

PHYSICIANS' PERCEPTIONS AND RESPONSE TO THE ROLE OF CLINICAL PHARMACISTS IN A TEACHING HOSPITAL IN EGYPT

Sally Nabil Ibrahim Mohamed¹, Wafaa Mohamed Hussein² and Moustafa ElHoussinie Moustafa²

ABSTRACT:

¹Quality department, Al-Ahrar teaching hospital ²Department of Community, Environmental and Occupational Medicine, Faculty of medicine, Ain Shams University, Cairo, Egypt
Corresponding author:

Sally Nabil Ibrahim Mohamed

Mobile: 0201005165798

e-mail:

Dr.sallynab@hotmail.com

Received: 12/8/2023

Accepted: 2/9/2023

Online ISSN: 2735-3540

Background: Effective communication between clinical pharmacists (C. Ph.) and physicians has a significant impact on reducing drug-related problems (DRPs) and medication errors.

Aim of the work: To estimate the proportion of physicians with positive perceptions towards C. Ph., and physicians' responses to C. Ph. recommendations regarding DRPs.

Patients and Methods: A cross-sectional study was conducted at Al-Ahrar hospital between June and December 2022. A self-administered questionnaire was filled in by 134 physicians. The questionnaire consisted of demographic information, physicians' perceptions of C. Ph.'s roles, and perceived barriers to fulfilling these roles. C. Ph. checked for DRPs in ICU prescriptions of 244, 182 and 65 patients admitted to cardiology care unit (CCU), emergency ICU and internal medicine ICU respectively. Physicians' responses to C. Ph. recommendations were recorded.

Results: Most physicians considered C. Ph. as a source of information on medications (129, 96.3%) and drug interactions (119, 88.8%). Unclear C. Ph. responsibilities and unawareness of C. Ph.'s beneficial role were the main barriers to C. Ph. functioning stated by 64.2% and 55.2% of physicians respectively. A total of 378 DRPs were detected, of which 361 were also considered medication errors. Highest DRPs related recommendations' acceptance rate was observed in internal medicine ICU (88.6%) followed by CCU (77.4%) and emergency ICU (40.8%), $p < 0.001$. Recommendations most likely to be accepted were the ones regarding drug interactions (100%), a needed additional drug (77.4%), and dosing regimen recommendations (75.3%).

Conclusion: Most Physicians had positive perceptions of the C. Ph. role. Acceptance of C. Ph. recommendations varied across sites and DRP types.

Keywords: clinical pharmacist, perceptions, barriers, drug related problems, acceptance.

INTRODUCTION:

Clinical Pharmacy is an allied health profession that works directly with physicians, other health professionals, and patients to ensure that the prescribed medications contribute to the best possible

outcomes [1]. Clinical pharmacists (C. Ph.) can perform multiple functions especially in complex healthcare settings such as the intensive care units (ICU). These include reviewing medical history, evaluating drug therapy, monitoring pharmacokinetics,

evaluating parenteral nutrition orders, and educating other medical staff^[2].

The world health organization (WHO) has listed medication safety as one of the global patient safety goals^[3]. Medication safety necessitates addressing drug related problems (DRPs) and medication errors (MEs). A DRP is an undesirable event involving drug therapy that actually or potentially interferes with desired health outcomes and requires professional judgment. DRPs are classified into seven categories: 1) unnecessary drug therapy, 2) needs additional drug, 3) ineffective drug, 4) dose too low, 5) dose too high, 6) adverse drug reaction, and 8) noncompliance^[4]. A medication error (ME) is defined as any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of healthcare professional or patient^[5]. A clinical pharmacist led team can contribute to achieving medication safety goals by identifying DRPs and delivering timely interventions^[6].

Studies have highlighted the importance of cooperation between pharmacists and physicians to provide the least expensive and most effective pharmacotherapy services^[7]. This collaboration depends on physician perceptions and expectations from pharmacists^[8].

In Egypt, the clinical pharmacy movement is progressing slowly. Few publications have addressed the changes in pharmacy education and pharmacy practice in Egypt^[9]. El Anowr revealed that, in 1980, visiting professors from the United States led the efforts to bring clinical pharmacy to Egypt, and in 1994, the basic principles of clinical pharmacy were first introduced at Ain Shams University in Cairo, then multiple universities followed by establishing clinical pharmacy departments^[10]. In 2012, the Egyptian Ministry of Health started clinical pharmacy facilities at all governmental hospitals^[11]. According to Mahmoud et al,

physicians interacted with C. Ph. mainly to enquire about drug availability, alternatives, dosage, and drug interactions^[12]. However, other studies concluded that practicing physicians in Egypt do not consider clinical pharmacists as a part of the healthcare team^[11]. A study from Pakistan stated that physicians disagreed with C. Ph. intervention and did not allow their involvement in clinical consultation^[13].

Some of the main barriers to clinical pharmacy practice in Egyptian hospitals were the absence of hospital leadership support, lack of adequate clinical pharmacy training and career pathways, physician's resistance to change, lack of awareness among healthcare team about the importance of clinical pharmacy, and lack of communication^[14].

In this study we explore current physicians' perceptions of C. Ph. roles and how physicians respond to C. Ph. recommendations.

AIM OF THE WORK:

first, to estimate the proportion of physicians with positive perceptions towards C. Ph. at Al-Ahrar teaching hospital. The second aim was to estimate the proportions of the different physicians' responses to C. Ph. recommendations regarding DRPs and medication errors detected in ICU prescriptions.

