ASSESSMENT AND UTILIZATION OF DRUG INFORMATION SERVICES AND CREATING AWARENESS FOR ENHANCED UTILIZATION OF DRUG INFORMATION CENTER IN A TERTIARY CARE TEACHING HOSPITAL

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ABSTRACT

Objective: The objective of this study is to assess the utilization of drug information services and create awareness for enhanced utilization of drug information center in the hospital.

Methods: A retro-prospective observational study conducted from September 2015 to February 2016. The data obtained from drug information (DI) request, documentation, and feedback forms are analyzed for the parameters such as professional status of enquirer, mode of receipt of query, purpose of enquiry, time frame to reply, and references used. Awareness about drug information services was created in the hospital by circulating brochures and interacting with health-care professionals.

Results: A total of 943 queries were retrospectively analyzed. Most of the queries obtained from a post-graduate/intern (50.27%), during ward rounds (57.48%), and asked for updating knowledge (76.35%). Frequently asked questions were about indications of drugs (18.60%). Mostly answers given as printed (66.70%), replied within a day (46.45%) by using Micromedex (54.72%). The majority of the enquirers rated the DI services as good (54.93%). A total of 394 queries were prospectively analyzed. Most of the queries obtained from physicians (42.23%), during ward rounds (59.89%), and asked for updating knowledge (49.49%). Frequently asked questions were about adverse drug reaction (21.28%). The mode of reply to the queries given mostly in printed format (41.14%), replied within 2-4 hrs (33.75%) by using Micromedex (40.56%). The majority of the enquirers rated the DI services as good (46.98%).

Conclusion: The drug information services provided were useful for various health-care professionals to maintain rational drug therapy by giving unbiased and well-reviewed information.

Keywords: Drug information center, Drug information service, Drug information query, Micromedex drug database.

INTRODUCTION

Drug information service is the service that encompasses the activities of specially trained individuals to provide accurate, unbiased, factual information, primarily in response to patient-oriented drug problems received from various members of the health-care team [1]. These activities are undertaken by the especially well-trained individuals, i.e., clinical pharmacist and doctor of pharmacy professionals who are qualified and registered under the Board of State Pharmacy Council in providing information to optimizing the drug therapy [2]. Providing drug information is a fundamental responsibility of all pharmacists irrespective of the practice setting [3]. The World Health Organization (WHO) stated that drug information center (DIC) is a core component of national programs to promote the rational use of drugs [4]. Drug information is key to preventing medication errors. Such information leads to enhanced quality of patient care and thus improved patient outcome [5].

Drug use is a complex practice even a small mistake, and incomplete information has catastrophic implication in patients and results into noncompliance, therapeutic failure, overdosage, medication errors, drug interactions and adverse drug reactions (ADRs), which concurrently lead to ineffective and irrational use of drugs. According to the WHO, 60% of drug related problems can be prevented with appropriate information of drugs [6]. Lack of time is some of the factors that make the physicians unable to update their knowledge about drugs which have resulted in an increasing demand for independent and unbiased information about drugs for better patient care [7]. Information must be available in a format suitable for health practitioners and relevant to current clinical practice [8]. In India, irrational use of drugs is common, and this has led to antibiotic resistance, ADRs, drug interactions, and other drug-related problems [9].

The primary function of the center is in accessing to the drug information source and dissemination of the same to the requestor [10]. Possible sites for the location of a drug information center include the ministry of health, hospital, university, non-government organization, and the private sector [11]. According to available data, these services can help to detect and prevent ADRs, medication errors and promote rational use of drugs [12]. The center was intended to be utilized as a source center where people could call or contact health-care professionals and ask medicine-related questions [13]. DICs aims to achieve the quality use of medicines by providing and communicating timely, accurate, balanced and comprehensive information on drugs and their usage [14].

In 1962, the first drug information center was initialized at the University of Kentucky Medical Center [15]. In India, Rosemary sharp, a missionary from UK, started the first drug information center at Christian Medical College, Vellore in the early 1970s [16]. Later the Karnataka State Pharmacy Council (KSPC) established its Drug Information Centre in August 1997 to disseminate unbiased drug information to health-care professionals. The center has been registered with International Register of Drug Information Services [17].

Recognizing the need to provide organized drug information to health-care professionals as well as consumers, the WHO India Country Office in collaboration with the KSPC has supporting the establishment of 5 drug information centers. These centers have

been established in Haryana (Sirsa), Chattisgarh (Raipur), Rajasthan (Jaipur), Assam (Dibrugarh), and Goa (Panaji). They started functioning in 2007 [18].

