pharmacists, and 12 (16.2%) of the physicians get their needed medications' information from the internet. It was evident that an appreciable majority (36.6%) of the respondent physicians obtain their drug information from the pharmacists. In contrast, Iqbal and Ishag., 2017; reported that their studied doctors agreed that pharmacists are a reliable source of drug information.<sup>[63]</sup>

This result might reflect a fair level of inter-professional collaboration and respect between the physician and pharmacists within one working medical setting as advised by McDonough and Marialice, 2006,<sup>[64]</sup> who advised that interpersonal communication within the workplace is an important activity for both pharmacists and physicians.

Those physicians who prefer textbooks and other references might be under time and workload constraints. Both textbooks and other reference are always at hand at the convenient time for the physician. Add to that, both represent ongoing references that can be kept at home or office. They, as well, provide more comprehensive information.

### **Referring to the pharmacists**

Study results showed that a big majority of the respondent physicians 47(63.5%) asserted that they usually refer to the pharmacists when facing unknown drug related problems, while 27 (36.5%) of them don't. It is a very well known fact that pharmacists are the medicines' professional. Such medication problems might not always be cited in textbooks or other references, e.g. Drug-interactions with Sudanese food (Tabaldi (Boab Tree fruits) juice with oral Tetracyclines' or fluoroquinolones (Calcium contents), some unfamiliar drug-drug interactions, chronopharmacologic medications use implication, prescribing for pregnant ladies, renal and hepatic impairment, elderly with comorbidities, blood disorders, off-label prescriptions, new medications, etc.<sup>[65]</sup>

Broadly, physicians expect the pharmacist to be a knowledgeable drug experts who takes professional responsibility about detecting and preventing drug related problems such as prescription medication errors related to doses, length of treatment, missed dose, over dose management, drug-interactions, cost of treatment, drug- interactions and cost effectiveness, help them in designing drug therapy, educate patients about the appropriate use of their medications, and advise them to adhere to their prescribed medications regimens.<sup>[56]</sup>

More exposure to each other real professional competencies as when working in same medical settings, will invite more respect, and improves respect and trustworthiness, which are highly rated for the success of collaborative teamwork activities. Moreover, it was reported that young doctors., are more ready to reflect positive inter-professional collaboration with pharmacists. To ensure that coworkers are communicating with one another, regular staff meetings for those sharing one practice setting should be scheduled to solve any problems that might have been detected and evaluate overall performance.<sup>[64]</sup>

**Table 3: Reasons cited by physicians behind their abstinence from referring to the pharmacists when facing difficult medications' use problems.**

Reasons for not referring to pharmacist	Frequency	Percent (%)
Poor trust in the pharmacists' competencies.	4	14.8
Inadequate pharmacists training.	17	63.0
Refused to disclose reasons ?	6	22.2
Total	27	100.0

As shown in Table 3, there were certain reasons that deterred 27 (36.5%) of the respondent physicians from referring to pharmacists when they face some medication problems. The reasons mentioned by 21 (77.8%) of those respondents were around physicians' trust in overall training and competencies of pharmacists. These two claims are at least partially supported by two previous Sudanese studies.<sup>[66,67]</sup> This means that pharmacists must be well educated, trained, skilled, knowledgeable, as that helps them to perform their professional duties in a perfect manner to serve patients and gain physicians trust and respect. In Sudan, it was reported that almost 50% of studied Sudanese doctors had no interaction with pharmacists with regard to patients' medications. In contrast an Iranian study by Alipour et al, 2017 reported that their studied physicians (67,2%) considered the pharmacist as a reliable source of general drug information and (90.6%) of them expected pharmacists to provide their patients with medication information regarding dose, and instructions for use.<sup>[68]</sup>

### **Respondent physicians allowing generic medications' substitution by the dispensing pharmacists**

As shown in Table 4, hereunder, the majority of respondent physicians 41 (55.4%) reported that they occasionally ask the pharmacists for substitutes for the medication products they prescribed, when not available or unaffordable by patients.

However 16 (21.6%) did not. The remaining respondents' balance 17(23%) mentioned that they only sometimes do.

