



## Evaluation of drug information services provided by Clinical Pharmacists in a resource limited setting of India

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### KEYWORDS

Drug information center, Clinical Pharmacist, Clinical Pharmacy Services, Adverse Drug Reaction, Drug related problem

### ABSTRACT:

**Objective:** The primary aim of this study was to assess the responses of a clinical pharmacist at a recently established drug information and patient counseling center to various drug information queries received in a resource-limited setting of India.

**Method:** A prospective study on drug information requests received was conducted from December 2021 to May 2023. Socio-demographic information, how inquiries were received and responded to, types of references used, etc. were recorded in a specially designed data collection form based on a “modified systemic approach” for a drug information query. Requester’s Informed consent was also obtained. The acquired data were analyzed using Microsoft Excel for Windows. To simplify reporting, descriptive analysis was performed using frequencies and percentages and results obtained were presented in tables.

**Findings:** During the study period, a total of 423 drug information queries were received, majority were through direct walk-in (50.12%), written format (33.81%) followed by telephonic communication (12.53%). More than 50% of the queries were from people having graduate qualification (54.14%), and (25.06%) having high school qualification.

**Discussion:** In our study the number of query received (423) were less as compared to other studies. Majority of queries were related to side effect and use of drugs. The tertiary sources such as textbooks and internet resources were the most frequently used resources to answer the queries.

**Conclusion:** To make the services more effective, drug information center should be evaluated for economic and clinical outcome of the services provided. Further, there is a need to publicize the importance of drug information services among health care professionals and to the society for promoting the rational use of medicine.

### INTRODUCTION

In recent decades, medical sciences have evolved dramatically as the number of medications and therapeutic

methods has increased. On the other hand, a lot of biomedical literature comes onto the market every day. Therefore, it is a great challenge for a health care



practitioner to keep abreast of the latest trends in drug therapy and to promote rational use of drugs<sup>1</sup>. Lack of impartial drug information is one of the main reasons for irrational drug use, which may lead to adverse drug reactions and treatment failure<sup>2</sup>. Hence, Drug information service (DIS) is a unique service which is provided by clinical pharmacists or Pharmacists to update the knowledge about drugs, facilitates rational prescribing and minimizes medication related errors<sup>3,4</sup>. According to International Pharmaceutical Federation (FIP), it is a pharmacist's responsibility to ensure that a patient receives the necessary drug information for the safe and effective use of medications<sup>5</sup>. The Drug Information Center (DIC) renders healthcare professionals, Patients and consumers with well-referenced, unbiased, personalized, and accurate drug information including its indications, side effects and other aspects<sup>6</sup>.

Historically, the concept of drug information gained popularity around the 1960s, and the first drug information center was established at the University of Kentucky Medical Center in 1962 in USA<sup>7</sup>. In developed countries, Drug Information (DI) is frequently accessible on other hand, most of the DICs in low- and middle-income countries (LMICs) have limited access to current literatures and limited dissemination of information due to financial constraints<sup>8</sup>. Due to the lack of these services, national health system committees are unable to update current medication lists, and information about proper medication use and other drug-related consequences is still a common problem<sup>9-10</sup>.

## DIS in Indian Scenario

In India, illogical usage of drug is very common, which may lead to Adverse Drug Reactions (ADRs), drug interactions, antibiotic resistance, and other Drug-Related Problems (DRPs). So, it is necessary to provide relevant, up-to-date, and easily available DI to healthcare professionals and general public<sup>11</sup>. To tackle the situation, in August 1997, Karnataka State Pharmacy Council established its DIC which aimed to disseminate unbiased drug information for health-care practitioners. It is recognized as the first autonomous DIC to be registered with the International Registry of Drug Information Service (IRDIS). A total of 15 DICs in India, known to be independent DICs, providing clinical pharmacy services.<sup>12</sup>

## Overview of DIC in an institutional setup of a remote village in North Eastern part of India

In September 2021, a Drug information and Patient counseling centre was established in Jully Basti area of Arunachal Pradesh with a mission to provide unbiased information about the drugs and diseases to general public and ultimately to promote rational use of drugs and patient safety. Although it was established in April, 2021, but due to COVID-19 situation, it was almost non-functional up to November 2021. In the end of November 2021, a three-member team (One registered pharmacist with Master's degree in Pharmacology and two registered pharmacists with Bachelor of Pharmacy) was formed under the supervision of a registered Pharmacist with a Doctor of Pharmacy qualification. The members were provided with basic training on how to respond to a DI request and they were entrusted with the responsibility to render fulltime DI service. The DIC is active from Monday to Friday in a week and seven working hours in a day.