Quality assurance in DIS can be deciding what services are to be provided, providing them, measuring how well the services were provided, and if the services were not found to be acceptable or optimal, undertaking some correctional activity to ensure that future services will be acceptable [19]. In developing countries like India, there are only a few DICs and are limited by lack trained staff, funds and by limited access to current literature. This clearly signifies that there is a need for periodic evaluation of mode of functioning and quality of services provided by the DIC [20]. Pharmacists are challenged with keeping up to date with an increasing number of new drugs and literature [21].

WHO recognizes independent drug information centers as a core component of national programs to promote the rational use of drugs [22].

In 2013, the drug information center was established by Bapuji Pharmacy College in S.S Institute of Medical Sciences and Research Centre (SSIMS and RC), Karnataka. The center focuses on providing unbiased drug information, well referenced, critically evaluated and up to date information which promotes the safe and effective use of medication. Clinical pharmacists and the staff working in our department were specially trained under drug information center with adequate knowledge on clinical research, pharmacology, pharmaceutics, pharmacotherapeutics, and statistics.

Objectives
The objective of the study was to assess the utilization of drug information services and creating awareness for enhanced utilization of DIC in a tertiary care teaching hospital.

METHODS

A retro-prospective observational analysis of DIC was conducted in a tertiary care teaching hospital in Davanagere for 6-months.

Inclusion criteria
- Drug information provided to various health-care professionals (doctors, nurses, paramedical).
- Drug queries generated or requisitioned from various departments in the entire hospital.

Exclusion criteria
- Drug information provided to patients at the time of patient counselling.
- Any other drug information provided to the patient through direct access to DIC.

Ethical issues
The ethical clearance for the study was obtained from the Institutional Ethical Committee of Bapuji Pharmacy College, Davangere.

Study procedure
The drug information request and documentation forms from the DIC were retro-prospectively analyzed for 6-months, for collecting the following parameters such as professional status of enquirer, speciality of practice, mode of receipt of query, purpose of enquiry, time frame to reply, and references used. The quality of services provided by the DIC was assessed on feedback questionnaire given by the enquirer, which comprised questions pertaining to awareness, utilization, opinion, etc. Education program was conducted in the hospital for the students of Pharm. D. regarding their role in patient care and the systematic approach to answering drug information enquiries. Awareness about DIC and its services was created in the hospital by circulating brochures and interacting with health-care professionals.

RESULTS

Retrospective analysis
A total number of 943 queries were received to drug information center of SSIMS and RC from January 2013 to August 2015 (Table 1).

Among these, most of the queries were given by post-graduate (PG)/interns 474 (50.27%) followed by physician 282 (29.90%) and pharmacist 68 (7.21%) (Table 2).

Out of 943 queries, 542 (57.48%) were obtained during ward rounds, 393 (41.67%) via direct access and 8 (0.85%) by others (Table 3).

Among these, 719 (76.25%) were enquired to update knowledge, 221 (23.43%) for better patient care and 3 (0.32%) for other purposes (Table 4).

Our retrospective analysis illustrates that most of the queries were asked regarding indication 358 (18.60%) and least regarding poisoning 22 (1.14%) (Table 5).

Around 629 (66.70%) queries were given as printed material, 197 (20.89%) as written, 62 (6.58%) as verbal and 55 (5.83%) in both written and verbal form (Table 6).

Time frame for reply for the majority of queries was within a day (46.45%) followed by within 2-4 hrs (27.78%) (Table 7).

Table 1: Year-wise distribution of queries

S. No.	Year	Total number of queries received	Average number of queries received
1	2013 (January-December)	237	20
2	2014 (January-December)	401	33
3	2015 (January-August)	305	38

Table 2: Professional status of enquirer

S. No.	Professional status of enquirer	Number of queries (%)
1	PG/Intern	474 (50.27)
2	Physician	282 (29.90)
3	Pharmacist	68 (7.21)
4	Nurse	64 (6.79)
5	Surgeon	37 (3.92)
6	Others	8 (0.85)
7	Resident	6 (0.64)
8	Dermatologist	4 (0.42)

PG: Post-graduate

Table 3: Mode of receipt of the queries

S. No.	Mode of receipt of the query	Number of queries (%)
1	During ward rounds	542 (57.48)
2	Direct access	393 (41.67)
3	Others	8 (0.85)
4	Telephone	0 (0)

Table 4: Reason of requisition

S. No.	Reason of requisition	Number of queries (%)
1	Update knowledge	719 (76.25)
2	Better patient care	221 (23.43)
3	Others	3 (0.32)

About 516 (54.72%) queries were answered by using Micromedex followed by textbooks 243 (25.77%), websites 107 (11.35%), and journals 77 (8.16%) (Table 8).

Nearly 77 (8.16%) queries were answered by using primary resources, 623 (66.07%) by secondary resources and 243 (25.77%) by using tertiary resources (Table 9).

