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*Original Article*

# Drug information needs of physicians treating diabetic nephropathy in a tertiary care hospital

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**Abstract**
**Objective:** Diabetic Nephropathy is a leading cause of end stage renal disease. Doctors often have questions during patient care when they are advised to seek the best available evidence. Rational drug use demands access to unbiased drug information. This study was conducted to delineate and analyse the patient-specific drug information needs of physicians treating diabetic nephropathy in Nephrology ward of a south Indian tertiary care hospital.
**Methods**: A prospective, observational study was conducted in the Department of Nephrology in St John's Medical College, Bangalore from 1st October 2003 to 31st March 2004. The relevant data regarding patient- specific queries of physicians on drug information were collected by joining physicians on clinical rounds and analysed.
**Results:** Out of 102 patients included in the study, physicians had queries on 66% of patients. The total number of queries was 80. The average number of queries per nephrologist was 9 and those per physician were 10. Queries on adverse drug reactions and drug interactions exceeded (31%) others. Queries on anti-hypertensive drugs were the maximum (33%) followed by antimicrobials (12.5%). About 93% of queries were answered. Tertiary sources (51%) were the most commonly used drug information sources. The mean time to find the answer to a query was about 30 minutes.
**Conclusion:** Physicians treating DN are in need of drug information services, especially on adverse drug reactions and drug interactions during in-patient care. The majority of queries of physicians treating diabetic nephropathy can be answered by referring authentic drug information sources.

**Key words**: Drug information, diabetic nephropathy, hypertension, adverse drug reactions

Diabetic nephropathy (DN) is a micro-vascular complication of long standing DM, which is characterized by persistent proteinuria, decline in glomerular filtration rate and increased morbidity and mortality due to cardio-cerebrovascular diseases in diabetics[1]. DN is the most common cause of end-stage renal disease (ESRD)[2]. About 30% cases of type 1 diabetes mellitus and approximately 20% of patients with type 2 diabetes mellitus develop diabetic nephropathy[1]. The prevalence of DM continues to increase, with the continued advances in medical technology and care, persons with this disease will live longer and the incidence of DN will increase[3]. Hence physicians face challenges in selecting, initiating and individualising appropriate drug therapy for patients with DN.

Doctors have questions about the care of their patients. "Can salbutamol cause tachyphylaxis?" Most of such questions occur at the point of care in busy clinics or hospitals[4]. When faced with such questions, doctors are advised to seek the "best available evidence" to guide their decision[4,5]. Rational drug use demands, amongst other things, access to unbiased information. New drugs and new modes of therapy are also steadily being introduced. Most developing countries suffer from lack of adequate information and this could be due to decreased availability of current literature as well as poor dissemination of what little information is available[6]. Hence, adequate sources to provide reliable drug information for specific situations will be highly beneficial to improve patient care. The objective of this study is to delineate and analyse the patient-specific drug information needs of physicians treating diabetic nephropathy by joining clinical rounds in Nephrology ward of a tertiary care hospital.

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**Materials and methods**

The study was carried out in St. John's Medical College Hospital situated in south Indian city of Bangalore. This is a tertiary care teaching hospital with super speciality services and bed strength of 1200. It is equipped with modern diagnostic and treatment facilities. A prospective, observational study was conducted in inpatient ward of the Nephrology Department for a period of six months (from 1st of October 2003 and 31st March 2004).

All inpatients with the diagnosis of diabetic nephropathy, made by a consultant nephrologist, in the Nephrology unit were included in the study. However, Patients who were under day care and those who were admitted only for dialysis were excluded. Permission to collect the data and accompany physicians on nephrology ward rounds was taken from the head of the Department of Nephrology before starting the study. Patients with the diagnosis of DN were identified by accompanying physicians during morning rounds as well as confirming the diagnosis from the inpatient medical records.

To delineate drug information needs, the data on drug information queries of physicians who treated patients with DN were collected by accompanying the team of doctors (three nephrologists and five physicians) during daily rounds, 6 days a week. Patient-specific queries on drug information from nephrologists as well as from physicians which were asked directly (active) to the investigator or perceived as need by the investigator (passive) during patient care were collected. Those queries discussed for medical students and residents ('teaching questions') were not included in the study. Also, total number of patients with queries and number of drugs with queries were noted every day. Once the authentic information was obtained, the treating physicians were informed accordingly by the investigator as early as possible. The time to find out the answer to a query and number of searches to find the authentic answer to each query were also noted. The data collected were subjected to descriptive statistics.

