Original Article

Drug information service awareness program and its impact on characteristics of inquiries at DIS unit in Malaysian public hospital

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ABSTRACT

Objectives: To study the Drug Information Service (DIS) awareness program organized by a DIS unit in Malaysian hospital through utilization of provided services by the healthcare professionals, allied healthcare providers, patients and the public, and to identify the characteristics of inquiries received. **Materials and Methods:** An awareness program to promote the services of the DIS unit was held throughout the month of March in 2010. Drug information queries forms that have been documented six months prior to (September 2009–February 2010) and six months after (April–September 2010) the awareness program were collected and assessed. Mean monthly inquiries volumes pre- and post-program were compared to evaluate the effectiveness of the program. Types of information requestors, inquiries, reference sources, and drug class information were identified and evaluated. **Results:** A total of 747 drug information queries forms were received during the study period. The mean total utilization of the DIS unit services after (63.67 ± 18.24) the DIS awareness program was increased but not significant ($P < 0.05$) when compared to records before (60.83 ± 21.49) the program. Majority of the DIS service users were the pharmacist (67.5%), followed by the doctors (24.9%). Most inquiries were regarding the dosage and route of administration of drugs (61.4%). The most frequently referred sources of information were the Micromedex and the Internet (37.3%). The most common inquiries were related to the anti-infective agents (37.8%). **Conclusion:** Provision of sufficient and accurate drug information to the healthcare professionals, patients, and the public is crucial to ensure optimization of therapy. The utilization of services provided by the DIS unit should be supported. Frequent DIS awareness program should be undertaken to promote and encourage the use of services.

Key words: Awareness program, data collection, drug information service, drug profile, healthcare professionals

INTRODUCTION

Provision of precise and appropriate drug information to healthcare professionals, patients and the public is crucial. This is to promote safe and effective drug therapy as well as to prevent adverse drug events especially in ambulatory care.[1-3] Information pertaining to a drug can be obtained through printed reference, verbalized by an individual and searched online.[4,5]

Ineffective drug information transfer could cause the recipients to be provided with insufficient information[6-8] and would affect their knowledge and perception towards the use of the drug. Therefore in order to improve knowledge or information transfer pertaining drugs and medications, drug

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information centers (DICs) have been structured and optimized.[9,10]

The term "drug information" was introduced in the early 1960s and the first DIC was opened at the University of Kentucky Medical Centre.[11] The center was intended to be utilized as a source center where people could call or contact healthcare professionals and ask medicine-related questions.[9,10,12] Previous studies have reported improvement in patients' treatment outcomes by providing drug information to them.[13-16]

In Malaysia, the Drug Information Service centers have been established in most public hospitals. In present study, DIS unit of *Hospital Sungai Buloh*, Selangor, was selected as the location of evaluation of the effectiveness of a DIS awareness program. The DIS unit in *Hospital Sungai Buloh* has been operating since 2006. The center provides information to healthcare professionals as well as patients and public. It also provides other services such as suspected drug adverse reaction reporting, product complaint reporting, and processing of "off-label" drug application, which requires special approval from the Health Chief Officer of the Ministry of Health of Malaysia.

The *Hospital Sungai Buloh* DIS unit locates two registered pharmacists and one provisionally registered pharmacist. Most inquiries are received in the form of verbal questions, phone calls, or e-mails. The service is opened from 8 am to 5 pm during the weekdays. The main sources of references are from the pharmacy-related books, Ministry of Health of Malaysia drug formulary book, products leaflet and the Internet.

In March 2010, the DIS unit of *Hospital Sungai Buloh* organized an awareness program in order to promote its services. The program emphasized the unit's service as accurate, current and unbiased, aimed to optimize quality drug use among patients. Series of seminars on "Drug Inquiring Calling System" were carried out to acknowledge all level of healthcare provider staffs from *Hospital Sungai Buloh* as well as the representatives from hospitals around Selangor on the standard of procedure of the system. Notifications and information regarding the event were disseminated through e-mails, posters and memos.

The aims of the present study were to analyze the role and to describe the utilization of DIS unit as an information provider for healthcare professional and patients at *Hospital Sungai Buloh*, Selangor, Malaysia. Several aspects of the DIS center were investigated such as the monthly consult volume, types of requester, types of pharmacotherapy problems, sources of the reference used and the types of medicine inquired. A comparison of monthly consultation volume (utilization of DIS unit services by the healthcare providers, patients and the public) for six months before and after the awarenesss programmed was carried out to evaluate the impact of the DIS awareness program.