**Table 4: Respondent physicians allowing generic medications' substitution by the dispensing pharmacists.**

Asking the Pharmacist for generic or branded generic substitution.	Frequency	Percent (%)
Yes	41	55.4
No	16	21.6
Sometimes	17	23.0
Total	74	100.0

### Educating patients about their medications and how to use them

**Table 5: Educating patients about their medications and how to use them.**

Type of communication	Yes	No	Sometime	Total	Percentage (%)			Total
Educating patients about their medications	50	8	16	74	67.6	10.8	21.6	100
Providing directions for medications' use	61	6	7	74	82.4	8.1	9.5	100

As shown in Table 5, most of the respondent physicians 50 (67.6%) asserted that they used to educate their patients about their medications, while 16 (21.6%) of them only occasionally (sometimes) do. But, according to one Sudanese study, patients used to receive verbal medication information from doctors in only 57.8% of encounters.<sup>[38]</sup>

Only 8 (10.8%) of the physicians do not educate their patients about their medications. A majority of the physicians 61 (82.4%) also asserted that they usually provide patients with directions for use of their medications. It may be concluded that, some (21%) of the respondents depend on the pharmacists regarding the information about the medications' use directions given to the patients. But, the majority don't depend on pharmacists.

That might be attributed to the short duration of the clinical encounter between patients and the physician. Add to that the high traffic of patients especially in public hospitals outpatient clinics.

**Physicians and medication information knowledge****Table 6: Physicians and Medication information.**

<b>Physicians' know more about Medications, than pharmacists</b>	<b>Frequency</b>	<b>Percent (%)</b>
Yes	18	24.3
No	36	48.7
Sometimes	20	27.0
Total	74	100.0

Table 6 shows that 36 (48.7%) of respondent physicians said their level of knowledge about medication is less than that of pharmacists. While 18 (24, 3%) of them asserted that their knowledge about the drugs which they prescribe is more than that of pharmacists, and 20 (27%) of them claimed that sometimes they may know the drugs more than pharmacists. This means that an appreciable number of the respondent physicians feel that they had better knowledge about medicines than pharmacists. This result is not matching to the results of two other Pakistani studies by Azhar, et al; 2010 and Khan, et al; 2014.<sup>[57,58]</sup> It is well evident and is a very undeniable fact that pharmacists are medications' professionals. A study by Keijisers et al, 2014, concluded that final year pharmacy students have better knowledge of basic pharmacology, but not of its application than medical students.<sup>[69]</sup>

In contrast, an Ethiopian study concluded that their studied physicians considered pharmacists as medication information experts.<sup>[70]</sup> Historically the relationship between pharmacists and physicians had been a tenuous one, since physicians still consider that patients' care is their own prime responsibility. Though some studies reported that 68% of their studied physicians were comfortable with the pharmacists' new patient-centered role, yet they still hold on their fears of pharmacists' intrusion into their classical domains of power. They still claim that the patient is theirs.<sup>[53]</sup>

It is full of paradox when some studied Sudanese physicians whose overwhelming majority (98%) failed to write a proper prescription, claim that they may sometimes know about the medicines they prescribe more than pharmacists do.<sup>[36]</sup> As long as Sudanese pharmacists are still adopting the old style of merely dispensing, then other professional can underestimate their levels of knowledge and skills about medications.

### Physicians frequently ask patients to come back to them to check proper dispensing

**Table 7: Respondent physicians ask patients to come back to them to check proper dispensing by pharmacists.**

Patient returns back to prescriber	Frequency	Percent (%)
Yes	35	47.3
No	16	21.6
Sometimes	23	31.1
Total	74	100

A majority of the respondent physicians 35 (47.3%) in this study reported that they usually direct their patients to come back after filling their prescriptions from the pharmacy, 16 (21.6%) of them did not do, while 23 (31.1%) of them sometimes do, Table 7.