**Results**

Out of 102 patients included in the study, Physicians had drug information queries on 67 (65.6%) patients. The numbers of male patients were 49 (73.1%) and females were only 18 (26.9%). Maximum number of queries per patient was four.

Out of 80 drug information queries asked during the study period, 28 (35%) were from the nephrologists and 52 (65%) were from the treating physicians. The treating doctor's team included three super specialists (nephrologists) and five specialists (physicians). The average number of queries per nephrologist was 9.3 and those per physician were 10.4.

Questions that were asked directly to the investigator (active) were 56 (70%) and queries perceived by investigator during patient care (passive) were 24 (30%). Drug class with maximum number of queries was antihypertensive drugs (26) (32.5%) followed by antimicrobials (10) (12.5%) and anti-diabetic agents (10) (12.5%). The details of queries on different drug classes are presented in Fig1.

The queries collected were categorised as those on adverse drug reactions and drug interactions (25) (31.3%), drug dosage or dose modifications on renal failure (11) (13.7%), therapeutic indications and drugs of choice (10) (12.5%), banned drugs and availability in India (12.5%), pharmacodynamics (mechanism of action) (8)(10%), composition of proprietary products (8) (10%) and miscellaneous group (8) (10%) as presented in Table 1.

Answers were obtained from 19 authentic drug information sources, which were categorized into three groups: primary, secondary and tertiary sources. Depending on the nature of the queries, drug information sources were chosen to find out the answers. Out of 115 searches made, 32 (28%) searches were made to find the answers from primary sources, 24 (21%) searches to find the answers from secondary sources and 59(51%) searches were made to find the answers from tertiary sources.

Out of 115 searches performed, 74 (64.3%) searches were successful. When primary sources were used, out of 32 searches, 20 (62.5%) were successful. Similarly out of 24 searches where secondary sources were used, 11 (45.8%) were successful. Out of 59searches, 43 (73%) were successful for tertiary sources.

Out of 74 queries answered, depending on the nature of queries, primary sources were used to answer 20 (27%) questions, secondary sources were used for 11 (14.9%) questions and tertiary sources were used for 43 (58.1%) queries.

The mean time to find the answer from primary source was 46.5 minutes (SD=20). The time taken to find the answer from secondary source was 39 minutes (SD=16) and for tertiary source 19 minutes (SD=8). The mean time to find an answer to a query irrespective of the source was about 30 minutes

(SD=18). Out of 56 active queries asked, 54 (96.4) were answered and communicated to the treating physicians and out of 24 passive queries asked we were able to find and communicate answers to 20 (83.3%) queries.

The different groups of drug information sources with the number of times used, time spent in seeking an answer, and the number of successful searches are explained in Table 2

**Table 1:** Different Categories of Drug Information Queries (Different categories of queries on drug information expressed in numbers and percentages)

| S. No. | Category | Number | Percentage |
|---|---|---|---|
| 1. | Adverse drug reactions and drug interactions | 25 | 31.3 |
| 2. | Drug dosage and dose modifications in renal failure | 11 | 13.7 |
| 3. | Therapeutic indications and choices | 10 | 12.5 |
| 4. | Banning/availability | 10 | 12.5 |
| 5. | Pharmacodynamics (mechanism of action) | 8 | 10 |
| 6. | Composition of proprietary products | 8 | 10 |
| 7. | Others | 8 | 10 |
| | Total | 80 | 100 |

**Table 2:** Drug information sources and time spent in seeking answers (Different sources of drug information used, number of times of usage in percentage, and the number and percentage of successful searches and time spent in seeking an answer in minutes

| Drug information source used | Number of times used (% of total) | Number (%) of successful searches | Mean time spent for a successful search in minutes (SD) |
|---|---|---|---|
| Primary source♣ | 32 (28) | 20 (62.5) | 46.5 (20) |
| Secondary Sources♣♣ | 24 (21)) | 11 (45.8) | 39 (16) |
| Tertiary sources♣♣♣ | 59 (51) | 43 (73) | 19 (8) |
| Total | 115 (100) | 74 (64.3) | 30 (18) |

SD=Standard Deviation

♣Primary sources 1) Drugs, 2) British Medical Journal, 3) New England Journal of Medicine 4) Journal of American medical Association 5) Drug safety

