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Barriers of healthcare professionals in utilizing the service of drugs and poison information Centre: A cross-sectional study



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ABSTRACT

Background: Health care professionals (HCPs) have been using drugs and poison information centre (DIC) less frequently in recent years. The purpose of this study was to identify the barriers that inhibit HCPs from using the DIC service in a tertiary care hospital, as well as the factors that assist HCPs in using DIC more effectively.

Methods: A cross-sectional study was conducted among HCPs in Sri Ramachandra Institute of Higher Education and Research, Chennai. HCPs were given a semi-structured questionnaire that was developed and validated by a subject expert, a public health expert, and a clinical psychologist, and their barriers and facilitators in accessing drug information services were recorded.

Findings: A total of 405 HCPs responded to the survey. Among the identified barriers, the top 3 were: HCPs found it easier to use mobile internet (31%) and the department's reference library (25%) instead of contacting DIC for any drug/poison information. In addition, 17% of HCPs stated that they were too busy. The factors that may assist HCPs utilize DIC more effectively were more awareness is required to demonstrate the functionalities of DIC (24%), and a mobile application is required (23%).

Conclusion: Today's HCPs have easy access to a variety of drug information resources, and many prefer to do their own drug/poison research. As current generation HCPs find it more convenient to use mobile internet than contacting DIC, the creation of a mobile application for drug information service may enhance the number of questions from HCPs.

1. Introduction

Drug information service is a specialized service that is provided by pharmacists to enhance knowledge of drugs allowing rational prescribing and minimizing drug related problems.¹ Drugs and poison information center (DIC) provides authentic, individualized, accurate, relevant, unbiased and well-referenced drug information including their indications, adverse effects, drug toxicity and drug safety aspects to the healthcare professionals (HCPs) and patients/consumers.² DIC plays a crucial role in providing pharmaceutical care services effectively and efficiently. It is accessible to any HCPs for pharmacotherapy related information and doubts that provides objective and unbiased information ensuring the safe use of medications.³ The center has a positive impact on improving the outcomes of drug therapy and promoting rational drug use.⁴⁻⁶

The first DIC, at the University of Kentucky Medical Centre, opened in 1962 with the purpose of providing a selected and comprehensive source of drug information for HCPs, allowing them to compare and analyze different pharmaceuticals.⁷ The World Health Organization (WHO) supports and encourages the creation of independent DICs as a core component of national health-care programs to assure quality health care and promote rational medication use.^{8,9}

To justify its budgetary requirements, the DIC could provide other value-added services in addition to drug information, such as poison information, adverse drug reaction monitoring, and training of postgraduate students in concerned and related subjects.¹⁰ Current advancements in medical sciences generate massive amounts of data regarding drugs and diseases. Unfortunately, developments in medication therapy have created an information gap for both HCPs and patients. This could lead to drug misuse. As a result, drug information services are meant to assist anyone who

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requires quick and evidence-based important information. They provide pharmacological and therapeutic care recommendations, thereby helping to alleviate the global problem of drug misuse.¹¹

Pharmacists working in DIC will be able to deal with a large amount of new information coming from various scientific publications, and DIC is readily available to HCPs in answering their questions or providing any recent updates, so HCPs will not have to waste time in examining drug information.¹² However, the use of DIC by HCPs has been decreasing in recent years. According to a review of the literature, no research has been carried out to determine the barriers that prevent HCPs from using the drug information service given by pharmacists in DIC. With this backdrop, the goal of this study was to identify the barriers that prevent HCPs from using the DIC service and the factors that help HCPs use DIC more effectively in a tertiary care hospital.

2. Methods

A cross-sectional study was conducted over a 6-months period (October 2021 to March 2022) at Sri Ramachandra Institute of Higher Education and Research (SRIHER), Porur, Chennai. Sri Ramachandra Medical Centre is a teaching tertiary hospital with 1800 beds for admitted patients. Medical, surgical, paediatrics, gynaecology-obstetrics, oncology, emergency, ambulatory, ophthalmology, psychiatric and dentistry departments, as well as numerous pharmacy units are all available at the hospital.

