

Implementation of Drug Information Services in a Tertiary Care Hospital: Patients' and Physicians' Perception

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ABSTRACT

Background: This study aimed to establish and promote drug information services for healthcare professionals and patients in a tertiary care hospital, and to assess the level of awareness and utilization of the center. **Materials and Methods:** This prospective observational study was conducted from November 2021 to May 2022. A pilot study was conducted using a validated questionnaire to assess the level of awareness of drug information services among 200 healthcare professionals and patients. The second part of the study involved the collection of medication-related queries from patients and healthcare professionals through a drug information request and documentation form. The data collected over six months included the professional status and specialty of the enquirer, the mode of receipt of the query, the purpose of the enquiry, the time frame to reply, and the queries received based on gender. **Results:** The questionnaire revealed that among healthcare professionals, most of the queries received were from Duty medical officers (31.6%), and the majority of respondents (86%) felt that a drug information center was necessary. Among patients, the majority (71%) were unaware of the drug information center, but a large number (94%) felt that establishing such a center would be useful. A total of 383 queries were analyzed, with most received in April (46.99%) and from the gastroenterology department (20.62%). The majority of queries were received during ward rounds (46.2%) and for updating knowledge (61.1%). Frequently asked questions were related to medication information (26.74%) and were obtained from patients (23.8%). Most answers were provided through WhatsApp (64.22%) and were replied to within a day (48.6%). In the feedback process, 88% of healthcare professionals felt that the response was appropriate, while 12% did not feel the same. Among patients, 92% felt that the response was appropriate, while 8% did not. **Conclusion:** The establishment of drug information services led to an increase in awareness and utilization of the center for unbiased drug information. The center provided a valuable resource for healthcare professionals and patients in AIG Hospital, Gachibowli, Hyderabad.

Keywords: Drug Information, Awareness, Drug enquiries, Information resources.

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INTRODUCTION

Drug Information Services (DIS) are essential in the healthcare system, providing accurate and unbiased information primarily to address patient-oriented drug problems. Trained clinical pharmacists and doctors of pharmacy professionals are qualified and registered under the Board of State Pharmacy Council to offer information that optimizes drug therapy. The World Health Organization (WHO) recognizes the DIC as a core component of national programs to promote the rational use of drugs.^{1,2}

Despite the increasing range of available drugs and multiple combinations of treatments being introduced, physicians lack

the time to update their knowledge about drugs. As a result, there is a growing demand for independent and unbiased drug information to improve patient care. In India, irrational use of drugs is common, leading to antibiotic resistance, Adverse Drug Reactions (ADRs), drug interactions, and other Drug-Related Problems (DRPs). Therefore, it is vital to provide relevant, up-to-date, and easily accessible drug information to healthcare professionals.^{3,4}

The primary function of the DIC is to access drug information sources and disseminate them to the requester. Possible sites for the location of a DIC include the Ministry of Health, hospitals, universities, non-government organizations, and the private sector. These services detect and prevent ADRs, and medication errors, and promote the rational use of drugs, achieving quality use of medicines by providing and communicating timely, accurate, balanced, and comprehensive information on drugs and their usage.^{1,5}



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In August 1997, the Karnataka State Pharmacy Council established the first independent Drug Information Centre (DIC) in India. This center was registered with the International Register of DIS, making it a significant achievement. The JSS Ootacamund, MSPC Thiruvananthapuram Medical College in Kerala followed suit in setting up their DICs. The WHO India country office collaborated with KSPC to set up five DICs across Rajasthan (Raipur), Goa (Panaji), Haryana (Sisra), Assam (Dibrugarh), and Chhattisgarh (Raipur) to provide organized drug information to healthcare professionals and consumers.³⁻¹⁰

The aim and objectives of this study are to implement drug information services, provide drug information to healthcare professionals and patients, and promote awareness of DICs to enhance their utilization in a tertiary care hospital. The study also aims to promote evidence-based practice and rational drug use to improve patient care. The establishment of a Drug Information Centre provides accurate and unbiased information to healthcare professionals and patients and can optimize drug therapy while preventing DRPs. By utilizing DICs, healthcare professionals can improve their knowledge and enhance patient care.