This indicates that the relationship between the pharmacists and the prescribers needs some improvement and should be based on trust and bearing in mind that, the dispensing of the drug is one of the responsibilities of the pharmacists. As well, this act evidently indicates that the respondents question pharmacists' knowledge and competencies, not to mention the pharmacists' possible commercial drives, and the prescribers' possible brand loyalty as an effect of pharmaceutical companies' aggressive promotion.<sup>[71,72]</sup>

This result is also matching to one reported by AbuRuz, et al; 2012.<sup>[73]</sup>

### Agreement of respondent Physicians to accept, consider and include Pharmacists as members of the health care team

A very big majority of the respondent physicians 71(95.9%) agreed that the pharmacists must be included in the health care team, except only 3 (4.1%) of them.

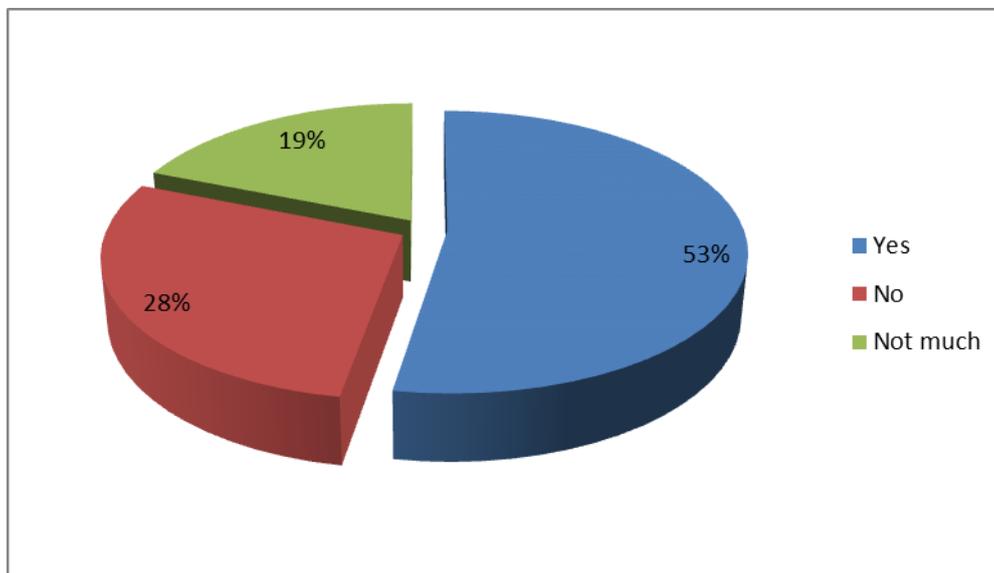
This result matches with different previous studies reports.<sup>[74]</sup>

It is our opinion that pharmacists are true members of the healthcare by their very professional responsibilities and practice. The profession of pharmacy is an integral part and pillar of the health care. It doesn't need the recognition from any other members of the health care team.

### Knowledge of physicians about the term Pharmaceutical Care (PC)

Figure 1, shows that 39(53%) of the respondent physicians know the term pharmaceutical care, but 21(28.4%) of them did not know it and 14 (19%) of physicians had some

information about the term but not as much as the first group. This result compared to a survey on pharmaceutical care which was run in 2008-2009 by the Council of Europe to Ministries of Health (and governmental agencies), National Pharmacists Associations, National Medical Doctors Associations and National Patients Associations, their knowledge about the term of PC were 67%, 33%, and 50% respectively.<sup>[75]</sup>



**Figure 1: Knowledge of physicians about the term Pharmaceutical Care (PC).**

### The importance of pharmaceutical care

**Table 8: The importance of pharmaceutical care.**

Importance of pharmaceutical care	Frequency	Percent (%)
Yes	55	74.3%
No	14	18.9%
Sometimes	5	6.8%
Total	74	100.0%

As shown in Table 8, most of the respondent had the opinion that pharmaceutical care is beneficial and represents an advance and improvement in the pharmaceutical and medical profession. This result is also comparable to results reported by Strand et al; 2004.<sup>[76,73]</sup>

### Physician's appreciation for the goals of Pharmaceutical care

A very big majority of the respondent physicians 67 (90.5%) agreed that the goal of pharmaceutical care was to improve the individual patient's quality of life and therapeutic outcomes, while only 7 (9.5%) of them disagreed. As shown in Table 8, when the respondent physicians were asked whether they agree that the main goal of pharmaceutical care is to