METHODOLOGY:

Study design and Study setting:

A cross sectional study was conducted at Clinical departments at Al-Ahrar teaching hospital in Zagazig in Sharqia governorate. The hospital has around 210 inpatient beds, including three main ICUs, namely: internal medicine ICU, cardiology care unit (CCU) and emergency ICU. Unlike the other clinical departments, only ICU staff included clinical

pharmacists. The hospital has 384 physicians of whom 124 work with C. Ph. in ICUs.

Sampling and sample size:

A sample size of 126 physicians (including 55 working with C. Ph.) was calculated assuming 50% having "good to fair" perception of clinical pharmacist's role (with 10% margin of error). A convenience sample of 134 physicians completed the self-administered questionnaire, of whom 60 worked in ICUs where C. Ph. were available.

A sample of 100 patients' files with DRPs was required to study physicians' response to C. Ph. recommendations, assuming 50% acceptance rate and 10% margin of error. Out of 573 cases admitted between June and December 2022 to different ICUs 82 cases were not examined for different reasons mainly short stay in the ICU and being admitted and discharged during vacations. Clinical pharmacists examined the files of 491 cases, of which 182 included at least one DRP.

Study Tools:

A self-administered questionnaire was used to measure physicians' perceptions. Questions were adapted from [15&16]. The questionnaire covered: Socio-demographic information (age, gender, experience, education, current area of practice), fourteen questions (rated on a five-point Likert scale) about what physicians perceive to be a clinical pharmacist's role, and eight questions (rated on a five-point Likert scale) about the perceived barriers that hinder physicians' collaboration with clinical pharmacists.

A Data collection sheet was developed by us to collect information from ICU prescriptions including Patient ID, Date, Patient information (age, gender, diagnosis), Department (Which ICU), Prescribing physician's name/ID, Whether DRPs reported by C. Ph. exists for each patient, number and types of DRPs for each patient file if any (Definitions of seven DRPs types have been derived from [17]). Whether a

medication error reported by C. Ph. exists for each patient, number, stages, and severity of errors for each medication if any. In addition, clinical pharmacists' recommendation regarding a DRP/medication error. And, receiving physician name/ID, receiving Physician's response to clinical pharmacists' recommendation were collected.

Statistical Analysis:

Data analysis was performed using Statistical Package for Social Science (IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.). Categorical variables were presented as frequencies and percentages. Chi-square and Fisher-Freeman-Halton Exact tests were used to compare proportions. Quantitative variables were presented as mean and standard deviation or median and interquartile range (IQR). Independent t-test or one-way ANOVA test were used to compare the means between groups. The Mann Whitney U test was used to compare non-parametric quantitative variables. Statistical significance was reported if p-value ≤ 0.05 .

Ethical approval

The study was approved by the Research Ethics Committee at the Faculty of Medicine at Ain Shams University, Egypt (No. FWA 000017585). An informed consent was taken from participating physicians after full explanation of the aim of the work. Administrative approval was obtained from Al-Ahrar hospital's manager.

RESULTS:

A total of 134 physicians responded to the questionnaire, 74 of them had no C. Ph. in their departments. Males dominated the sample (79, 58.9%). The average age of the physicians was 34.9 ± 7.4 years with a mean of 8.6 ± 7.2 years of experience (range = 1-35 years of experience). The largest proportion of participants (59, 44.0%) had master's degree followed by MBBCh (39, 29.1%).

Almost all known specialties were represented in this survey. Special surgeries presented the largest sector (26.9%), followed by internal medicine (19.4%), then Cardiology (12.7%). **Table (1)** shows socio-demographic characters of the participants.

Physicians in departments with and without clinical pharmacists had equal perceptions of the roles of clinical pharmacists except for assessment of patients' compliance which was significantly more acceptable among physician from departments with clinical pharmacists (Mean rank= 78.6 vs 58.5, Median (IQR)= 4(4-5) vs 3(3-4), $p=0.002$). Percentages of physicians in both groups and -in the total sample who agree/ strongly agree with the 14 statements regarding C. Ph. role perceptions are presented in **Figure (1)**. Overall, most physicians expected pharmacists to be potential sources of drug information (129, 96.3%) and a source information on drug interactions (119, 88.8%).

Figure (2) shows the percentage of physicians in departments with and without C. Ph. who agree/ strongly agree with the eight statements considering barriers to clinical pharmacist role. Barriers to collaboration with C. Ph. in Al-Ahrar hospital -ranked from highest to lowest- were as follows: unclear C. Ph. Responsibilities (64.2%), lack of awareness of the benefits of having a clinical pharmacist (55.2%), inability to judge C. Ph. knowledge and skills (45.5%), absence of prior work experience with a clinical pharmacist (43.3%), C. Ph. inaccessibility when needed (39%), lack of communication skills (35.1%), Low level of trust in the C. Ph. abilities (32.8%) and continuity of care interruption by C. Ph. involvement (32.8%). Accessibility, interruption of care, absence of previous experience, and inability to judge clinical pharmacist knowledge and skills were statistically more prevalent in the absence of clinical pharmacists at the department ($p=0.006$, 0.004 , 0.002 , and 0.028 , respectively).

A total of 573 cases were admitted to the three ICUs. Clinical pharmacists examined 491 cases, and 182 cases (31.8% from total cases and 37.1% from the examined cases) included one or more DRPs. The proportion of cases with DRPs out of examined cases were as follows: 78/244 in CCU, 77/182 in emergency ICU and 27/74 in Internal medicine ICU.

