






Original Research

Information seeking behavior and awareness among physicians regarding drug information centers in Saudi Arabia

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Abstract

Background: The role of Drug Information Center (DIC) in a health-care setting has increased tremendously owing to the high influx of pharmaceutical molecules that pose serious challenges to physicians. DIC promotes rational prescribing behavior among physicians, leading to better patient outcome.

Objectives: This study aimed to explore information-seeking behaviors and awareness of physicians regarding DIC services in the Kingdom of Saudi Arabia.

Methods: A cross-sectional study was conducted among physicians working in government and private sectors between June to November 2018 by using an 18-item electronic anonymous questionnaire. Descriptive and inferential statistics were performed using IBM SPSS (Version 21). A P-value of <0.05 was taken as the level of significance between responses.

Results: In total, 500 questionnaires were distributed among the included hospitals, and only 254 physicians (response rate: 50.8%), including 193 males (76%), participated in the study. The majority of participants (n = 83, 32.7%) had more than ten years of experience, and many of the respondents (n=131) worked as residents. Most of the physicians (62.9%) were aware of their institutional DIC. UpToDate was the most preferred drug information database among physicians. Regarding the improvement required in the DIC services, most of the physicians (23.6%) opined that the contact details should be available in all clinical wards.

Conclusions: Only 10% of the respondents were not aware of the presence of DIC at their institution. The UpToDate online drug information database was the most frequently used database by the physicians. Our findings showed that there is a need for conducting educational programs for physicians regarding DIC services. Such an attempt can increase the frequency of drug-related queries and promote patient safety.

Keywords

Drug Information Services; Information Seeking Behavior; Awareness; Physicians; Reference Books; Surveys and Questionnaires; Saudi Arabia

INTRODUCTION

Professionals in clinical care experience information paradox but find it time-consuming to search and appraise scientific evidence.¹ Such professionals can take the help of Drug Information Centers (DICs) that provide unbiased and factual drug information, focusing on Patient-Oriented Evidence that Matters (POEMs).²⁻⁴ The POEMs strategy is based on the following three criteria: 1) it addresses a question that physicians encounter; 2) it measures the outcomes that physicians and their patients care about such as symptoms, morbidity, quality of life, and mortality; and 3) it has the potential to change the way physicians practice.⁵ However, self-reliance on information technology has affected the relationship between healthcare professionals and DIC personnel.

A previous study in Saudi Arabia that assessed DIC queries of a particular year at a 1400 bed setting revealed that merely 24% of physicians consulted DIC pharmacists for drug-related queries while the majority (61%) of the queries were asked by pharmacists.⁶ Likewise, a major DIC in Iran found that merely 19% queries were asked by physicians. Drug reference books, advice from colleagues, and scientific papers/journals were reported as the frequently utilized drug information resources by physicians.⁷ The brochures of pharmaceutical companies was another common source of drug information for physicians; however, brochures lacking appropriate scientific evidence can also compromise patient safety.⁸ Physicians are the first point of contact in clinical care, and their acquaintance with evidence-based drug information promotes rational prescribing behaviors that eventually lead to a better patient outcome.⁷

Although the first DIC was established in Saudi Arabia in the late 1970s, there is a dearth of empirical evidence pertinent to drug information seeking behaviors and acquaintance of practicing physicians regarding DICs in Saudi Arabia.⁶ Therefore, this study aimed to ascertain information seeking behaviors and awareness of physicians regarding DIC services. This study also aimed to calculate the average ranking of physicians' opinions regarding the improvement of DIC services. The findings of this study will aid in the

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implementation of awareness and educational programs, thus, improving the DIC services, frequency of drug queries, and patient safety.

METHODS

Design and setting

A cross-sectional survey was conducted between June 2018 to November 2018 for investigating information seeking behaviors and awareness of licensed physicians (working in the central, eastern, western and northern regions of the Saudi Arabia) regarding DIC services.

Of the total 415 hospitals (excluding health centers and private clinics) in Saudi Arabia, 249 hospitals are managed by the Ministry of Health. Almost half of the over 66,000 physicians in Saudi Arabia work for the Ministry of Health.⁹ In addition, it has been estimated that there are 24 physicians per 10,000 persons. Currently, there are 31 DICs in the Saudi Arabia that respond to inquiries from healthcare professionals and the public; however, not all hospitals in the Saudi Arabia have an operational DIC unit.⁶ Moreover, there is a National Drug Information Center under the umbrella of the Ministry of Health that aims to provide drug-related consultation services through the hotline calling service.¹⁰

Data collection and ethical approval

An 18-item electronic anonymous questionnaire was designed based on previous similar studies with some modifications.³ A web link of the survey questionnaire was distributed to 20 randomly selected group of private and government hospitals throughout the Saudi Arabia. In order to avoid selection bias, all physicians employed in the selected hospitals received an invitation to participate in the survey. The study objectives were included on the first page of the questionnaire under the consent statement to provide general information to the study participants. The questionnaire asked questions related to demographics, information seeking behaviors, awareness and opinions. This non-invasive study was initiated after obtaining approval from the Institutional Review Board of King Saud Medical City (Reference: H1RI-19-Mar18-01).