MATERIALS AND METHODS

Study design

Retrospective study of drug information from request forms for a period of 12 months, from September 2009 to August 2010 (6 months before and 6 months after the awareness program) was collected. The study was based on the following parameters: monthly consult volume, types of requester, types of pharmacotherapy problems, sources of reference used and types of medicine inquired.

Data collection

The data collection is shown in Figure 1. First, the question was recorded in the questionnaire form, and after providing the solution to the inquiries, the main characteristics and full-text question and answer were compiled in a database for statistics purposes.

Statistical analysis

All data were analyzed using SPSS version 19.0 and presented as percentages or mean ± SD. For the analysis of the types of drugs inquired, classification of drugs was done according to the World Health Organisation (WHO) Anatomical Therapeutic Chemical (ATC) classification system. The results are presented as percentages and only subgroups of drugs with more than five inquiries were mentioned.

RESULTS

The DIS unit received a total of 747 drug information queries during the study period, with an average of 62 queries per month [Figure 2]. It is shown by the results that DIS unit service were utilized

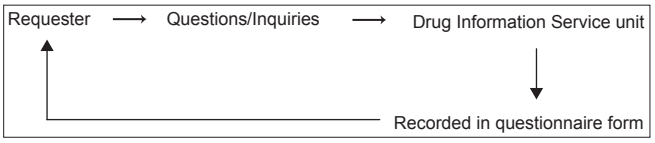

Figure 1: Working model of drug information service unit at pharmacy department of hospital Sungai Buloh, Selangor, Malaysia

the most by the pharmacist (67.5%) followed by the doctors (including medical officer and consultant) (24.9%). Assistant pharmacist (4.3%) and nurses or medical assistant (2.8%) were the other healthcare providers who have used this service. A small number of utilization was also reported from the patients (0.1%) and the public (0.4%) [Figure 3].

The most frequently asked pharmacotherapy queries were about dosages and routes of administration (61.4%). This is followed by queries regarding issues not listed in the evaluation form (19.5%) followed by queries about drug efficacy (11.1%), queries related to drug interactions (2.9%), drugs indications (2.7%), drugs contraindications (1.7%) and drugs poisoning or overdosing (0.5%) [Figure 4].

Electronic databases like Micromedex were the most regularly used resources (32.1%) for answering the queries. Pharmacy-related reference books (29.0%) (e.g. Martindale, Drug Information Handbook) were the second most frequently sought reference for drug information followed by the Ministry of Health or Hospital Sungai Buloh drug formularies (11.2%), product leaflets (10.4%), references apart from those listed in the questionnaire form (8.7%), website (5.2%) and scientific articles (3.4%) [Figure 5].

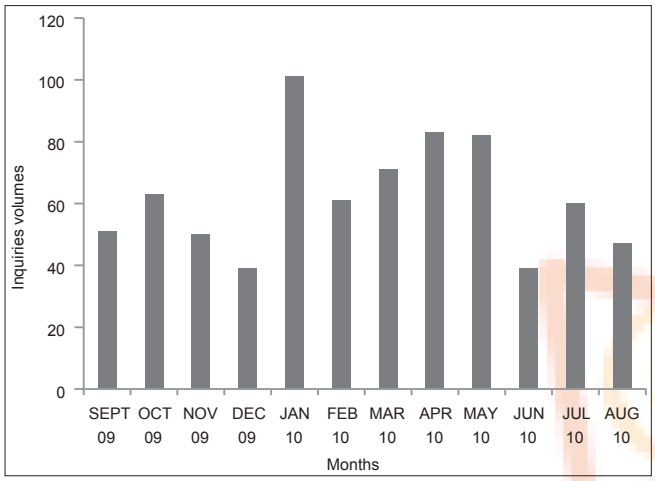

Figure 2: Volume of inquiries to the Drug Information Service unit, at Pharmacy Department of Hospital Sungai Buloh, Selangor, Malaysia (from Septrmber 2009-August 2010