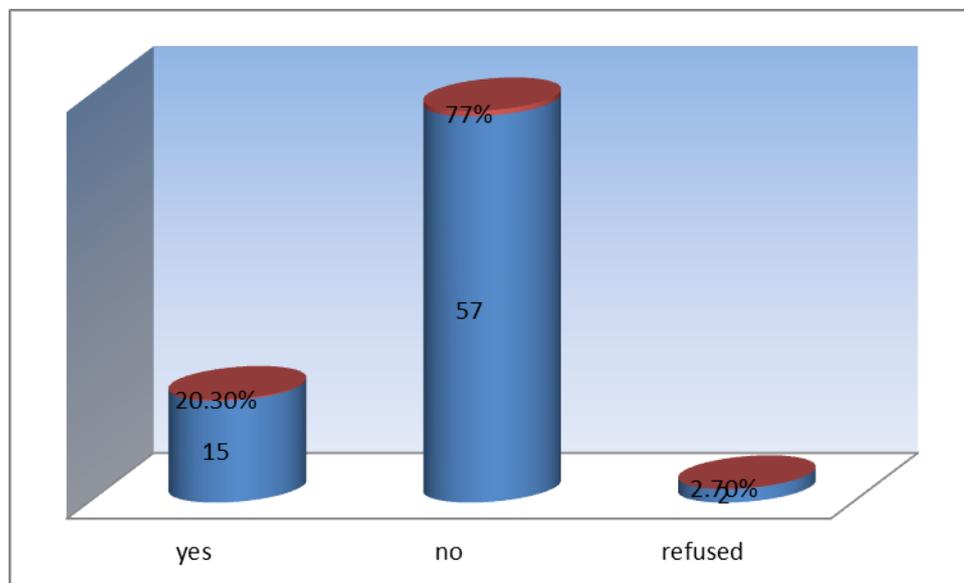
improve medication-related therapeutic outcomes, a casting majority 72 (97.3%) agreed. This result is similar to that reported in a Polish study by Waszyk-Nowaczyk *et al.*, 2011.<sup>[77]</sup>

**Table 9: The goal of pharmaceutical care.**

Goal of pharmaceutical care	Agree	Disagree	Total(frequency)	Percent (100%)		Total(100%)
Improve Patient quality of life	67	7	74	90.5	9.5	100
Improve targeted therapeutic outcomes	72	2	74	97.3	2.7	100

### Practice of Pharmaceutical Care in Central Sudan

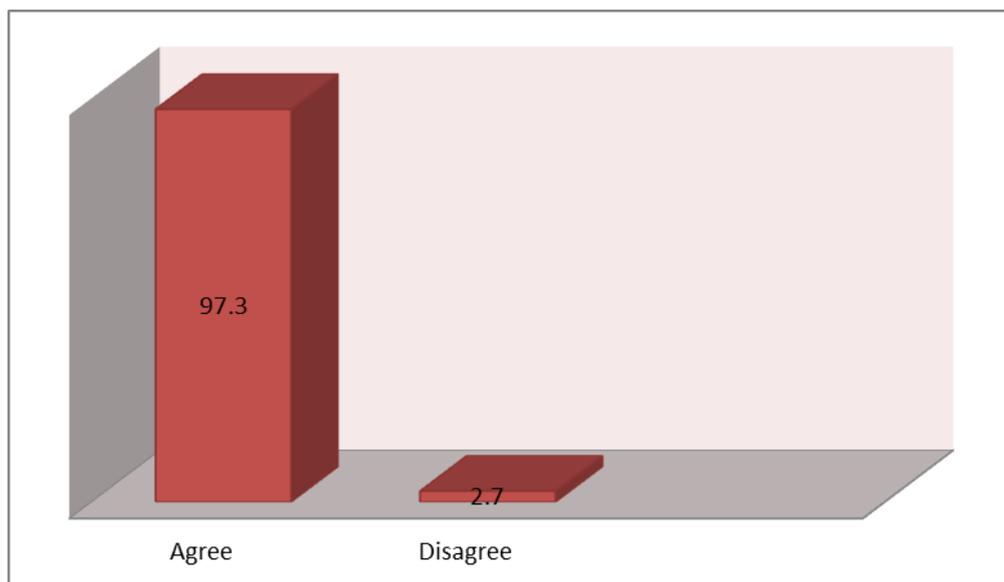
Figure 2, shows that, when asked about the implementation of pharmaceutical care in their area, 57 (77%) of the respondent physicians negated that, while 15 (20.3%) of them endorsed it. This result is intimately comparable to that reported in a Polish study by Waszyk-Nowaczyk *et al.*, 2011.<sup>[77]</sup>