MATERIALS AND METHODS

Setting

This prospective observational study was conducted at AIG Hospital, Gachibowli, Hyderabad, a tertiary care hospital, between November 2021 and May 2022.

Study Sample

The study sample consisted of 311 healthcare professionals, including doctors, nurses, clinical pharmacists, paramedics, and 382 in-patients, for the assessment of drug information services. The study was conducted for six months with prospective data collection, and the sample size was calculated using EPI-Info 7 software.

Inclusion and exclusion criteria

The inclusion criteria for the study were healthcare professionals, including doctors, nurses, clinical pharmacists, and paramedics, as well as in-patients. Community pharmacists from the city and outpatients from the hospital were excluded from the study.

Ethical Approval

The study protocol underwent rigorous review and was approved by the Institutional Ethics Committee of the hospital on 18th February 2022 (ECR/346/Inst/AP/2013/RR-19).

Data Collection and Statistical Analysis

To assess the awareness of drug information services among healthcare professionals and patients, a structured, self-administered online questionnaire was developed using Google Forms. A pilot study was conducted in small groups

to validate the questionnaire. The validated questionnaire was tested on 311 healthcare professionals and 382 patients. The second part of the study focused on collecting medication-related queries from patients and healthcare professionals using a drug information query request form and documentation form. The data collected over a period of four months were analyzed based on the professional status of the enquirer, demographics of the enquirer, specialty of practice, mode of receipt of query, purpose of inquiry, and response time.

The collected data were analyzed using Microsoft Excel, and the results were expressed as numbers and percentages. Descriptive statistics were used, with means and standard deviations for numerical data, and summary frequencies and percentages for categorical data.

RESULTS AND DISCUSSION

A survey was developed to gauge the level of understanding regarding Drug Information Services (DIS) among medical practitioners and patients. Initially, the survey questions were crafted and a preliminary study was conducted with a group of medical practitioners and patients to ensure the appropriateness of the questions. A limited number of questionnaires were distributed among both focus groups, namely medical practitioners and patients. Based on the feedback received, necessary adjustments were made, and the validated DIS Awareness questionnaire was created using Google Forms. This questionnaire was then utilized to assess the awareness of DIS within both focus groups.

A total of 315 medical practitioners and 382 patients were invited to complete the online questionnaire aimed at evaluating their awareness of DIS. Participants from both groups were educated about DIS and encouraged to seek information through this service in the future. Subsequently, inquiries were gathered using drug Information request forms and documented. A total of 383 inquiries were gathered from medical practitioners and patients, and appropriate responses were provided in the preferred manner of the inquirers. Lastly, feedback was obtained from the medical practitioners and patients regarding their experience (Figures 1 and 2).¹¹

Evaluation of Awareness among Healthcare Professionals

Among the healthcare professionals who completed the DIC awareness form, the distribution of gender revealed that Females accounted for 56% and Males for 44%.

In terms of age, the healthcare professionals who participated in the DIC awareness form were categorized as follows: 20-30 years old (42%), 31-40 years old (39%), 41-50 years old (11%), and 51-60 years old (8%).

The study encompassed a diverse group of healthcare professionals functioning within the hospital setting. This group included

District Medical Officers (DMOs) comprising 32% of the participants, Nurses contributing 11%, Cardiologists accounting for 9%, Diplomate of National Board (DNB) members making up 7%, and Gastroenterologists representing 5%, constituting the highest proportion of contributors.

Participants were queried about their preferred websites for accessing medical information, and the results indicated that Medscape was the most frequently visited website (55%), followed by 1mg (12%), and Up-to-Date (8%).

When participants were asked if they utilized any databases to address their queries, findings revealed that 25% of respondents did not utilize any database for resolving doubts. Remarkably, 32% of individuals relied on Medscape for this purpose. Approximately 19% turned to PubMed, while 14% utilized Micromedex to seek answers to their inquiries.

Among those who acknowledged using a database, further inquiry was made regarding whether the database required a subscription fee or was available for free. The data demonstrated that a majority of healthcare professionals (68%) opted for a subscription-based database, while a portion (32%) utilized a free database.