## Available resources and facilities

In order to provide quality DI to the community, the centre has variety of DI sources including an electronic database and a library with vast reference books. The DIC is equipped with one computer, a printer and Internet access. To date, no study has been conducted focusing on the process of requests received by DIC in the region.

## MATERIALS AND METHODS

### Study design:

It was a Prospective, observational, community based unicentric study.

**Study duration:** The study was conducted for a period of 18 months from December 2021 to May 2023

**Study site:** Newly established Drug Information & Patient Counseling Centre (DIPC) in an institutional setup of Jully Basti area of Arunachal Pradesh, India

### Ethical approval:

Ethical clearance was obtained before the initiation of the study. All study objectives, as well as data protection and analysis methods, were explained. All study protocols were approved by the institutional ethics committee of Sanjeevani Cancer Hospital, Chhattisgarh, India.



### Study procedure and data collection process:

Modified systematic approach was followed for answering and documentation of drug information query<sup>13-14</sup>. Documented DI requests were evaluated based on various parameters such as requester's demographics, qualifications, method of receiving requests and their response, category of request, references used and feedback of the enquirer. The captured data was analyzed using Microsoft Excel for Windows 11. Descriptive analysis was carried out using frequencies and percentages for ease of reporting and the outcome were presented in tables.

### Selection Criteria

#### Inclusion criteria:

- A. All patients or general public and health care professionals visiting or sending queries via email, telephone or social media to DI&PC or "Mobile Pharmaceutical Care Unit" (In health camps)
- B. Guardians or patient relatives having some drug or disease related query or issues.

#### Exclusion criteria:

- A. Patients approaching to have some information for self medication with Schedule H, H1 and X drugs.
- B. Patients who have been confirmed or diagnosed as having psychiatric problems or disorders.
- C. Patients/persons with confirmed alcohol or drug intoxication.
- D. People who have questions about drugs that can encourage suicide.
- E. Patients who are unwilling to provide their identification or contact information

### Operational definitions

**Drug Information Centre:** A center open to all Health care professionals and the public for any questions regarding medicines.

**Drug information query:** A question related to any aspect of drug raised by a person in need.

**Direct walk-in:** An enquirer who can directly come to DI&PC to get the response of his query.

**Written format:** Specially designed DI request form based on Modified systematic approach to DI query.

### RESULT

#### Sociodemographic information and general characteristics of DI queries

During the study period, the DIC received and responded to a total of 423 drug information requests. The questioners included (251; 59.34%) men and (172; 40.66%) women. Most inquiries were made by participants who had a college degree (54.14%), a high school qualification (25.06%), and less than a high school education (20.80). The 18-40 age group accounted for the majority of inquiries (336; 79.43%), followed by the 41-60 age group (78; 18.44%), and almost 2.3% (9) of the requests came from people over 60 years old. (Table 1).

The DIC received majority of inquiries in the following ways: direct walk-in to the DIC (212; 50.12%), in writing (143; 33.18%), by telephone (53; 12.53%) and a few by email (15; 3.553%). Most of the queries were patient-specific (356; 84.16%), to update knowledge (40; 9.46%), and others (27; 24.3%). The responses were given in following manner: orally (227; 53.66%), in printed format (143; 33.81%) and by telephone (53; 12.53%). The time frame for an authentic response ranged from one minute to 8 hours, with the majority of the requests (283; 66.90%) being responded to in 5 to 30 minutes. Sequentially, slightly less than a quarter of the inquiries (103; 24.35%) were responded to within 5 minutes. Maximum time range to respond the queries were 4 to 8 hours (03; 0.71%). The references used were: textbooks (226; 53.43%), Internet resources (138; 32.62%), package inserts (35; 8.27%), internal database (13; 3.07%), other (11; 2.60%). (Table 2).

#### General Classification of Query

The Majority of queries were related to adverse drug reactions/side effects (110; 26%), Pharmacology (102; 24.11%), Therapy (61; 14.42%), Interactions (56; 13.24%), Availability (48; 43.2%), Administration (8; 1.89%), other (7; 6.3%), Pharmaceuticals (6; 1.42%), Pregnancy (4; 0.95%), Pharmacokinetics (3; 0.71%). (Fig. 1).

#### Classification of query based on pharmacological category of drug.

The majority of DI requests in the pharmacological categorization were related to acid suppressants/PPIs (68, 16.07%), oral hypoglycemic agents (66, 15.06%), less than a



quarter were from antibiotics (56, 10.63%), steroids (42, 9.92%), (Fig. 2).