A total of 378 DRPs (averaging two DPRs per patient file) were detected, of which 361 (95.50%) were also considered medication errors. DRPs were distributed as follows: 70 (18.5%) in Internal medicine ICU, 134 (35.4%) in Cardiology care unit and 174 (46.1%) in Emergency ICU.

The proportions of DRPs types in the three ICUs (are shown in **Table 2**). "Unnecessary drug", "dosing regimen", "needs drug" were the most common constituting 50.5%, 21.4 %, and 16.4% of errors respectively. Comparing column proportions with Bonferroni corrections showed that unnecessary drug was highest in Emergency ICU, needs drug was highest in Internal Medicine ICU and dosing regimen was highest in Cardiology ICU.

Classification of Medication errors in different ICU (is shown in **Table 3**). Almost all errors 99.1% were at the stage of physician's ordering decision. Largest error subcategory was "No valid indication" (44.3%) followed by dosing regimen (16.5%). The latter was relatively more frequent in Cardiology ICU cases (31.3%). "Lack of knowledge/experience" was the major cause of the error (81.7%). Most of the errors were in Category C (65.7%) and D (22.7%) (Table 3). There were minor but insignificant differences between the three sites.

Table (4) shows that C Ph. recommendations most likely to be accepted were the ones regarding drug interactions (100%), needed drug (77.4%), and recommendations regarding dosing regimen

(75.3%). C. Ph. Recommendations' acceptance rate was 88.6%, 71.6% and 40.8% for internal medicine, cardiology, and emergency ICUs respectively.

Recommendations were more likely to be accepted when the prescribing physician is the one who receives C. Ph. recommendations.

Table 1: Selected demographic and job for the physicians' participants

		No C. Ph. N=74	C. Ph. N=60	Total N=134
Age (Mean ± SD)		35.9 ± 8	33.6 ± 6.3	34.9 ± 7.4
Work duration in years (Mean ± SD)		9.7 ± 7.8	7.3 ± 6.3	8.6 ± 7.2
Gender N (%)	Male	40(54.1)	39(65)	79(59)
	Female	34(45.9)	21(35)	55(41)
Academic degree N (%)	MBBCh	16(21.6)	23(38.3)	39(29.1)
	Fellowship	9(12.2)	13(21.7)	22(16.4)
	Diploma	3(4.1)	3(5)	6(4.5)
	Master's	41(55.4)	18(30)	59(44)
	MD	5(6.8)	3(5)	8(6)
Specialty (N %)	Cardiology	0(0)	17(28.3)	17(12.7)
	ICU	0(0)	13(21.7)	13(9.7)
	Internal medicine	0(0)	26(43.3)	26(19.4)
	Gastroenterology	7(9.5)	0(0)	7(5.2)
	General surgery	6(8.1)	0(0)	6(4.5)
	Pediatrics	15(20.3)	0(0)	15(11.2)
	Ob & Gyn	8(10.8)	0(0)	8(6)
	Nephrology	0(0)	2(3.3)	2(1.5)
	Special surgery	36(48.6)	0(0)	36(26.9)
	Other	2(2.7)	2(3.3)	4(3)

Table (2) presents the classification of DRPs in the three ICUs *

DRP type	Internal Medicine N=70 (18.5%)	Cardiology N= 134 (35.4%)	Emergency N=174 (46.1%)	Total N=378
Unnecessary drug	27 (38.6%)	46 (34.3%)	118 (67.8%)	191 (50.5%)
Needs drug	21 (30%)	24 (17.9%)	17 (9.8%)	62 (16.4%)
Selection	6 (8.6%)	10 (7.5%)	11 (6.3%)	27 (7.1%)
Drug interactions	1 (1.4%)	0 (0%)	1 (0.6%)	2 (0.5%)
Dosing regimen	14 (20%)	45 (33.6%)	22 (12.6%)	81 (21.4%)
Instructions	0 (0%)	3 (2.2%)	0 (0%)	3 (0.8%)
Monitoring	1 (1.4%)	4 (3%)	5 (2.9%)	10 (2.6%)
Adherence	0 (0%)	2 (1.5%)	0 (0%)	2 (0.5%)

*Fisher-Freeman-Halton Exact Test = 55.578, p<0.001

Table (3) classification of Medication errors (out of total DRPs) in different ICU*