Sample size and statistical analysis

In order to elicit a response in 33% of respondents regarding awareness of DIC, with 95% confidence level, a sample size of 335 was estimated. The sample size was calculated by an online sample size calculator. Data analysis was carried out using the SPSS software, version 21 (IBM. Armonk, NY: IBM Corp). Descriptive and inferential statistics were used to report the data. The influence of gender, experience and designation differences on the responses of awareness of hospital and national DIC questions was evaluated by performing chi-square test.

Average ranking

Ranking questions (physician's opinion for improving DIC services) calculates the average ranking for each answer choice in order to determine the most preferred answer choice.¹¹ The answer choice with the largest average ranking is the most preferred choice.

The average ranking is calculated as follows:

Average ranking = $(x_1w_1 + x_2w_2 + x_3w_3 \dots x_nw_n)/\text{Total response count}$

Where,

x = response count for answer choice

w = weight of ranked position (weights are applied in reverse)

RESULTS

A total of 500 electronic questionnaires were distributed during the study period, and only 254 physicians completed the survey, i.e., 50.8% response rate. Majority of the respondents (n=193, 76%) were male, whereas one-third of the physicians (n=83; 32.7%) had over ten years of clinical experience. Nearly half of the respondents (n=131) were residents. Of these respondents, 85 (33.5%) and 46 (18.1%) were specialists and consultants, respectively. Regarding the use of DIC services, 48% of the respondents mentioned that they had used DIC services, and more than half of the physicians never contacted the DIC for drug-related queries during their professional practice. When asked about getting orientation from DIC personnel regarding DIC services, merely 36.2% of physicians responded positively. Moreover, 96 respondents (37.8%) had contacted DIC six months before the initiation of this study. Forty-two percent of the respondents indicated that they can get the required information from drug information databases available at their institution; this was the most common reason for not contacting the DIC. Other reasons were insufficient time (86, 33.9%) and lack of knowledge regarding DIC (78, 30.7%). The majority (66.1%) of the physicians contacted DIC by telephone, followed by the submission of papers or electronic forms (18.1%). The summary of these results is listed in Table 1.

The most frequently utilized DIC service by physicians was related to drugs (Table 1). Two-thirds of the queries asked by the physicians were related to the dosage and administration of drugs, followed by drug-drug interaction (58.7%) and adverse drug reaction (37%). Table 1 also shows that UpToDate was the most preferred drug information database among physicians, followed by Lexicomp and Micromedex. Majority of the respondents were aware of the existence of DIC at the institutional and national levels. Table 2 shows that there is a statistically significant difference between the designations of the respondents, earlier use of DIC services, received an orientation from the DIC pharmacist, and awareness of both institutional and national DIC.

The respondents ranked five opinions for the improvement of DIC services. Sixty physicians (23.6%) considered the availability of the DIC contact details in all clinical wards as the most important area of improvement. Eighty-six physicians (33.9%) considered training and orientation about DIC services as the most important area of improvement. More than half of the physicians (n=137) identified the frequent dissemination of recently published scientific studies to the healthcare professionals as the least important of the suggestions (Table 3).