### Frequency of queries received on monthly basis during study period

Averages of 20.35 requests were received at the start of the nine-month study period from December 2021 to August 2022. In the later phase from September 2022 to May 2023, a significant increase was observed with an average of 28.8 requests received (Fig.3)

### Enquirer's Feedback

After evaluating feedback question one "Did you clearly understand the information about the medications provided?", it turned out that the majority of questioners (389; 91.9%) were fully agreed that they have clearly understood the information about the medications provided by the CP, Less than 10% (30, 7.0) tended to somewhat agree that they clearly understood the information provided. Six questioners remained neutral in their opinion, while one disagreed on understanding the information clearly. When

evaluating the second question "Would you like to use this type of DI service in the future?" it was found that (421; 99.5%) of the inquirers were strongly in favor to have DI service in future, while (02; 0.47%) were somewhat agree to have DI service in the future. Analysis of third question "Are you satisfied with the quality of service in relation to Communication and Delivery?" Revealed (370; 87.47%) enquirers were strongly agreed to found the service effective, while (23; 5.4%) found the service somewhat good, (10; 2.36%) remained neutral and (20; 4.72 %) were somewhat disagreed to have a good service. After evaluating the feedback question four "Do you think that a pharmacist needs to be consulted if there are medication problems?", it was found (400; 94.5%) that the respondents strongly agreed to consult a pharmacist if there were medication problems, (15; 3.54%) were somewhat agreed to consult a pharmacist, (06; 1.41%) remained neutral and (02; 0.47%) were somewhat disagreed to consult a pharmacist. (Table 3)

**Table 1. Description of requester demographic details.**

Variables	n	Percentage (%)
<b>Gender</b>		
Male	251	59.34
Female	172	40.66
<b>Educational Qualification</b>		
Less high school	88	20.80
High school	106	25.06
Graduate	229	54.14
<b>Age</b>		
18-40	336	79.43
41-60	78	18.44
> 60	9	2.13



Table 2. Description of general characteristics of DI requests received and responded.

Variables	n	Percentage (%)
<b>Mode of receiving queries</b>		
Walk-in	212	50.12
Telephone	53	12.53
Written Form	143	33.81
Email	15	3.55
<b>Type of queries</b>		0.00
Patient Specific	356	84.16
To upgrade Knowledge	40	9.46
Others	27	6.38
<b>Time taken to answer queries</b>		
0 - 5 minutes	103	24.35
5 - 30 Minutes	283	66.90
30Mins-1Hr	32	7.57
1 - 4Hrs	02	0.47
4 - 8Hrs	03	0.71
<b>Source of information</b>		
Reference books	226	53.43
Internet resources	138	32.62
Package inserts	35	8.27
In-house database	13	3.07
Others	11	2.60
<b>Mode of response</b>		
Oral	227	53.66
Printed Format	143	33.81

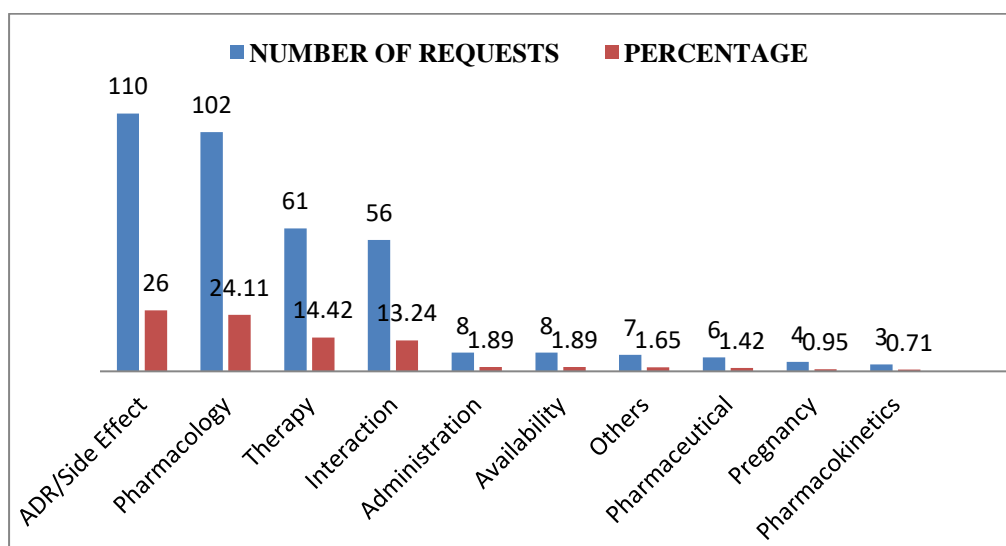


Fig. 1 General classification of the requests received.