		Internal Medicine N= 70	Cardiology N=134	Emergency N= 174	Total N=378
Medication error		70 (100%)	121 (90.3%)	170 (97.7%)	361 (95.5%)
Error stage	Ordering decision	69 (98.6%)	112 (100%)	168 (98.8%)	349 (99.1%)
	Monitoring	1 (1.4%)	0 (0%)	2 (1.2%)	3 (0.9%)
Error Subcategory	Additional drug required	2 (2.9%)	0 (0%)	2 (1.2%)	4 (1.1%)
	Contraindication	5 (7.1%)	4 (3.6%)	5 (2.9%)	14 (4%)
	Drug interaction	1 (1.4%)	0 (0%)	1 (0.6%)	2 (0.6%)
	No valid indication	20 (28.6%)	41 (36.6%)	95 (55.9%)	156 (44.3%)
	Indication	5 (7.1%)	20 (17.9%)	12 (7.1%)	37 (10.5%)
	Preventive drug required	14 (20%)	2 (1.8%)	3 (1.8%)	19 (5.4%)
	Administration time	0 (0%)	1 (0.9%)	0 (0%)	1 (0.3%)
	Selection is not the most effective	1 (1.4%)	3 (2.7%)	6 (3.5%)	10 (2.8%)
	Duplication	7 (10%)	5 (4.5%)	22 (12.9%)	34 (9.7%)
	Administration rate	0 (0%)	1 (0.9%)	0 (0%)	1 (0.3%)
	Dosing regimen	14 (20%)	35 (31.3%)	9 (5.3%)	58 (16.5%)
	Duration	0 (0%)	0 (0%)	13 (7.6%)	13 (3.7%)
	Monitoring not ordered	1 (1.4%)	0 (0%)	2 (1.2%)	3 (0.9%)
Error cause	Confusing drug insert	0 (0%)	0 (0%)	7 (4.1%)	7 (1.9%)
	Environmental factors	0 (0%)	16 (13.2%)	4 (2.4%)	20 (5.5%)
	Incomplete patient information	2 (2.9%)	2 (1.7%)	0 (0%)	4 (1.1%)
	Lack of information sources	4 (5.7%)	1 (0.8%)	13 (7.6%)	18 (5%)
	Lack of knowledge/ experience	61 (87.1%)	101 (83.5%)	133 (78.2%)	295 (81.7%)
	Cause unclear	3 (4.3%)	1 (0.8%)	13 (7.6%)	17 (4.7%)
Error severity	A. Circumstances may lead to error	1 (1.4%)	1 (0.8%)	1 (0.6%)	3 (0.8%)
	B. Error prevented before reaching patient	3 (4.3%)	11 (9.1%)	22 (12.9%)	36 (10%)
	C. Error reached patient with no harm	59 (84.3%)	98 (81%)	80 (47.1%)	237 (65.7%)
	D. Error reached patient & monitoring needed	4 (5.7%)	11 (9.1%)	67 (39.4%)	82 (22.7%)
	E. Error reached patient with temporary harm	3 (4.3%)	0 (0%)	0 (0%)	3 (0.8%)

*In 9 cases the cause was not stated

Table (4) Response of the physicians to clinical pharmacist reported DRP.

		Accepted N=229	Considered N=128	Rejected N= 21
DRP category *	Unnecessary drug N=191	95 (49.7%)	81 (42.4%)	15 (7.9%)
	Needs drug N=62	48 (77.4%)	13 (21%)	1 (1.6%)
	Selection N=27	15 (55.6%)	12 (44.4%)	0 (0%)
	Drug interactions N=2	2 (100%)	0 (0%)	0 (0%)
	Dosing regimen N=81	61 (75.3%)	15 (18.5%)	5 (6.2%)
	Instructions N=3	2 (66.7%)	1 (33.3%)	0 (0%)
	Monitoring N=10	5 (50%)	5 (50%)	0 (0%)
	Adherence N=2	1 (50%)	1 (50%)	0 (0%)
ICU **	Internal medicine N=70	62 (88.6%)	8 (11.4%)	0 (0%)
	Cardiology care N=134	96 (71.6%)	29 (21.6%)	9 (6.7%)
	Emergency ICU N=174	71 (40.8%)	91 (52.3%)	12 (6.9%)
C Ph. comment received by the prescribing physician ***	No N=156	78 (50%)	69 (44.2%)	9 (5.8%)
	Yes N= 222	151 (68%)	59 (26.6%)	12 (5.4%)

* Fisher-Freeman-Halton Exact Test = 32.367, p< 0.001

** X_2 (df=4) = 61.549, p <0.001 with statistically significant difference in the proportion of accepted comments in each pairwise comparison and a higher proportion of considered in the Emergency ICU compared with others

*** X_2 (df=2) =13.364, p=0.001. The proportion of accepting the comments is higher when the receiving physician was the one who prescribed the Medicines.