Table 1. Characteristics and information seeking behaviors of physicians included in the survey (N = 254).		
Characteristics		N (%)
Gender	Male	193 (76)
	Female	61 (24)
Experience	Less than 2 years	51 (20)
	2-5 years	65 (25.6)
	6-10 years	55 (21.7)
	Over 10 years	83 (32.7)
Designation	Consultant	46 (18.1)
	Specialist	85 (33.5)
	Resident	123 (48.4)
Region	Central	174 (68.5)
	Eastern	5 (1.97)
	Western	13 (5.12)
	Northern	62 (24.41)
Have you ever used DIC services?	Yes	122 (48)
	No	132 (52)
Which drug information services you earlier used? (You may select more than one answer)	Drug-related question	108 (42.5)
	Formulary addition request form	39 (15.4)
	Direct purchase for non-formulary drugs	26 (10.2)
	Approved drug for unapproved indication "Off-label use" request form	33 (13)
	Summary of Product Characteristics	25 (9.8)
	Poison related query	42 (16.5)
	Drug recall	25 (9.8)
	Experimental/Investigational drugs	7 (2.8)
	None of them	102 (40.2)
	Have you ever received orientation from drug information pharmacist/personnel regarding DIC services?	Yes
No		162 (63.8)
Did you ask or requested any information regarding any drug from your hospital's DIC in the last 6 months?	Yes	96 (37.8)
	No	158 (62.2)
What are the possible reasons for not contacting DIC for any drug-related query? (Respondents were able to select more than one option)	Insufficient time.	86 (33.9)
	There is no DIC in your hospital/institute.	30 (11)
	I can get the information from a drug information database that is available in the hospital/institute.	108 (42.5)
	I do not know how to contact DIC.	78 (30.7)
	I do not know about the scope and services of DIC.	57 (22.4)
Other *	24 (9.4)	
Do you have access to any electronic drug information database in your hospital (e.g., Micromedex, Lexicomp, UpToDate)?	Yes	171 (67.3)
	No	48 (18.9)
	Not sure	35 (13.8)
What is the drug information database that you have in your hospital?	Lexicomp	71 (28)
	Micromedex	35 (13.8)
	UpToDate	87 (34.2)
	Other	61 (24)
In your opinion, what is the most common type of drug-related query you usually ask from DIC? (You may select more than one answer)	Dosage/Administration	171 (67.3)
	Drug-Drug Interaction	149 (58.7)
	Adverse Drug Reaction	94 (37)
	Drug availability/Formulary	87 (34.3)
	Pregnancy/Lactation	72 (28.3)
	Therapeutic Use/Indication	65 (25.6)
	General Drug Information	48 (18.9)
	Stability/Compatibility	25 (9.8)

What is the drug information resource that you prefer to use?		Lexicomp	62 (24.4)
		Micromedex	26 (10.2)
		UpToDate	100 (39.4)
		British National Formulary (BNF)	15 (5.9)
		Saudi National Formulary (SNF)	5 (2)
		Package Insert/ Drug leaflet	3 (1.2)
		Textbooks or electronic books	19 (7.5)
		Official websites (Saudi FDA, US FDA)	11 (4.3)
		Other	13 (5.1)
How do you usually contact DIC?		By telephone	168 (66.1)
		By email	18 (7.1)
		By visiting DIC	22 (8.7)
		Drug information form (paper/ electronic)	46 (18.1)
*Other: Most respondents mentioned that there is a clinical pharmacist in their ward so they ask them instead of contacting DIC, and some mentioned that they can get the information from the internet.			

DISCUSSION

As per our knowledge, this is the first study in the recent 15 years that assessed information seeking behavior and awareness regarding DICs among physicians in the Saudi Arabia. There is a scarcity of literature on the studied topic as the recently published studies mainly focused on the assessment of DIC services provided to the healthcare professionals.^{6,12} Similarly, previous studies predominantly reported the statistics of the DIC activities.

Our study shows that more than two-thirds of the respondents were male, reflecting the existing male and female proportionality among physicians.¹³⁻¹⁴ In addition, nearly one-third of the physicians were experienced professionals. This study also revealed that a majority of the physicians were aware of the existence of DIC at their institutions. However, these findings contradict earlier reports.^{3,15} Thirty-seven percent of the physicians contacted DIC six months before the initiation of this study, which accords well with the previous findings.³ In the present study, UpToDate was the most common online resource utilized by physicians for drug-related queries; this finding is comparable to the results reported in other studies.¹⁶ UpToDate is an evidence-based, peer-reviewed reference

that is accessible through the web and mobile application and requires an individual and group subscription.¹⁷ It provides updated clinical information at the point of care.¹⁸ A retrospective study in the US reported that the usage of UpToDate eventually reduced the patient's hospital stay and mortality rates.¹⁸ According to the findings of a cross-over randomized trial, healthcare professionals relatively spend less time on UpToDate for information retrieval compared to PubMed.¹⁹

In this study, two-thirds of the respondents sought information from DIC by telephone, which is in line with earlier reports.^{12,20} We also found that the most frequent type of DIC query requested by physicians was related to the dosage and administration of drugs. This strengthens the findings of previous studies.^{6,12,21} Our study revealed that a significant proportion of the respondents were aware of the hospital and national DICs after receiving DIC orientation regarding their services. This finding corroborates the findings of a study conducted in Malaysia.²² Physicians identified the availability of DIC contact number in every clinical ward as the most important area of need. This will facilitate the physicians to ask queries to the DIC personnel in a timely manner, thus avoiding delay in the treatment process and improving