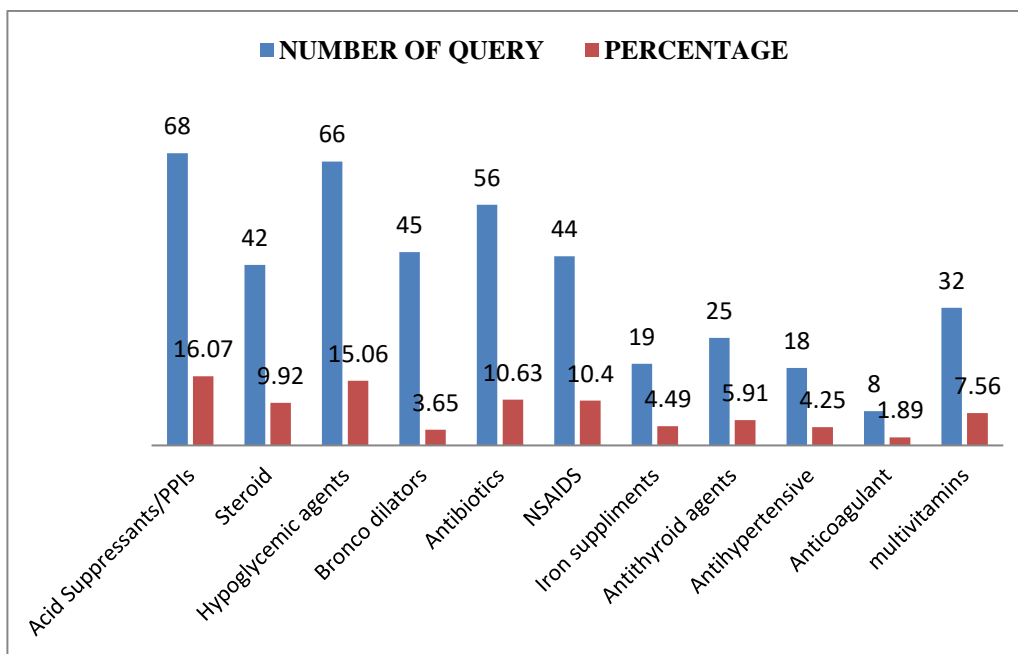


Fig. 2 Description of the pharmacological categories of the drugs

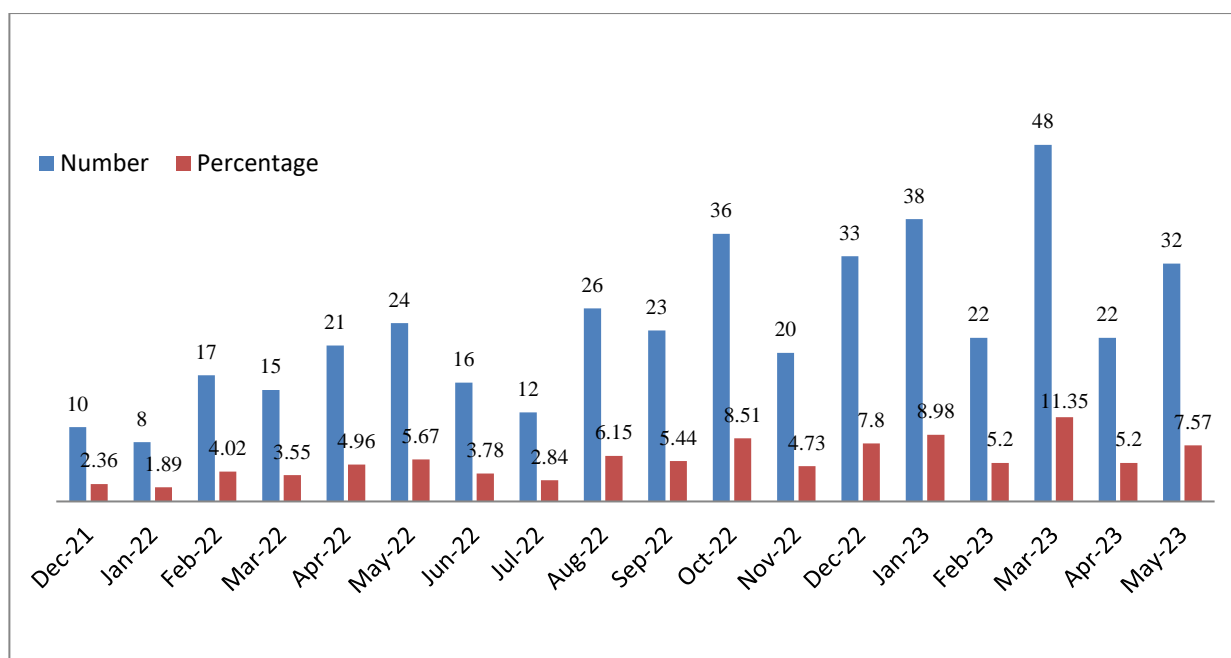


Fig.3 Description of the number of DI requests received monthly during the study period.