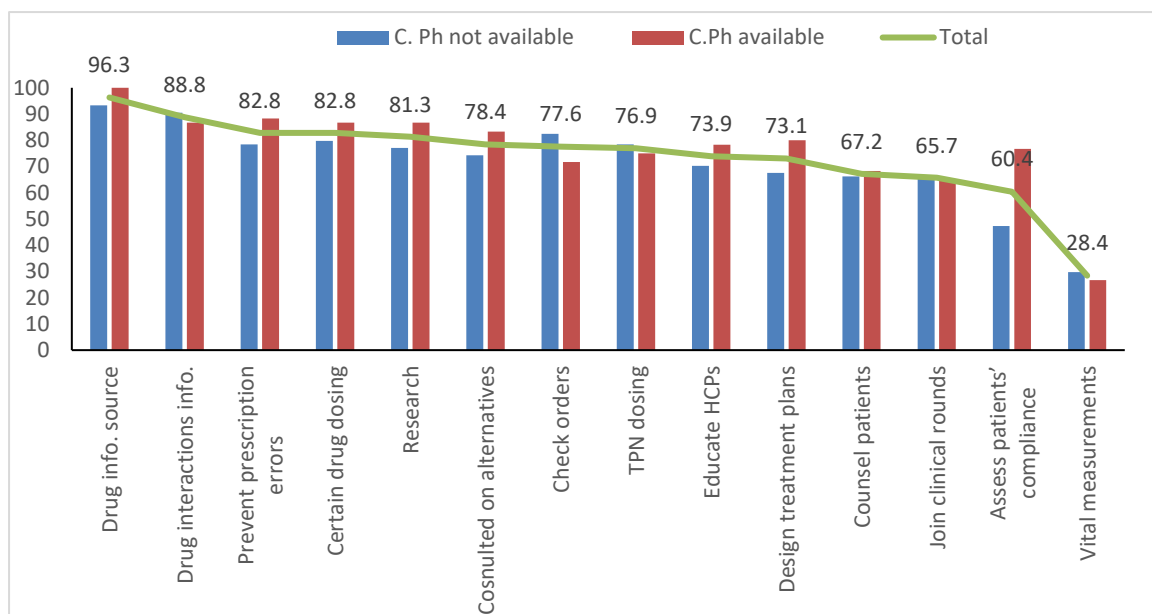


Figure 1: Percentage of physicians' perception (agree/strongly agree) of clinical pharmacist's roles, grouped by the availability of a clinical pharmacist. The line and data labels represent the percentages in the total sample (n=134).

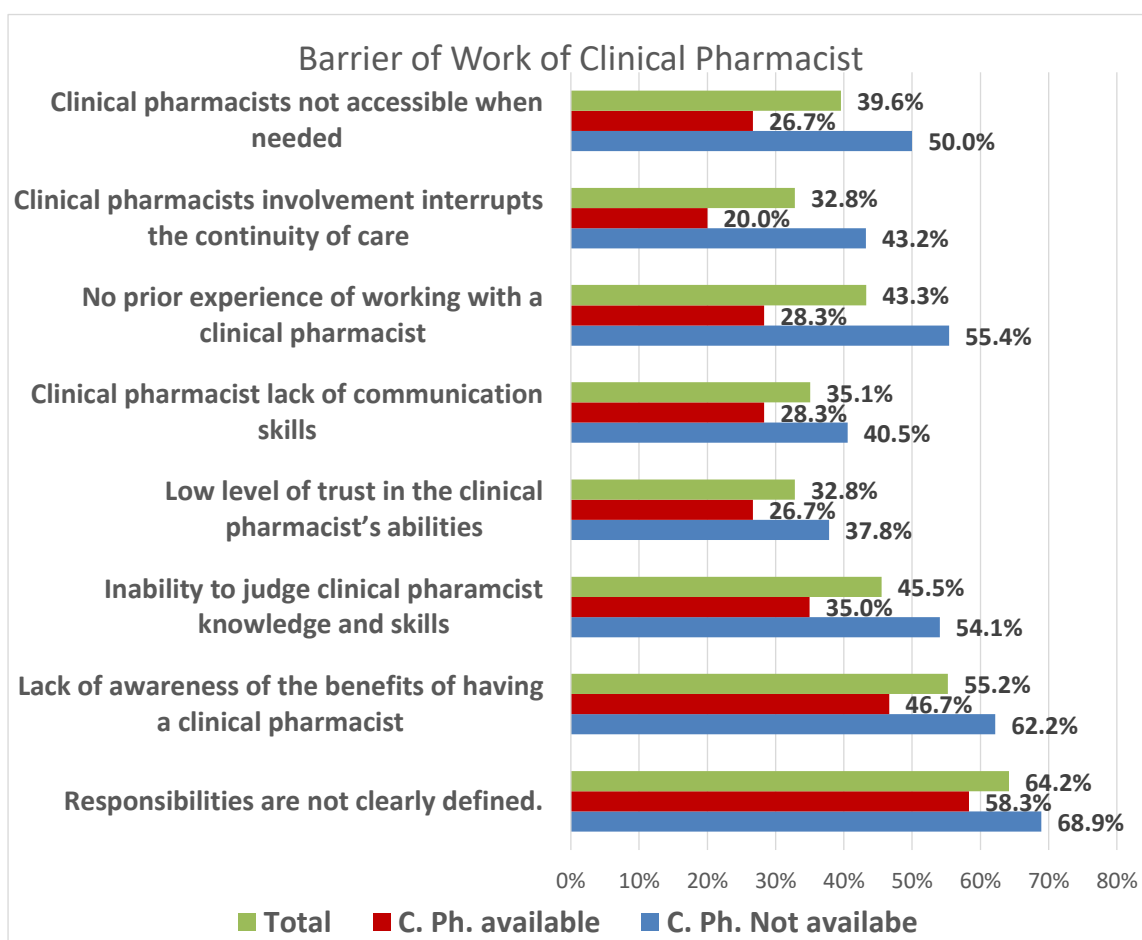


Figure 2: Barrier of Work of Clinical Pharmacist. Shows the percentage of physicians with available and not available clinical pharmacists who agree/strongly agree with the 8 statements considering barriers to clinical pharmacist role.

DISCUSSION:

The clinical pharmacist's role is not yet well recognized among some Healthcare providers (HCPs) and the public.

In this study, less than half of the sampled physicians worked with clinical pharmacists who were stationed only in ICUs. This reflects the slow integration of clinical pharmacy practice in Egyptian hospitals^[11].

Most physicians in the current study welcomed C. Ph. traditional role in providing information about drugs, drug interaction, drug alternatives, dosing, and monitoring in addition to education and research. This goes in line with previous studies which reported physicians' appreciation of C. Ph. functions mainly linked to medication management as medication selection and dose adjustment^[11,18&12]. In agreement with previous reports, physicians in the current study were less enthusiastic about C. Ph. involvement in direct patient care such as attending clinical rounds or counseling patients^[19&13]. Like a study conducted in Qatar in 2020, physicians in the current study perceived that clinical pharmacists' practice can minimize medication errors^[16].