**Figure 2: Full practice of pharmaceutical care in Central Sudan.**

### Barriers impairing the implementation of pharmaceutical care in Central Sudan

Figure 3, shows that the majority of the respondent physicians (n= 72; 97.3%) agreed that there were many barriers impairing the implementation of pharmaceutical care e.g. lack of pharmacist personnel, inadequate pharmacists training, and physicians' resistant. This result is matching to that reported in two a Sudanese study.<sup>[78]</sup>



**Figure 3: Barriers impairing implementation of pharmaceutical care in Central Sudan.**

**Lack of pharmacists' personnel and inadequate pharmacists training.** Table 10, shows that, a big majority 62 ( 83.8%) of the respondent physicians thought that the reasons why pharmaceutical care is not implemented in their areas, may be due to inadequate training of pharmacists, while 12 (16.2%) of them didn't endorse that. Also 47 (63.5%) of the respondent physicians attributed it to the lack of pharmacists personnel. A similar study done by a group of pharmacists in Hospitals of Kuwait reported that there were many barriers to the implementation of PC, including the attitudes of pharmacists, lack of pharmacists personnel, and lack of advanced pharmacists' practice skills.<sup>[79]</sup>

**Table 10: Lack of pharmacists' personnel and inadequate pharmacists training.**

Reasons	frequency		Percent%		Total	
	yes	no				
Lack of pharmacists	47	27	63.5	36.5	74	100%
Inadequate pharmacists training	62	12	83.8	16.2	74	100%
No idea	0	0	0	0	0	0

### **The Professional responsibilities of the pharmacists and their roles**

Figure 4, shows that the majority 72 (97.3%) of the respondent physicians, asserted that the responsibilities of the pharmacists were not well defined, while only 2(2.7%) disagreed.

Also most of the respondent physicians 71 (97%) asserted that patients do not understand the role of the pharmacists in the health care team. A similar opinion was reported by Deya RM, et al. 2011, and Berdine H, et al. 2012, respectively.<sup>[80,81]</sup>

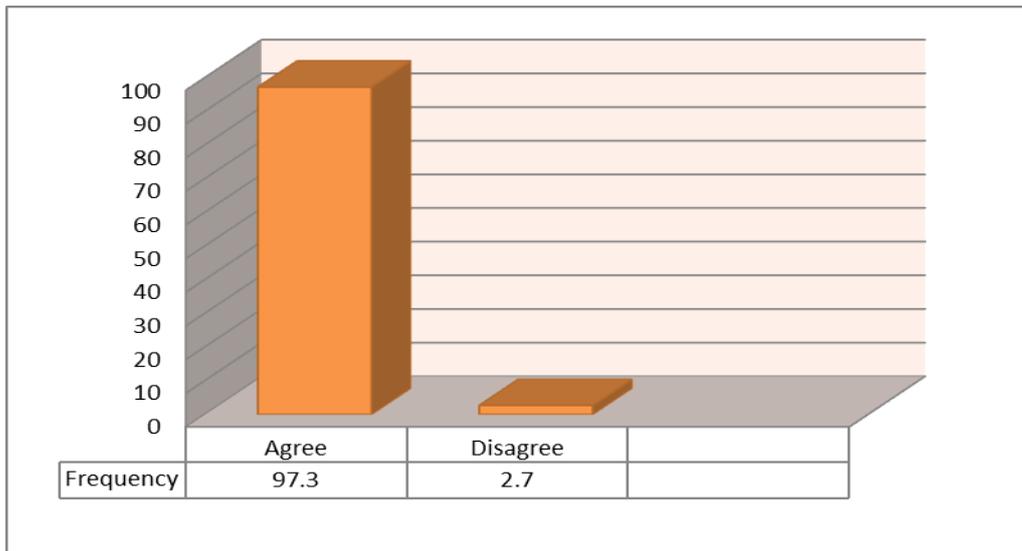


Figure 4: The professional responsibility of the pharmacists.