Participants were inquired about the frequency of their utilization of Drug Information (DI) sources. The findings highlighted that the largest group, consisting of 232 individuals, were daily users of the Internet for this purpose. The most prevalent cumulative resource employed was seeking advice from colleagues, attributed to their accessibility and frequent interaction with healthcare professionals. On the other hand, the option of utilizing databases was selected less frequently, as it necessitates comprehensive research and time. The least utilized resource was University/Library resources, with 114 participants never utilizing this source, possibly due to the demanding schedules of healthcare professionals.

Regarding offline resources, participants were queried about their preferred references for addressing queries. Colleagues emerged as the most preferred choice, garnering 80% of the responses.

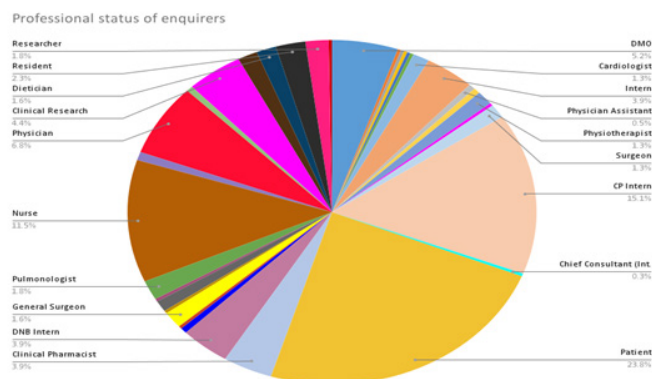


Figure 1: Professional status of enquirers.

Senior doctors followed at 54%, possibly influenced by some hesitancy in approaching them. Notably, 19% of participants sought answers from pharmacists, recognizing their ability to dedicate time to addressing inquiries.

When asked about the frequency of receiving answers, the results indicated that 77% of respondents consistently received answers, 20% received them intermittently, and 3% rarely received responses.

Participants' satisfaction levels after receiving answers exhibited variability. Approximately 44% expressed being very satisfied, while 49% indicated being somewhat satisfied, suggesting room for enhancement through a dedicated Drug Information Center (DIC) offering evidence-based answers. Additionally, a minority of 2% expressed being very dissatisfied with the responses received. Addressing these concerns could be achieved by establishing a robust communication network between healthcare professionals and the DIC.

The participants were asked whether there is a need for a dedicated DIC for getting their queries resolved reliably. A total of 86% of people felt the need for DIC service in the hospital whereas 14% of people were satisfied with their available options and did not feel the need for a DIC.

Evaluation of Awareness among Patients

Among in-patients who completed the DIC awareness form, 58% were males and 42% were females. Patient age distribution was as follows: 10-20 (6%), 21-30 (26%), 31-40 (26%), 41-50 (20%), 51-60 (13%), 61-70 (6%), 71-80 (2%), and 81-90 (1%). 61% of participants searched online for information, while 39% did not. Regarding preferred websites, 17% used 1mg, 13% used Pharm Easy, 12% used WebMD, 19% used other websites, and 39% did not use any.

Approximately 48% lacked direct physician contact, highlighting the importance of a directly accessible DIC for answers. Regarding consultation time satisfaction, 64% were satisfied, and 36% desired more time. 29% were aware of the Medicine Information Center, while 71% were not. 21% had approached the Medicine

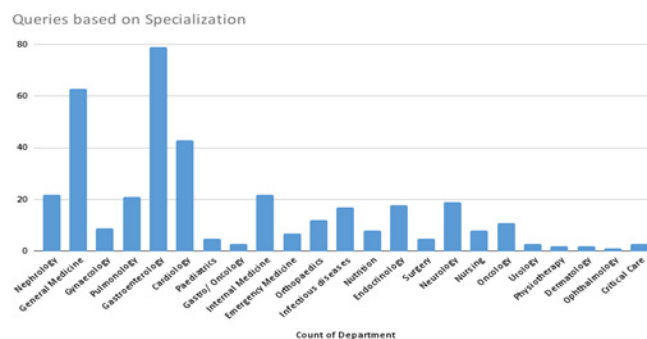


Figure 2: Distribution of queries based on Specialization.