The DIC at SRIHER is staffed with Pharmacy Practice faculties and equipped with textbooks, journals, computers, internet access, intercom, as well as databases such as Up-to-date. The centre has a variety of forms, such as a Query form, a Feedback form, and a Quality Assurance form, that can be used to evaluate DIC's service. It is open Monday through Saturday from 8 a.m. to 4 p.m. During working hours, all HCP's queries are answered. The centre also serves as a practice site for graduating pharmacy students as part of their clinical rotation.

A 12-item semi-structured questionnaire (Appendix I) was developed to gather demographic information on HCPs, as well as their barriers to use drug information services and factors that motivate them to use effectively. The research team developed the questionnaire and had validated for its appropriateness by a subject expert, a public health expert, and a clinical psychologist. The questionnaire was distributed in person among HCPs in several departments after receiving Institutional Ethics Committee (IEC) permission (CSP/21/APR/93/320). The study comprised HCPs from the faculties of medicine, dentistry, nursing and clinical research who worked in hospitals. HCPs who refused to consent were excluded in the study. The data was entered in an excel sheet. Data entry was double checked by an independent researcher for quality assurance. Qualitative variables were expressed as percentages.

3. Findings

In total, 405 HCPs took part in the survey. Physicians accounted for 47% of the total, nurses for 33%, and dentists for 19%. The demographic characteristics of HCPs are shown in Table 1. The majority of the HCPs that took part in the study were under the age of 40 (84%). Women made up the majority of them (68%). The majority of HCPs (30%) had a Bachelor's degree in medicine and surgery and 2 to 10 years of experience (58%).

The awareness of DIC among HCPs is summarized in Table 2. A total of 239 people (59%) knew about DIC in the hospital. Among them, 79% of HCPs were unaware of the DIC's intercom and e-mail address. In the previous year, just 15% of the HCPs had approached DIC. The majority of the participants (92%) had visited DIC less than five times in the previous year, with 75% of the HCPs satisfied with the answers given to them.

Table 3 summarises the barriers that HCPs reported. Each respondent had given multiple responses. About 31% of participants felt more

Table 1
Demographic details of HCPs.

Variables	N (405)	%
Gender		
Women	274	68
Men	131	32
Age (in years)		
<40	342	84
>40	63	16
Designation		
Physicians	189	47
Nurses	135	33
Dentists	75	19
Clinical Trial Coordinator	6	1
Educational qualification		
MBBS	122	30
B.Sc. Nursing	93	23
MDS	42	11
MD	34	8
BDS	33	8
Diploma in Nursing	27	7
MS	25	6
Ph.D in Nursing	6	1
RNRM	6	1
M.Ch	5	1
Research manuscript editor	4	1
DM	3	1
ANM Nursing	3	1
Ph.D in Clinical Research	2	1
Work experience (in years)		
<1	103	25
2-10	234	58
>10	68	17

Abbreviations: MBBS = Bachelor of Medicine and Bachelor of Surgery, B.Sc Nursing = Bachelor of Science in Nursing, MD = Doctor of Medicine, BDS = Bachelor of Dental Science, MDS = Master of Dental Science, MS = Master of Science, Ph.D = Doctor of Philosophy, RNRM = Registered Nurse, M.Ch = Master of Surgery, DM = Post-doctoral Course, ANM = Auxiliary Nurse Midwifery.

convenient to use mobile internet rather than contacting DIC for any drug/poison information, and 25% of HCPs felt more convenient to utilize department's reference library rather than contacting DIC for any drug/poison information. 17% of respondents said that they were held up with routine work, no time to contact DIC for any drug/poison information. Other reported barriers of HCPs included were Unaware of DIC's contact details/person (12%), Unaware of DIC's scope/services in the hospital (8%) and the previous responses to the query were dissatisfied (2%).