**Bivariate Analysis**

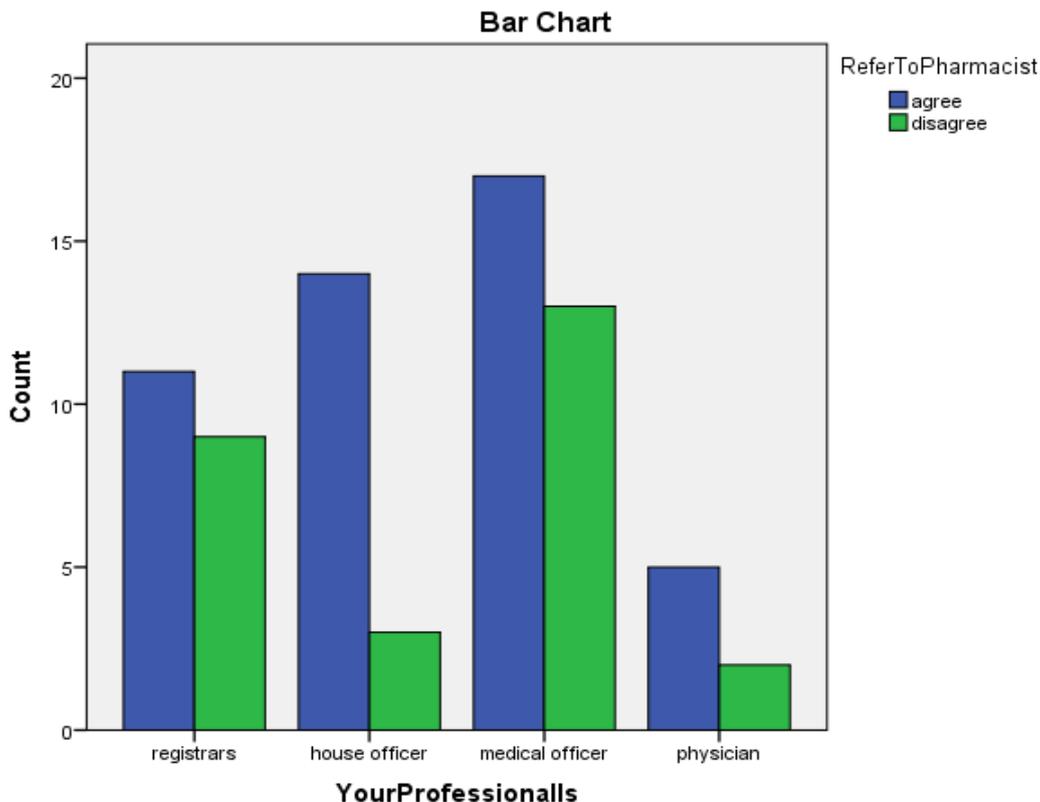
**Specialty of physicians \* Referring to the pharmacists Cross tabulation**

Specialty of physicians		Refer To Pharmacist		Total
		agree	disagree	
registrars	Count	11	9	20
	% percent	55.0%	45.0%	100.0%
house officer	Count	14	3	17
	% percent	82.4%	17.6%	100.0%
medical officer	Count	17	13	30
	% percent	56.7%	43.3%	100.0%
physician	Count	5	2	7
	% percent	71.4%	28.6%	100.0%
Total	Count	47	27	74
	% percent	63.5%	36.5%	100.0%

**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.025 <sup>a</sup>	3	.259
Likelihood Ratio	4.313	3	.230
Linear-by-Linear Association	.035	1	.852
N of Valid Cases	74		

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is 2.55.