Physicians in this study stated unclear C. Ph. responsibilities, unawareness of C. Ph. beneficial roles and doubts about C. Ph. competency as the main barriers to working with C. Ph. These major barriers were reported by similar studies in Egyptian hospitals, and in Qatar^[14&16]. Around one third of physicians were concerned about access and communication barriers, which were also reported in studies from Tanzania and Egypt^[20&14].

In the current study, more than 40% of the physicians considered the lack of previous work experience with C. Ph. as a barrier to current collaboration, especially for physicians in departments without C. Ph. This is consistent with limited collaboration

reported in a previous Sudanese study where nearly half of the physicians either had never or rarely interacted with a C. Ph.^[12]. Other reports have attributed physicians' discomfort with C. Ph. involvement in direct patient care, to the lack of exposure to C. Ph. practice^[19].

In the current study, we found two DRPs patient files on average. This is close to a mean of 1.8 DRPs per patient, reported by a study in a mixed Norwegian ICU and a 3.3 DRPs / patient reported in Qatar^[21&22]. In contrast, a much lower incidence of 0.26 DRPs/ Patient was reported by Indian study, however that study was conducted during the COVID-19 pandemic where access to medical records and proper review for DRPs were limited^[6].

Nearly half of the DRPs were detected in emergency ICU where "unnecessary drug" was the most common DRP. Need for an additional drug and dosing regimen problems were most common in internal medicine and CCU respectively. Similarly, a study from Thailand listed the need for additional drug, and unnecessary drug therapy among the most frequent DRPs^[23]. Also, studies in a Brazil and Turkey, reported a high frequency of unsuitable drug selection, and dosing regimen problems^[24&25].

Almost all medication errors in the current study were at the stage of ordering decision especially invalid indication and dosing regimen errors. A study conducted in Oman also found that most C. Ph. interventions addressed prescribing errors, inappropriate drug therapy, and drug dosage^[26].

Almost two thirds of the errors in the current study reached the patients with no harm, but nearly one fifth required monitoring, which is comparable to a study in Thailand reporting a 21.3% DRPs with potential harm in a medical ICU^[23].

Physicians in this study accepted around 60% and considered one third of C. Ph. recommendations regarding DRPs, with variation between sites and DRP types. The significant low acceptance in emergency ICU in the current study draws attention to the limiting effect that the special nature of physicians' practice, types and severity of cases may impact the effectiveness of C. Ph. role. It was also noticed that a significantly higher proportion of C. Ph. recommendations was received and responded to by physicians other than the prescribing physicians in emergency ICU compared to the other two sites. Acceptance rate in the current study falls somewhere between those observed in developed and developing countries. In multiple studies from the United Kingdom, Italy, Saudi Arabia, and from two hospitals in China, acceptance of clinical pharmacists' interventions reached or exceeds 90% [27, 28, 29, 30&31]. One study in mixed Norwegian ICU reported a combined rate of 87% accepted or considered DRP recommendations [21]. A study in an outpatient setting in Tehran reported that physicians accepted only 44.1% of C. Ph. recommendations and the authors have cited poor collaboration between C. Ph. and physicians [32].

Conclusions and recommendations:

Physicians view clinical pharmacists as facilitators of medication management whose efforts could help avoid drug interactions and prescription errors. However, Physicians were less supportive of clinical pharmacists' direct contact with patients. To overcome the barrier to collaboration, physicians need orientation about C. Ph. functions. Also, C. Ph. responsibilities need to be clarified. There is a need to research interventions with potential to improve physicians' response to clinical pharmacists' recommendations, especially in critical care.

Limitation of the study:

Only ICU prescriptions were reviewed for DRPs since clinical pharmacists were

stationed only in ICUs. Also, clinical pharmacists were not available to review files of patients admitted and discharged during holidays and weekends. Also, the data of this study was confined to only one hospital.

Conflict of interest:

No Conflict of interest.

REFERENCES:

1. **Rose AJ, Witt D, Azran C, Nissan R.** Seven key parameters that facilitate clinical pharmacy practice: a comparison between Israel and the United States. *Isr J Health Policy Res.* 2021 Jun 30; 10(1):37. Doi: 10.1186/s13584-021-00476-8.
2. **MacLaren R, Roberts RJ, Dzierba AL, Buckley M, Lat I, Lam SW.** Characterizing Critical Care Pharmacy Services Across the United States. *Crit Care Explor.* 2021 Jan 8; 3 (1): e0323. Doi: 10.1097/CCE.0000000000000323.
3. **Donaldson LJ, Kelley ET, Dhingra-Kumar N, Kienny MP, Sheikh A.** Medication Without Harm: WHO's, Third Global Patient Safety Challenge. *Lancet.* 2017 Apr 29; 389(10080):1680-1681. doi: 10.1016/S0140-6736(17)31047-4.
4. Europe P. C. DRP-classification V5. 01. 2013. June 2015, <http://www.Pcne.org/documenter/PCNE%20classification%20V5.00.pdf>.
5. **National Coordinating Council for Medical Reporting and Prevention,** About Medication Errors. 2023. <https://www.nccmerp.org>.
6. **Mandumpala JJ, Manoj A, Baby N, Mathai SE, Antony S, Tom AA.** Drug-related problems among inpatients of general medicine department of a tertiary care hospital in South India. *Asian J Pharm Res Health Care* 2023; 15:22-8.
7. **Alipour, F., Peiravian, F., and Mehralian, G.** Perceptions, experiences and expectations of physicians regarding the role of pharmacists in low-income and middle-income countries: the case of Tehran hospital settings. *BMJ Open* 2018; 8:

- e019237. Doi: 10.1136/bmjopen-2017-019237
8. **Kabba JA, James PB, Hanson C, Chang J, Kitchen C, Jiang M, Yang C, Fang Y.** Sierra Leonean doctors' perceptions and expectations of the role of pharmacists in hospitals: a national cross-sectional survey. *Int J Clin Pharm.* 2020 Oct; 42(5):1335-1343. Doi: 10.1007/s11096-020-01096-z. Epub 2020 Aug 8. PMID: 32772304.
 9. **Abdel-Latif MM, Sabra K.** Clinical pharmacy practice in Egyptian hospitals. *Am J Health Syst Pharm.* 2016 Jan 1; 73(1): e63-6. Doi: 10.2146/ajhp150250. PMID: 26683684.
 10. **El Anowr WM.** History of Clinical Pharmacy Practice in Egypt (Part 2) *Int J Pharm Teach Pract.* 2011; 2(2):61–63.
 11. **Sabry NA, Farid SF.** The role of clinical pharmacists as perceived by Egyptian physicians. *Int J Pharm Pract.* 2014; 22(5):354–359. Doi: 10.1111/ijpp12087.
 12. **Mahmoud MI, Maatoug MM, Jomaa AAAFA, Yousif M.** Sudanese Medical Doctors' Perceptions, Expectations, Experiences and Perceived Barriers towards the Roles of Clinical Pharmacists: A Cross-Sectional Study. *Integr Pharm Res Pract.* 2022 Jul 18; 11:97-106.
 13. **Khan N, Abbas A, McGarry K, Shahid S.** Perceptions and experiences of physicians regarding integration of clinical pharmacists in health practices: A survey of hospitals of Karachi. *Int J Allied Med Sci Clin Res* 2014; 2:222-34
 14. **Eldin MK, Mohyeldin M, Zaytoun GA, Elmaaty MA, Hamza M, Fikry S, Kamal S, Khalifa AE, Abouelnaga S.** Factors hindering the implementation of clinical pharmacy practice in Egyptian hospitals. *Pharm Pract (Granada).* 2022 Jan-Mar; 20(1):2607.
 15. **Said A, Hussain N, Abdelaty LN.** Physicians' and pharmacists' perception and practice of hospital pharmacist professional role in Egypt. *Int J Pharm Pract.* 2020 Oct; 28(5):491-497.
 16. **Omar NE, Elazzazy S, Abdallah O, Nashwan AJ, Eltorki Y, Afifi HM, Kassem N, Yassin M, Hamad A.** Perceptions and expectations of health care providers towards clinical pharmacy services at a tertiary cancer centre in Qatar. *J Oncol Pharm Pract.* 2020 Jul; 26(5):1086-1096.
 17. **Bizuneh GK, Adamu BA, Bizuayehu GT, Adane SD.** A Prospective Observational Study of Drug Therapy Problems in Pediatric Ward of a Referral Hospital, Northeastern Ethiopia. *Int J Pediatr.* 2020 Mar 20; 2020:4323189. Doi: 10.1155/2020/4323189. PMID: 32256614; PMCID: PMC7115047.
 18. **Hayat K, Mustafa ZU, Godman B, Arshed M, Zhang J, Khan FU, Saleem F, Lambojon K, Li P, Feng Z, Fang Y.** Perceptions, Expectations, and Experience of Physicians About Pharmacists and Pharmaceutical Care Services in Pakistan: Findings and Implications. *Front Pharmacol.* 2021 May 14; 12:650137.
 19. **Abduelkarem A, Sharif S.** Current levels of interaction between the physician and pharmacist: A comparative study in Libya and UAE. *Jordan J Pharm Sci* 2008; 1:146-55.
 20. **Kilonzi M, Mutagonda RF, Mlyuka HJ, Mwakawanga DL, Mikomangwa WP et al.** Barriers and facilitators of integration of pharmacists in the provision of clinical pharmacy services in Tanzania. *BMC Prim Care.* 2023 Mar 17; 24(1):72.
 21. **Johansen ET, Haustreis SM, Mowinckel AS, Ytrebø LM.** Effects of implementing a clinical pharmacist service in a mixed Norwegian ICU. *Eur J Hosp Pharm.* 2016 Jul; 23(4):197-202.
 22. **Kheir N, Awaisu A, Sharfi A, Kida M, Adam A.** Drug-related problems identified by pharmacists conducting medication use reviews at a primary health center in Qatar. *Int J Clin Pharm.* 2014 Aug; 36(4):702-6.
 23. **Tharanon V, Putthipokin K, Sakthong P.** Drug-related problems identified during pharmaceutical care interventions in an