♣♣ Secondary sources Abstracts through Pub Med. From 1) Clin Ther. 2) Acta diabetol 3) Diabetes Care 5) Kidney international. 6) Cardiology

♣♣♣ Tertiary sources 1) CIMS, 2) Goodman and Gillman's, The Pharmacological Basis of Therapeutics, Tenth Edition 3) Harrison's Principles of Internal Medicine, Fifteenth edition 4) Brenner and Rector's, The Kidney, Sixth edition 5) Physician's Desk reference 6) Text book of diabetes mellitus by Pickup and Williams, 7) Martindale's The Complete Drug Reference, 8) MIMS

**Fig 1:** Drug Class and Percentage of Drug Information Queries

**Discussion**

Out of 102 inpatients diagnosed with DN during the study period in the nephrology unit, the numbers of patients with queries on drug information were 67 (65.6 %). The average number of queries from nephrologists was 9.3 and that from physicians was 10.4 which indicated the need of drug information services during patient care. It was noticed that 73% of queries were for male patients. This could be due to the male preponderance of the disease [7].

In the present study, for a total of 80 patient specific queries which were asked by the clinicians during a period of six months, the dug information centre established by the Karnataka State Pharmacy Council [KPSC] in India had reported a collection of 658 queries in 18 months period from doctors [8]. These two studies differ in a number of ways: chiefly, the KPSC centre is open to all doctors in the whole Indian state of Karnataka. In our study the queries were restricted to specific problems of in-patients admitted with DN in the nephrology ward of just one hospital.

It was noticed that maximum numbers of queries were on antihypertensive drug class (32.5%). The single drug with maximum number of queries was amlodipine. The close relationship between hypertension and diabetic nephropathy could explain this finding [1.]

In this study queries on adverse reactions and drug interactions (31%) predominated while the two previous studies, one conducted in Nepal, and the other in north Indian city of Calcutta have reported that the most commonly asked questions were on drug indications and drug therapy [6, 9]. The most commonly asked queries recorded in drug information centre of KSPC were on product availability or identification [8]. However, a recent study has reported that information on ADRs was among the most sought information on drugs by the health care professionals and analysis of these queries could help to establish safer drug use [10]. In the present study queries on dose modifications in renal failure accounted for 14%, which was the second major category of queries. This finding could be related to the context in which questions were elicited.

We have found that the most commonly used drug information sources were tertiary sources (51%), compared to primary (28%) or secondary sources (21%). The time taken in finding an answer to a patient- specific query was about 30 minutes irrespective of the source. MICROMEDEX was the

most commonly used source by drug information centre established by KSPC and response time recorded to answer a majority of queries was within 30 minutes [8]. The difference between the categories of drug information sources used in the present study versus those used by the established drug information centre of KSPC could be due to the predominance of queries on adverse drug reactions and drug interactions (Table-1) in the present study for which we were able to find most of the answers from authentic tertiary drug information sources like Martindale's; The Complete Drug Reference.

The report from the drug information unit of Tribhuvan university teaching hospital in Nepal, also showed that tertiary sources were the most commonly used drug information source like our study. In this study also, having been conducted in a teaching hospital, tertiary sources were easily available to find the answer to a patient specific query as reported in the previous study [6]. Also it was noticed that close proximity to the different specialised Departments, library, and hospital pharmacy were important factors which could aid the investigators in finding the answer to a patient - specific query.

The kinds of questions collected during a doctors' drug information needs survey, seem to depend on the methods used to collect them. This study proved that accompanying clinicians during rounds and collecting queries is a reliable as well as useful method to study the drug information needs of physicians. Active as well as passive queries can be collected by this method. The necessary details regarding the clinical background and investigations etc. can be collected directly from the medical records. However, this is a tedious and time - consuming process.

The nature of queries depends on the context of patient care. We did not ask to rate the urgency of the answers of the queries. However, we were able to find answers to a majority of queries of treating physicians (93%) based on authentic drug information sources.

**Conclusion**

Predominance of queries on ADRs and drug interactions demonstrated concern among clinicians in this domain of patient care. Most of the queries on drug information were answered based on authentic drug information sources especially tertiary sources. Accompanying physicians during daily rounds and collecting patient specific queries is a useful method to identify and study the drug information queries during patient care.

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