Physician category	Awareness of hospital DIC; N (%)				Awareness of National DIC; N (%)			
	Yes	No	Not sure	p-value	Yes	No	Not sure	p-value
Gender				0.377				0.539
Male	122 (63.2)	23 (11.9)	48 (24.9)		85 (44)	68 (35.2)	40 (20.7)	
Female	38 (62.3)	4 (6.6)	19 (31.1)		22 (36.1)	24 (39.3)	15 (24.6)	
Experience				<0.001*				0.095
Less than 2 years	23 (45.1)	2 (3.9)	26 (45.1)		20 (39.2)	16 (31.4)	15 (29.4)	
2-5 years	40 (61.5)	5 (7.7)	20 (30.8)		20 (30.8)	26 (40)	19 (29.2)	
6-10 years	42 (76.4)	8 (14.5)	5 (9.1)		24 (43.6)	21 (38.2)	10 (18.2)	
Over 10 years	55 (66.3)	12 (14.5)	16 (19.3)		43 (51.8)	29 (34.9)	11 (13.3)	
Designation				0.036*				0.028*
Consultant	35 (76.1)	4 (8.7)	7 (15.2)		23 (50)	16 (34.8)	7 (15.2)	
Specialist	54 (63.5)	13 (15.3)	18 (21.2)		43 (16.1)	30 (18.1)	12 (14.2)	
Resident	71 (57.7)	10 (8.1)	42 (34.1)		41 (33.3)	46 (37.4)	36 (29.3)	
Have you ever used DIC services?				<0.001*				<0.001*
Yes	103 (84.4)	7 (5.7)	12 (9.8)		80 (65.5)	29 (23.8)	13 (10.7)	
No	57 (43.2)	20 (15.2)	55 (41.7)		27 (20.5)	63 (47.7)	42 (31.8)	
Have you ever received orientation from DIC pharmacist or personnel regarding drug information services				<0.001*				<0.001*
Yes	79 (85.9)	7 (7.6)	6 (6.5)		59 (64.1)	23 (25)	10 (10.9)	
No	81 (50)	20 (12.3)	61 (37.7)		48 (29.6)	69 (42.6)	45 (27.8)	

*p<0.05, level of significance

Table 3. Physicians' opinion on improving drug information services.

Rank n (%)	1	2	3	4	5	*Average rank
DIC contact information should be available in every ward	60 (23.6)	95 (37.4)	43 (16.9)	34 (13.4)	22 (8.7)	3.54
More training/orientation about DIC services should be provided	86 (33.9)	49 (19.3)	51 (20.1)	35 (13.8)	33 (13.0)	3.47
Providing mobile subscriptions of major drug information databases	58 (22.8)	66 (26.0)	66 (26.0)	39 (15.4)	25 (9.8)	3.37
Drug information services should be provided 24 hours in a healthcare setting	34 (13.4)	29 (11.4)	66 (26.0)	88 (34.6)	37 (14.6)	2.74
Frequent dissemination of latest scientific studies to healthcare professionals	16 (6.3)	15 (5.9)	28 (11.0)	58 (22.8)	137 (53.9)	1.88

*The average ranking = $(x1w1 + x2w2 + x3w3 \dots xnwn) / \text{Total response count}$; where: w = weight of ranked position. x = response count for answer choice

Note: The Ranking question asks respondents to compare items to each other by placing them in order of preference. Respondents rank the answer choices in order of preference, 1 being the highest and 5 being the least preferred. Weights are applied in reverse. In other words, the respondent's most preferred choice (which they rank as #1) has the largest weight, and their least preferred choice (which they rank in the last position) has a weight of 1.

patient safety. Training or orientation about DIC services was found to be the second most preferred choice for improving the services of DIC. It has been reported that the DIC of the largest and flagship tertiary care setting in the Saudi Arabia previously received merely 139 queries during one calendar year.⁶ However, physicians consider DIC pharmacists as a reliable source of information as they provide unbiased and factual information about drugs to the healthcare providers.^{2,23}

This is the first study that sought physicians' opinions for the improvement of DIC services in the Kingdom. The diversity in the studied hospitals ensured the generalizability of our findings. However, a limitation of this study is the relatively low number of respondents. This may be because healthcare professionals constantly receive irrelevant survey requests from different sources and, thus, could have ignored important surveys pertinent to their professional field such as our survey. Likewise, the low response rate is frequently cited as a weakness of online surveys.²⁴⁻²⁶ Nonetheless, our study sample is unlikely to be representative and lacks the power for statistical testing. As per earlier literature, electronic survey's response rates may only approximate 25% to 30% with the maximum rate

of 70%.²⁷ Our study response rate was well above the cited approximate range.

CONCLUSIONS

This study found that the majority of licensed physicians working in the Saudi Arabia were aware of the existence of DIC at the institutional and national levels. UpToDate was the most frequently utilized online drug information database among physicians in the Kingdom. Our findings revealed that there is a need to provide the contact details of DICs to all clinical wards. Training should also be provided to physicians regarding DIC services so as to facilitate drug consultation from DIC personnel and promote patient safety. Future studies are needed to explore the impact of DIC services on the professional performance of physicians.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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