Table 2
HCPs knowledge about DIC in hospital.

Responses	N (405)	%
Aware of DIC in hospital		
Yes	239	59
No	166	41
If yes,		
Aware of DIC intercom / mail ID		
Yes	51	21
No	188	79
Ever approached DIC in the past year		
Yes	36	15
No	203	85
Number of times approached		
<5	33	92
>5	3	8
Satisfied with answer given		
Yes	27	75
No	9	25

Abbreviations: ID = Identity, DIC = Drugs and Poison Information Centre.

Table 3
Barriers of HCPs in using DIC.

Responses	N (827)	%
It is more convenient to use mobile internet rather than contacting DIC for any drug/poison information	253	31
It is more convenient to use department's reference library rather than contacting DIC for any drug/poison information	207	25
Held up with routine work, no time to contact the DIC for any drug/poison information	143	17
Unaware of DIC's contact details / person	101	12
Unaware of DIC's scope / services in the hospital	67	8
DIC is not placed in a permanent location for easy access	38	5
Dissatisfied with the previous response to my query	18	2

Abbreviations: DIC = Drugs and Poison Information Centre.

The factors that encourage HCPs to use DIC are shown in Table 4. There were many responses from each respondent. About a quarter of the participants said that more awareness is required to demonstrate the functionality of DIC in the hospital. 23% of HCPs believe that using a mobile application is more convenient to submit the query, and timely answers are required (21%). According to over 21% of HCPs, DIC must operate 24 h a day, seven days a week. Other factors mentioned by HCPs included DIC contact information can be posted at all wards (4%), DIC can be placed closer to the emergency department for convenient access to poison-related queries, and HCPs can be encouraged through information leaflets and text messages. Aside from the facilitators mentioned by HCPs, the research team identified a few more, such as forming a DIC committee with a general medicine physician, an emergency medicine physician, a nurse, a clinical pharmacist, and other internal and external subject specialists to ensure the quality of the service provided. Clinical pharmacists can also assist with answering questions and promoting the DIC service. To raise awareness regarding the functionality of DIC, a sensitization effort among other HCPs is critical.

4. Discussion

The present study was carried out in a DIC that was located in a hospital. Physicians provided the most responses, followed by nurses, dentists, and other HCPs. Instead of contacting DIC for drug/poison information, today's HCPs find it easier to use mobile internet. HCPs also feel pressed for time when approaching DIC for drug/poison information. It is clear that technology has improved in recent years in terms of drug information, and most practitioners now have access to this information.

Other barriers mentioned by HCPs were a lack of knowledge of DIC's contact information/person, a lack of knowledge of DIC's scope/services in the hospital, and dissatisfied previous responses to the inquiry. Even though the response rate was low, there is still a need to address this in terms of timely responses and increased advertising of the DIC's presence to raise awareness among newly appointed/young HCPs.

The factors that motivate HCPs to use DIC were also gathered. More awareness is needed to illustrate the functionality of DIC in the hospital, according to almost a quarter of the participants. The majority of HCPs

believe that submitting the inquiry via a mobile application is more convenient. Due to the time constraints that HCPs have when approaching DIC, they believe that having a mobile app would be beneficial.

The DIC is an operational entity that provides up-to-date scientific and technical information on drugs and poison in an objective and timely manner. The centre offers the most effective technique for meeting the specific information needs of HCPs. For that matter, DIC should have adequate resources and specifically qualified professionals such as pharmacists, who can provide impartial and relevant information in response to the inquiries.¹³ Users can reach out to the centre by phone, in person, by fax, or through e-mail, and their queries will be answered verbally or in a structured written format.¹⁴