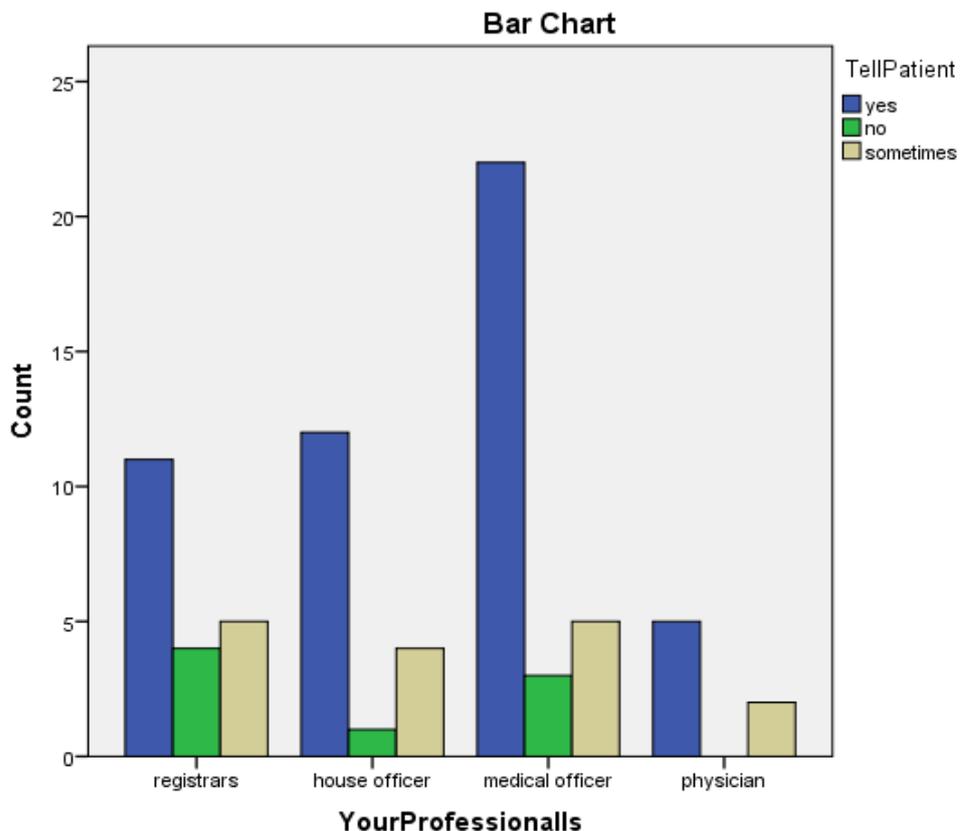


**Specialty of physicians \* educating patients about their medications. Cross tabulation**

Specialty of physicians		Tell Patient			Total	
		yes	no	sometimes		
registrars	Frequency	11	4	5	20	
	% percent	55.0%	20.0%	25.0%	100.0%	
house officer	Frequency	12	1	4	17	
	% percent	70.6%	5.9%	23.5%	100.0%	
medical officer	Frequency	22	3	5	30	
	% percent	73.3%	10.0%	16.7%	100.0%	
physician	Frequency	5	0	2	7	
	% percent	71.4%	0.0%	28.6%	100.0%	
Total		Frequency	50	8	16	74
		% percent	67.6%	10.8%	21.6%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.004 <sup>a</sup>	6	.676
Likelihood Ratio	4.558	6	.602
Linear-by-Linear Association	.736	1	.391
N of Valid Cases	74		

a. 8 cells (66.7%) have expected count less than 5. The minimum expected count is .76.