- intensive care unit at a tertiary university hospital. *SAGE Open Med.* 2022 Apr 19; 10:20503121221090881.
24. **Molino CDGRC, Carnevale RC, Rodrigues AT, Visacri MB, Moriel P, Mazzola PG.** Impact of pharmacist interventions on drug-related problems and laboratory markers in outpatients with human immunodeficiency virus infection. *Ther Clin Risk Manag.* 2014; 10:631–639.
 25. **Abunahlah N, Elawaisi A, Velibeyoglu FM, Sancar M.** Drug related problems identified by clinical pharmacist at the Internal Medicine Ward in Turkey. *Int J Clin Pharm.* 2018 Apr; 40(2):360-367.
 26. **Al Rahbi HA, Al-Sabri RM, Chitme HR.** Interventions by pharmacists in out-patient pharmaceutical care. *Saudi Pharm J.* 2014; 22(2):101–106.
 27. **Bourne RS, Choo CL, Dorward BJ.** Proactive clinical pharmacist interventions in critical care: effect of unit speciality and other factors. *Int J Pharm Pract* 2014; 22:146–54.
 28. **Lombardi N, Wei L, Ghaleb M, Pasut E, Leschiutta S, Rossi P, Troncon MG.** Evaluation of the implementation of a clinical pharmacy service on an acute internal medicine ward in Italy. *BMC Health Serv Res.* 2018 Apr 10; 18(1):259.
 29. **Althomali A, Altowairqi A, Alghamdi A, Alotaibi M, Althubaiti A, Alqurashi A, Harbi AA, Algarni MA, Haseeb A, Elnaem MH, et al.** Impact of Clinical Pharmacist Intervention on Clinical Outcomes in the Critical Care Unit, Taif City, Saudi Arabia: A Retrospective Study. *Pharmacy.* 2022; 10(5):108.
 30. **Li X, Zheng S, Gu JH, et al.** Drug-Related Problems Identified During Pharmacy Intervention and Consultation: Implementation of an Intensive Care Unit Pharmaceutical Care Model. *Front.Pharmacol.* 2020;11:1-13
 31. **Zhu Y, Liu C, Zhang Y, et al.** Identification and resolution of drug-related problems in a tertiary hospital respiratory unit in China. *Int J of Clin Pharm.* 2019;41(6):1570-1577. DOI: 10.1007/s11096-019-00922-3.
 32. **Shahrami B, Sefidani Forough A, Najmeddin F, Hadidi E, Toomaj S, Javadi MR, Gholami K, Sadeghi K.** Identification of drug-related problems followed by clinical pharmacist interventions in an outpatient pharmacotherapy clinic. *J Clin Pharm Ther.* 2022 Jul; 47(7):964-972.

تصورات الأطباء واستجاباتهم لدور الصيادلة الإكلينيكيين في مستشفى تعليمي في مصر

سالي نبيل ابراهيم محمد 1، وفاء محمد حسين 2، مصطفى الحسيني مصطفى 2

قسم الجودة بمستشفى الأحرار التعليمي 1

قسم طب المجتمع والبيئة وطب الصناعات ، كلية الطب، جامعة عين شمس 2

الخلفية: التواصل الفعال بين الصيادلة الإكلينيكيين والأطباء له تأثير كبير على الحد من المشاكل المتعلقة بالأدوية والأخطاء الدوائية.

الهدف: تقدير نسبة الأطباء ذوي التصورات الإيجابية تجاه الصيادلة الإكلينيكيين. درسنا أيضاً استجابات الأطباء لتوصيات الصيادلة الإكلينيكيين فيما يتعلق بالمشاكل المتعلقة بالأدوية المكتشفة في وصفات وحدات العناية المركزة.

الطريقة: أجريت دراسة مقطعية في مستشفى الأحرار التعليمي في الأقسام مع وبدون الصيادلة الإكلينيكيين بين يونيو وديسمبر 2022. تم ملء استبيان ذاتي من قبل 134 طبيباً. يتكون الاستبيان من المعلومات الديموغرافية ، وتصورات الأطباء لأدوار الصيادلة الإكلينيكيين. ، والعوائق المتصورة التي تحول دون تحقيق هذه الأدوار. تم فحص الصيادلة الإكلينيكيين المشاكل المتعلقة بالأدوية في وصفات وحدات العناية المركزة لـ 244 و 182 و 65 مريضاً تم قبولهم في وحدة رعاية أمراض القلب ووحدة العناية المركزة للطوارئ ووحدة العناية المتوسطة باطنة على التوالي. تم تسجيل ردود الأطباء على توصيات الصيادلة الإكلينيكيين.

النتائج: اعتبر معظم الأطباء أن الصيادلة الإكلينيكيين هم مصدر للمعلومات عن الأدوية (129 ، 96.3%) والتفاعلات الدوائية (119 ، 88.8%). كانت مسؤوليات الصيادلة الإكلينيكيين غير الواضحة وعدم الوعي بالدور المفيد للصيادلة الإكلينيكيين هي العوائق الرئيسية. تم اكتشاف ما مجموعه 378 من المشاكل المتعلقة بالأدوية ، منها 361 اعتبرت أيضاً أخطاء دوائية. لوحظ أعلى معدل قبول لتوصيات المشاكل المتعلقة بالأدوية في وحدة العناية المتوسطة باطنة (88.6%) تليها وحدة رعاية أمراض القلب (77.4%) ووحدة العناية المركزة في حالات الطوارئ (40.8%) ، التوصيات الأكثر احتمالاً لقبولها هي تلك المتعلقة بالتفاعلات الدوائية (100%) ، واحتياج دواء اضافي (77.4%) ، وتوصيات نظام الجرعات (75.3%).

الخلاصة: كان لدى معظم الأطباء تصورات إيجابية لدور الصيادلة الإكلينيكيين على الرغم من أن المسؤوليات غير الواضحة ونقص الوعي كانت عوائق كبيرة أمام التعاون. تباينت قبول توصيات الصيادلة الإكلينيكيين بين الاماكن وأنواع المشاكل المتعلقة بالأدوية.