Table 1: Frequency of use of DI sources by HCPs.

Sources	Daily	Weekly	Monthly	Yearly	Never
Internet	232	75	8	-	-
Databases	35	132	63	6	79
Ask a colleague	94	138	63	20	-
University/ Library sources	21	60	68	52	114

Table 2: Distribution of queries based on the category of questions.

Category	Number	Percentage
Education	115	26.74
Others	60	13.95
Treatment/ Management	54	12.55
ADRs	41	9.53
Administration/ Dosage	37	8.60
Indication	35	8.13
Pharmacokinetics	27	6.27
Interactions	18	4.18
Efficacy	12	2.79
Drug of Choice	9	2.09
Drug Profile	7	1.62
Poisoning	6	1.39
Alternate Treatment	4	0.93
Pregnancy/ Lactation	3	0.69
Availability/ Cost	2	0.46

Information Center previously, while 79% did not, with an 8% gap even after awareness.

Satisfaction after response: 66.66% satisfied, 33.33% not satisfied. 94% felt a DIC was necessary for acquiring knowledge, while 6% felt it unnecessary. 95% supported a DIC in every hospital, while 5% did not. DIC benefits: cost-effectiveness, time-saving, better treatment options, and improving knowledge (39% selected).

Preferred query types: medicine-related (59%), disease-related (57%), nutrition (28%). Preferred response method: WhatsApp (57%), Telephone (30%), In-person (27%), E-Mail (23%). 95% believed DIC could improve healthcare, while 5% did not. 92% intended to approach DIC in the future, while 8% did not. Top of Form

Analysis of Queries

During the study period, Drug Information queries were collected and organized based on various parameters.

A total of 383 queries were received at the drug information center between February 2022 and May 2022. The highest number of queries, 180 (46.99%), was received in April, followed by May with 96 (25.06%), February with 63 (16.45%), and March with 44 (11.48%). A verbal discussion was conducted through one-to-one

interactions with healthcare professionals, resulting in a notable increase in query submissions. This trend aligns with findings from studies by Mohammed *et al.* and Sapan Kumar Behera *et al.* (Tables 1 and 2).

The majority of queries were obtained during ward rounds, accounting for 177 (46.2%). Other modes included direct access with 159 (41.5%) queries and telephone with 47 (12.3%). Direct access was the second most common mode, consistent with findings from Peter *et al.*

Among the queries, 171 (44.6%) were from males, and 212 (55.4%) were from females.^{9,12,13}

Among the received queries, the majority (23.8%) came from patients, followed by CP interns (15.1%) and nurses (11.5%). Physicians (6.8%), DMOs (5.2%), clinical research department (4.4%), DNB interns (3.9%), and clinical pharmacists (3.9%) also contributed. The least queries originated from residents (2.3%), researchers, and pulmonologists (1.8%), dieticians, general surgery (1.6%), physiotherapists (1.3%), surgeons (1.3%), physician assistants (0.5%), and chief consultant (0.3%).

While one of the primary purposes of Drug Information Services (DIS) is to enhance patient care, more queries were related to knowledge updates (236 or 61.61%) than to improving patient care (147 or 38.38%), aligning with previous findings by Vijayakumar TM *et al.* and Kumar S V *et al.*^{14,15}

During the study, a subset of queries required immediate responses (10 or 2.6%), and 60 (15.7%) needed responses within 30 min. This underscores the crucial role of DIS, administered by clinical pharmacists, in prompt patient care, as also observed in studies by Jayasudha J *et al.* and Bhavsar R *et al.*^{16,17}

Responses to queries were primarily conveyed through WhatsApp (246 or 64.22%), followed by verbal communication (72 or 18.79%), a combination of WhatsApp and verbal (41 or 10.70%), email (19 or 4.96%), and a combination of email and verbal (5 or 1.30%), in line with the approach adopted by Mohan P Joshi.⁷