Table 3. Enquirer's feedback after receiving DI response

Enquirer's feedback after Receiving DI Response		
<b>Did you clearly understand the information about the medication provided</b>		
Strongly Disagree	0	0.00
Somewhat Disagree	1	0.23
Neutral/No Comment	6	1.41
Somewhat Agree	30	7.0
Strongly Agree	389	91.9
<b>Whether you may like to have this type of DI service in future?</b>		
Strongly Disagree	0	00
Somewhat Disagree	0	00
Neutral/No Comment	0	00
Somewhat Agree	2	0.47
Strongly Agree	421	99.5
<b>Are you satisfied with the quality of service (Communication and Delivery)?</b>		
Strongly Disagree	0	0.00
Somewhat Disagree	20	4.72
Neutral/No Comment	10	2.36
Somewhat Agree	23	5.43
Strongly Agree	370	87.47
<b>Do you think, a Pharmacist/Doctor must be consulted for any drug related Issues?</b>		
Strongly Disagree	0	0.00
Somewhat Disagree	2	0.47
Neutral/No Comment	6	1.41
Somewhat Agree	15	3.54
Strongly Agree	400	94.5





## DISCUSSION

In our study, the number of requests received (423) was lower than in other studies<sup>15-16</sup>. This is because the DIC is newly established and has received less attention from the public due to COVID -19 pandemic situations at the early phase of nine months of study started from December 2021 to August 2022.

In our study, most of the inquiries received from general public having a university degree, which is not comparable to other studies in which most of the inquiries were generated from healthcare professionals such as doctors, pharmacists, nurses and healthcare students, and very few of them were reported, by general public or patients.<sup>17-20</sup>. This is due to the fact that our study was conducted in a community where health care practitioner's availability is not common due to its remote location, while the other studies were conducted in tertiary care hospital settings.

The mode of receiving DI was through direct access (50.12%) which is similar to a study conducted by Jeevangi VM et al.<sup>21</sup>. The majority of responses (53.66%) were given verbally which is similar to a study result conducted by Beena et al.<sup>22</sup>. This may be because the questioner asked for an immediate answer. In this study, most requests were patient-specific, which is not comparable to other studies in which requests were related to knowledge updating and other aspects<sup>23-24</sup>. The reason we received more patient-specific queries in our study may have been due to better interaction between patient and CP.

Similar to our study, the results of the study conducted by Venkatraghavan S et al. and Rajanandh M.G et al. showed that questions about ADRs and dosage were the most frequently asked DI questions. On the other hand, the most commonly used resources to answer the questions were tertiary sources such as textbooks and the Internet<sup>25-26</sup>. Unlike our study, many studies used Micromedex® as a resource for providing immediate drug information<sup>27-29</sup>. In our study we did not use Micromedex due to its high subscription costs.

A thorough evaluation of feedback questions of requesters revealed very high percentage of acceptance or satisfaction in receiving the drug information services rendered by CP. Which is similar to other studies conducted in India as well as other countries.<sup>30-31</sup>. Additionally requesters were

strongly agreed to have DI services in future. The reason may be due to better interaction and confidence between enquirers and CP.

## LIMITATIONS AND FUTURE PERSPECTIVE

As the DIC was newly established, there were many limitations in our study. First, the economic and clinical outcome of the service was not assessed as it is an assessment of long-term outcome. However, if evaluated in the future, it could provide a clearer picture of the clinical significance of DIS. Furthermore, the study was conducted in a single area, so the result cannot be generalized

## CONCLUSION

This study was conducted to evaluate DIS provided by CP in a resource-limited community. Patients and CP were found to have a strong association as majority of enquiry were patient-specific. This is critical to the growing role that CP can play in patient care and addressing specific drug-related needs of the rural community in India. After reviewing applicants' feedback questionnaires, it is observed that majority of enquirer were satisfied with the quality of services provided by CP. Furthermore, private and public health systems should work together to establish more DICs to ensure quality patient care. In addition, healthcare organizations should conduct more awareness programs to promote and encourage widespread use of drug information services.

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