The DIC can be classified into three categories: hospital-based, industry-based, and community-based. The important functions of the hospital-based DIC include receiving and responding to the requestor calls, engaging in formulary decision-making, and delivering service education.^{15,16} In industry-based DIC, any user can communicate with the company through phone calls at any time during the peak hours. The telephone recording machine is cleared every hour; and the medical information staff can be contacted for any additional information if needed.¹⁷ Community-based DIC tries to modify patient behaviour through medication therapy, resulting in improved patient adherence and thereby improving health care quality.¹⁸

The processing of the queries registered in the DIC occurs through three different types of resources that include primary, secondary, and tertiary. The primary sources document the previously unpublished research papers or clinical studies, that records the clinical events such as adverse drug responses or unexpected therapeutic outcomes which will be published in the primary journal search engines. Secondary sources provide an overview of previously published work. IOWA Drug Information Service (IDIS), Medline, International Pharmaceutical Abstracts (IPA), Clinalert, PubMed (National Library of Medicine), Micromedex, Up-to-date, are few important secondary resources to procure information in DIC. Tertiary sources contain general literature such as textbooks and references which include American Hospital Formulary Services (AHFS), Martindale the Complete Drug Reference, Meyer's Side Effects of Drugs, Remington's Pharmaceutical Sciences, and United States Pharmacopoeia Drug Information (USPDI). These sources

Table 4
Facilitators of HCPs in using DIC.

Responses	N (1637)	%
More awareness is required to demonstrate the functionality of DIC in the hospital	390	24
Mobile application is required as it is more convenient to submit a query	381	23
Timely answers are required	361	21
24 × 7 function of DIC is necessary	358	21
Contact information for the DIC can be posted in each ward	68	4
Periodic SMS messages or e-mails can be sent to all HCPs to remind them about DIC services	37	2
Information leaflets describing DIC and its role might be distributed to all HCPs to encourage them to use the DIC service	25	2
DIC might be placed closer to the emergency department for convenient access to poison-related queries	17	1

Abbreviations: DIC = Drugs and Poison Information Centre, SMS = Short Message Service.

contain composite, condensed, and compressed information. All three resources indicated are available in the current study's DIC. When the above-mentioned sites fail to provide answers, further sources of drug information that include local and national websites, professionals and government organisations, and pharmaceutical companies/manufacturers can be used.¹⁹

The availability of clinical evidence and timely updates of different therapy and clinical conditions worldwide makes it difficult for the physician alone to finalize the treatment. Thus the involvement of drug information centre staff or clinical pharmacists with the treating physician in planning the treatment approach for the individual patient becomes necessary.²⁰ By providing drug information services, pharmacists assist the medical practitioner and other HCPs in individualizing patient therapy by pharmaceutical care or a group of patients as part of a disease management programme.¹³

Apart from answering drug/poison-related questions, pharmacist's responsibilities in the DIC include maintaining documents for recording details of the query and inquirer, promoting rational drug therapy, ensuring that services are evaluated at regular intervals, seeking regular feedback from inquirers that the drug information service has been provided in a timely and satisfactory manner, and performing quality assurance of the information, all of which have resulted in improved quality. However, the number of queries received from HCPs for whatever reason has plummeted.

In developing countries like India, irrational drug usage is a common phenomenon that has led to the occurrence of complications such as antibiotic resistance, adverse drug reactions, drug interactions and other drug related problems. There are other contributing factors such as lack of unbiased drug information, availability of more than 60,000 formulations and lack of time which makes the clinicians unable to update their knowledge about drugs thereby resulting in increasing demand for independent, specific and unbiased drug information for better patient care.²¹ To maintain consistency in the service provided and for better functioning of the centre, it is important to evaluate the functioning and quality of the services provided by the centre at constant intervals.²²