The majority of the requesters rated the provided drug information as good 518 (54.93%) and satisfactory 142 (15.06%) (Table 10).

Prospective analysis
A total of 394 queries were received from September 2015 to February 2016. The average number of queries received per month was 67. Most of the queries were obtained in the month of February (20.81%) (Table 11).

Out of 394 queries, most of the queries were given by physicians 166 (42.13%) followed by PG/interns 87 (22.08%) and surgeon 50 (12.69%) (Table 12).

Out of 394 queries, 236 (59.89%) were obtained during ward rounds, 140 (35.53%) via direct access, 10 (2.55%) by others and 8 (2.03%) through telephone (Table 13).

Among the queries, 195 (49.49%) were enquired to update knowledge, 194 (49.23%) for better patient care and 5 (1.28%) for other purposes (Table 14).

Our prospective analysis illustrates that most of the queries were asked regarding ADR of the drug 202 (21.28%) and least regarding poisoning 9 (1.09%) (Table 15).

Table 5: Types of drug query

S. No.	Types of drug query	Number of queries (%)
1	Indication	358 (18.60)
2	ADR	289 (15.02)
3	Dosage/administration	271 (14.08)
4	Drug therapy	228 (11.84)
5	Others	192 (9.97)
6	Pharmacokinetics	178 (9.25)
7	Interactions	118 (6.13)
8	Availability/cost	108 (5.61)
9	Efficacy	100 (5.19)
10	Pregnancy/lactation	61 (3.17)
11	Poisoning	22 (1.14)

ADR: Adverse drug reaction

Table 6: Mode of reply

S. No.	Mode of reply	Number of queries (%)
1	Printed material	629 (66.70)
2	Written	197 (20.89)
3	Verbal	62 (6.58)
4	Both (written and verbal)	55 (5.83)

Table 7: Time frame for reply

S. No.	Time frame to reply	Number of queries (%)
1	Within a day	438 (46.45)
2	Within 2-4 hrs	262 (27.78)
3	Within 1-2 days	145 (15.38)
4	Immediately	98 (10.39)

Table 8: Data sources used for information

S. No.	Sources used for information	Number of queries (%)
1	Micromedex	516 (54.72)
2	Textbooks	243 (25.77)
3	Website	107 (11.35)
4	Journals	77 (8.16)
5	Others	0 (0)

Table 9: Categorization of data sources used

S. No.	Data sources used	Number of queries (%)
1	Primary resources	77 (8.16)
2	Secondary resources	623 (66.07)
3	Tertiary resources	243 (25.77)

Table 10: Quality of DI provided

S. No.	Quality of DI provided	Number of queries (%)
1	Good	518 (54.93)
2	Satisfactory	142 (15.06)
3	Excellent	122 (12.94)
4	Can improve	98 (10.39)
5	Fair	60 (6.36)
6	Poor	3 (0.32)

DI: Drug information

Table 11: Month-wise distribution of received queries

S. No.	Months	Number of queries (%)
1	September 2015	52 (13.20)
2	October 2015	68 (17.26)
3	November 2015	45 (11.42)
4	December 2015	70 (17.77)
5	January 2016	77 (19.54)
6	February 2016	82 (20.81)

Table 12: Professional status of enquirer

S. No.	Professional status of enquirer	Number of queries (%)
1	Physician	166 (42.13)
2	PG/interns	87 (22.08)
3	Surgeon	50 (12.69)
4	Nurse	47 (11.93)
5	Dermatologist	17 (4.32)
6	Pharmacist	17 (4.32)
7	Resident	9 (2.28)
8	Others	1 (0.25)

Table 13: Mode of receipt of queries

S. No.	Mode of receipt of queries	Number of queries (%)
1	During ward rounds	236 (59.89)
2	Direct access	140 (35.53)
3	Other	10 (2.55)
4	Telephone	8 (2.03)

Table 14: Reason of requisition

S. No.	Reason of requisition	Number of queries (%)
1	Update knowledge	195 (49.49)
2	Better patient care	194 (49.23)
3	Others	5 (1.28)

Our prospective study has shown that 162 (41.14%) queries were given as printed material, 129 (32.74%) as written, 58 (14.70%) as both written and verbal and 45 (11.42%) in verbal form (Table 16).

Time frame for reply for 133 (33.75%) queries were within 2-4 hrs, 117 (29.69%) were within a day, 93 (23.66%) were within 1-2 days and for 51 (12.90%) were immediately (Table 17).

About 203 (41.17%) queries were answered by using Micromedex followed by textbooks 135 (27.38%), journals 100 (20.28%) and websites 55 (11.17%) (Table 18).

Nearly 100 (20.28%) queries were answered by using primary resources, 258 (52.34%) by secondary resources and 135 (27.38%) by using tertiary resources (Table 19).