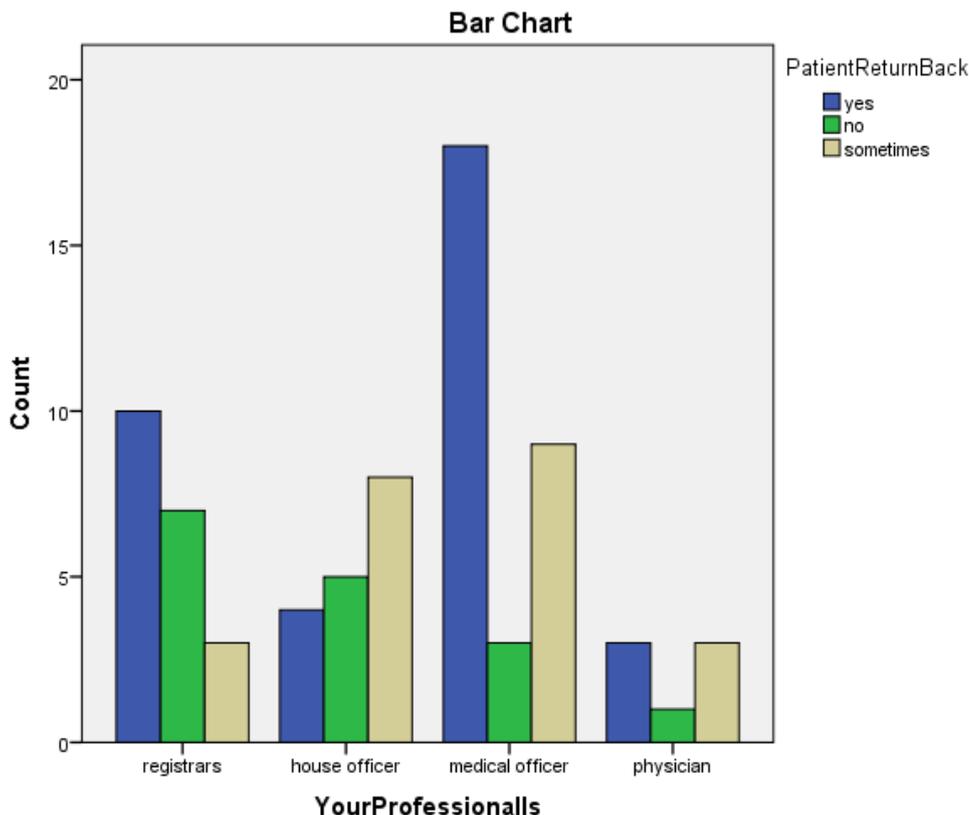


Specialty of physicians \*instructing Patient to Return Back after filling prescriptions. Cross tabulation

Specialty of physicians		Patient Return Back			Total	
		yes	no	sometimes		
registrars	Frequency	10	7	3	20	
	% percent	50.0%	35.0%	15.0%	100.0%	
house officer	Frequency	4	5	8	17	
	% percent	23.5%	29.4%	47.1%	100.0%	
medical officer	Frequency	18	3	9	30	
	% percent	60.0%	10.0%	30.0%	100.0%	
physician	Frequency	3	1	3	7	
	% percent	42.9%	14.3%	42.9%	100.0%	
Total		Frequency	35	16	23	74
		% percent	47.3%	21.6%	31.1%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	10.679 <sup>a</sup>	6	.099
Likelihood Ratio	11.419	6	.076
Linear-by-Linear Association	.066	1	.797
N of Valid Cases	74		

a. 5 cells (41.7%) have expected count less than 5. The minimum expected count is 1.51.



NO Significant correlation was detected.

## CONCLUSION AND RECOMMENDATIONS

More than half of physicians said they knew the term of pharmaceutical care and they appreciated its goals and agreed that it is an important new concept that improves patients' quality of life and therapeutic outcome.

Physicians agreed there were many barriers to the implementation of pharmaceutical care e.g. lack of pharmacist personnel, inadequate pharmacists training, physicians resistant, the responsibility and professional of the pharmacists were not clear and patients do not understand the role of pharmacists in the health care team.

Although physicians agreed that the pharmacists had information about drugs but most of them did not refer to the pharmacists when they stand in need of medications information, and educated patients how to used their prescribed medications.

Inter-professional collaboration between physicians and pharmacists needs much of improvement.

- Cooperation of physicians and pharmacists must take place for the benefits of patients.

- A better public understanding of PC must be promoted through media campaigns.
- National health care authorities could provide a legal basis for removing the various barriers to the implementation of pharmaceutical care and mandating it.
- Much emphasis must take placed on undergraduate pharmacy and medical schools curricula graduate and continuing education in pharmaceutical care
- Pharmacists must be prepared (attitude, knowledge, and skills) to provide care and recognize the responsibility in their communities.
- Lastly pharmaceutical care must be or should therefore become an integral part of the pharmacy professional practice.

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