Among health care professionals most of the queries were received from the Gastroenterology department 79(20.62%), followed by the General Medicine Department 63(16.44%), and the least was received from the Ophthalmology department 1(0.26%) as the same was reported by Venkatraghavan *et al.*¹⁸

Our prospective analysis illustrated that most of the queries were asked regarding education 115 (26.74%) and the least were

regarding availability/cost 2 (0.46%). The previously categorized "others" queries (60 or 13.95%) were reclassified as follows:

Unclassified: 17 (10.2%), Complications: 9 (9.2%), Diagnosis: 9 (9.2%), Causes: 7 (4.2%) Categories (Compatibility, Factors): 3 (1.8%), Categories (Risk Factors, Causes/Risk Factors, IV Dilutions, Guidelines): 2 (1.2%), Treatment Goals, Signs and Symptoms, Newer Drugs, Clinical Presentation: 1 (0.6%).

Feedback from HCPs

The feedback from HCPs was collected using a form. Out of 50 participants, most were DMOs (12 or 24%) and DNB (9 or 18%), followed by Gastroenterologists and Pulmonologists (6 each, totalling 12%).

88% of respondents found the responses appropriate, with 12% disagreeing. Among those who found the responses appropriate, the majority rated them as excellent (24 or 48%), followed by very good (12 or 24%), good (8 or 16%), and satisfactory (6 or 12%).

Respondents were particularly interested in improvements (19 or 38%), followed by better patient care (15 or 30%), prompt information (10 or 20%), and 6 (12%) sought general improvement. Those who found the service not useful cited extensive data usage (4 or 66.7%) and outdated information (2 or 33.33%) as primary reasons.

HCPs' overall performance rating: very good (24 or 48%), good (12 or 24%), satisfactory (9 or 18%), and 5 (10%) selected none.

Feedback from Patients

Regarding the received responses, 92% of participants found them appropriate, while 8% did not. Participants' perception of answer appropriateness: Excellent (30 or 60%), Very Good (8 or 15%), Good (8 or 15%), and Satisfactory (4 or 10%).

Respondents showed a keen interest in improving knowledge (23 or 46%), followed by timely information (13 or 26%), compliance (10 or 20%), and 4 (8%) expressed ineffectuality. Participants' overall performance rating: Very Good (30 or 60%), Good (8 or 15%), Satisfactory (8 or 15%), and 4 (10%) selected none.

CONCLUSION

Drug Information Centers are widely recognized as the primary gateway to reliable drug information. These centers have proven to be an impressive resource for all levels of individuals involved in the healthcare system, from patients to providers. They contribute by providing access to up-to-date information and ensuring the safe and effective use of medications.

Since the inception of Drug Information Services (DIS), the focus has been on testing awareness among Healthcare Providers (HCPs) and patients. A total of 86% of HCPs acknowledged the need for DIC services in hospitals, while 95% of patients believed that DIC services could improve overall healthcare. Moreover,

92% of patients expressed interest in approaching DIS in the future.

This increased awareness has led to a steady rise in the number of queries received. During the study period, a total of 383 queries were received, with most of them (46.2%) being received during ward rounds. The primary purpose of the majority of queries (61.61%) was to update knowledge. The Gastroenterology department accounted for the most queries (20.62%) as the hospital specialized in gastroenterology. The most commonly used resources for retrieving drug information to answer the query were the Drugdex database, Drug Interactions, IV compatibility, Neofax reference, Paediatrics reference from Micromedex, Cochrane, and a few tertiary references.

Feedback collected from HCPs and patients revealed that 88% of HCPs and 92% of patients felt they received appropriate responses, and most were satisfied with the answers provided by the DIC. Updating knowledge ultimately leads to better patient care. Therefore, the center proved to be a valuable resource for HCPs and patients at AIG Hospital in Gachibowli, Hyderabad.

However, there were some limitations to this study, including the lack of quality assurance of the drug information provided and the exclusion of out-patients. To improve the effectiveness of the DIC, more awareness procedures can be implemented in the future.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ABBREVIATIONS

DIC: Drug Information Center; **DIS:** Drug information service; **HCP:** Health care Professional.

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