Majority of the requesters rated the provided drug information as good 185 (46.95%) and excellent 74 (18.77%) (Table 20).

By comparing the results of both retrospective and prospective studies indicates an average of 29 queries/month was received in retrospective analysis and 67 queries/month in prospective analysis period.

DISCUSSION

Drug information service can help to detect and prevent ADRs, medication errors and promote rational use of drugs. Therefore, these centers can positively improve the outcome of therapy.

There was a gradual increase in the number of utilization of drug information service during the prospective analysis period. It was due to the impact of awareness created in the hospital regarding drug information center.

After analyzing the queries, the physicians maximally utilized the drug information services which comprise more than 40% of consult volume compared to PG/interns, surgeons and other health-care professionals.

Most of the queries were received during ward rounds (59.89%), which could be attributed to the easy accessibility of clinical pharmacist that prompts other health-care professionals to utilize the services. This was similar to the results of the studies conducted by Subash *et al.* (2009) and Venkatraghavan *et al.* In the study conducted by Subash *et al.*, 44% of queries received during ward round, whereas it was estimated as 61.5% in the study of Venkatraghavan *et al.*

The reason of requisition of most of the queries was to update knowledge (49.49%) and for better patient care (49.23%). This is comparable with the study conducted by Jeevangi *et al.*, which shown 56.56% and 31.15%, respectively.

In this study, queries on ADR (21.28%) were predominant. This result closely matches with the findings in a study done by Rajanandh *et al.* which showed that maximum queries were on ADR (35.90%). While in the study conducted by Subash *et al.*, in 2013, most commonly asked questions were on drug therapy (34%). Our findings indicate that physicians give more importance to ADRs of various drugs.

In this study, 33.75% of the queries were answered within 2-4 hrs, which is in contrast to the study findings done by Jayasutha *et al.* where majority of the queries were replied within a day (86%). This is because of the ready availability of authenticated drug information software and ease of getting information from these sources.

In our study, most of the queries were answered in printed material (41.14%). This result was similar to the result (52.46%) of the study done by Mudigubba *et al.*

To answer the queries, primary, secondary and tertiary sources were used. Among them, most of the queries were answered by using Micromedex (41.17%). These findings are similar to the studies conducted by Aida *et al.* and Jeevangi *et al.* where it was 37.3% and 52.45%, respectively. The availability of recent and relevant information in Micromedex makes clinical pharmacists to use it as a major source of providing DI.

Feedback responses clearly demonstrated that majority of enquirers were very much satisfied with the performance of the service and

Table 15: Types of drug query

S. No.	Types of drug query	Number of queries (%)
1	ADR	202 (21.28)
2	Indications	152 (16.32)
3	Dosage/administration	138 (14.52)
4	Efficacy	72 (8.72)
5	Drug therapy	71 (8.07)
6	Interactions	64 (7.27)
7	Others	48 (5.45)
8	Pregnancy/lactation	47 (5.34)
9	Availability/cost	46 (5.23)
10	Pharmacokinetics	40 (4.55)
11	Poisoning	9 (1.09)

ADR: Adverse drug reactions

Table 16: Mode of reply

S. No.	Mode of reply	Number of queries (%)
1	Printed material	162 (41.14)
2	Written	129 (32.74)
3	Both (written and verbal)	58 (14.70)
4	Verbal	45 (11.42)

Table 17: Time frame for reply

S. No.	Time frame to reply	Number of queries (%)
1	Within 2-4 hrs	133 (33.75)
2	Within a day	117 (29.69)
3	Within 1-2 days	93 (23.66)
4	Immediately	51 (12.90)

Table 18: Data sources used for information

S. No.	Data sources used for information	Number of queries (%)
1	Micromedex	203 (41.17)
2	Textbooks	135 (27.38)
3	Journals	100 (20.28)
4	Websites	55 (11.17)
5	Others	0 (0)

Table 19: Categorization of data sources used

S. No.	Data sources used	Number of queries (%)
1	Primary resources	100 (20.28)
2	Secondary resources	258 (52.34)
3	Tertiary resources	135 (27.38)

Table 20: Quality of the DI provided

S. No.	Quality of the DI provided	Number of queries (%)
1	Good	185 (46.95)
2	Excellent	74 (18.77)
3	Satisfactory	56 (14.21)
4	Fair	46 (11.68)
5	Can improve	33 (8.38)
6	Poor	0 (0)

DI: Drug information

rated as good (46.95%) and excellent (18.77%). Similar to the study conducted by Walli *et al.* where it showed that majority of the enquirers rated the provided drug information services as good (48.90%).

CONCLUSION

Awareness for enhanced utilization of drug information services is an effective tool for better patient care. Therefore, it is necessary to perform such studies frequently for accessing and analyzing the utilization of drug information services in the hospital.

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