Though there are multiple sources to clarify the queries generated by HCPs and patients, the pharmacy department faces various challenges while running a DIC in an hospital setup. One of the most difficult challenges is obtaining a permanent location in the hospital's main area. The DIC requires a minimum of resources, including a computer, printer, internet, journals, text-books, and databases, as well as labour. During the past decades, most of the HCPs did not have access to the internet, thus it was mandatory for them to approach a DIC for any drug/poison related information queries. The situation has changed right now. Thus, during the present internet booming era, the public, including HCPs, have been increasingly using the internet and mobile devices to clarify their queries. Moreover, most of the medical colleges have a drug information database to which all HCPs are subscribed. As a result, all HCPs have easy access to the database to look up answers to their questions. These reasons have led to a decrease in the number of queries reported in the DIC premises during the present years. It is to be attributed to the fact that the number of

queries decreased is not directly proportional to the centre's quality of service. Only HCPs prefer to approach DIC if they are unable to find an answer. As a result, the research was carried out in order to document and improve the identified barriers. The novelty of this study is that no literature has been published before on HCP's barriers to DIC, and this is the first study of its kind to document HCP's barriers and facilitators.

4.1. Limitations and future perspective

The obstacles that might be faced by the patients were not documented. In addition, this study is limited to a single area. It may not reflect the perception of all HCPs and hence the results cannot be generalized. The study's long-term goals include gathering patient-reported barriers and facilitators, sensitising all HCPs in the hospital, comparing the number of inquiries before and after sensitization, and developing a mobile application for DIC. Future research in this area could also have the following research questions: "What types of drug information do practitioners need help finding?" and "How do practitioners handle complex drug information queries?"

5. Conclusion

HCPs prefer to use mobile internet over DIC and they rely on the library available in the department for any information, since they feel more convenient with it. Increasing awareness about DIC's potential and the development of a mobile application are the crucial aspects that could help HCPs in using DIC more effectively. In order for HCPs to better utilize the DIC, appropriate measures must be taken to alleviate the identified barriers of HCPs.

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Author contributions

HM, AV, RV, IDD, TS, AA, AS, BBN, MK and MGR contributed to the concept and design of the work; HM, AV, RV, IDD, TS, AA, AS, BBN and MK acquired all data; HM, AV, RV and IDD contributed to data analysis; HM, AV, RV, IDD and MGR drafted the article; all authors revised it critically for intellectual content; all authors have participated sufficiently in the work for appropriate portions of the content. All authors approved the submission of the manuscript for publication.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix I

Questionnaire form

Date: / /

Demographic details

Name (optional) : _____ Initial

Age (in years) :

Gender : Male Female

Educational Qualification : _____

Designation : _____

Department : _____

Work experience in SRIHER : years/months

INSTRUCTIONS:

This questionnaire is intended to acknowledge the barriers in utilizing the Drug and poison Information Center

Tick (✓) the appropriate option suitable to you

S.No.	Knowledge about the Drug and poison Information Centre (DIC)	Yes	No
1.	Are you aware of Drugs and poison Information Center (DIC) at SRIHER?		
IF YES,			
2.	Have you ever approached Drug and poison Information Center?		
3.	How many times have you visited Drug and poison Information Center (DIC) in a year?		

4.	Did you get enough information when you approached Drug and poison Information Center (DIC)?		
5.	Are you aware of the Intercom number / Mail ID of DIC to give your query?		
According to you, what are the reasons for not utilizing DIC?			
6.	I prefer using internet in the mobile phone as it is more convenient rather than contacting DIC for any drugs/poison information		
7.	I am held up with routine work so no time to contact the DIC for any drugs/poison information		
8.	I prefer using department's reference library as it is more convenient than contacting DIC for any drugs/poison information		
Please mention for any other reason:			
What do you think can encourage healthcare professionals to utilize the service of DIC?			
9.	More awareness is required to demonstrate the functionality of DIC in SRIHER		
10.	A mobile application is required as it is more convenient to submit a query		
11.	24x7 function of DIC is necessary		
12.	Timely answers are required		
Please mention for any other reason:			

Thank you for your response

To be filled by data collector

How cooperative the healthcare professional in giving response

 Extremely very moderately slightly not at all

Other issues, if any

Name of the data collector

Date / / Verified By: Entered By: Date Entered: / / **References**

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