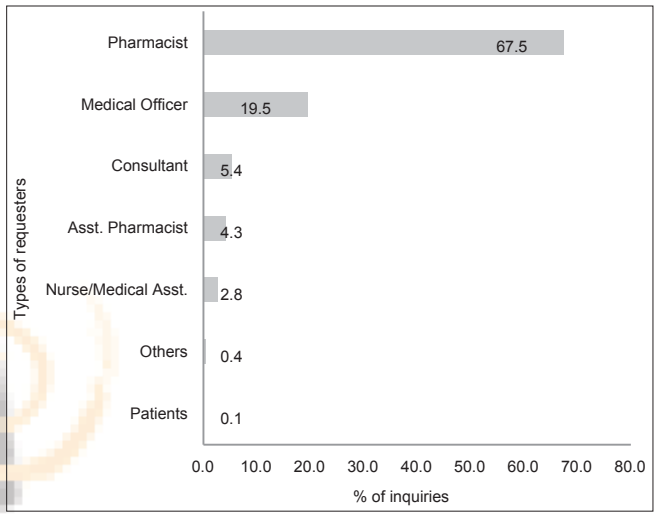

Figure 3: Types of requesters for a period of September 2009-August 2010 (% of inquiries, *n*=747)

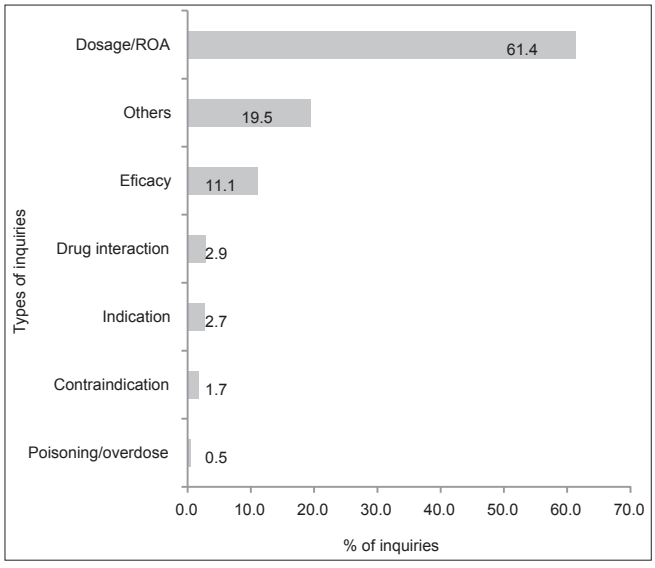

Figure 4: Types of pharmacotherapy problems for a period of September 2009-August 2010 (% of inquiries, *n*=747). ROA=Route of administration

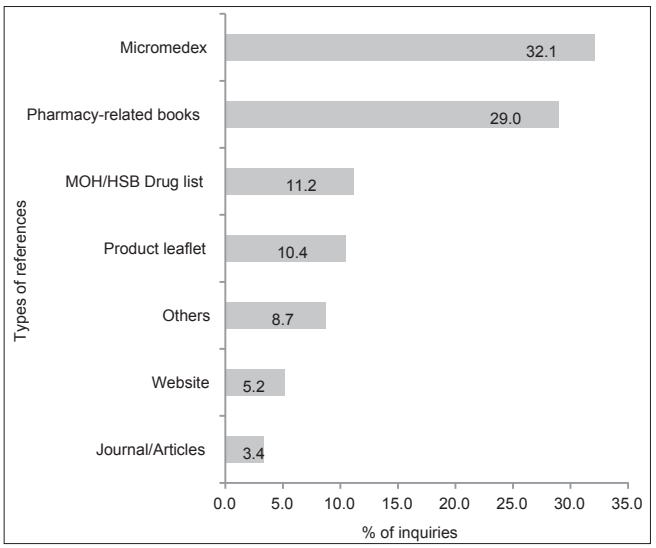

Figure 5: Types of references sources for a period of September 2009-August 2010 (% of inquiries, *n*=804). Inquiries may have included more than 1 reference. MOH=Ministry of Health; HSB=Hospital Sungai Buloh

Majority of the drugs inquiries were generally related to the anti-infective drugs with the ATC-classification J (37.8%) and nervous system affecting drugs with the ATC-classification N (12.5%). Among all the ATC-classification subgroups, the highest rates of inquiries were about beta-lactam antibacterials (J01D), followed by direct acting antiviral (J05A), penicillin (J01C), and antiepileptics (N03A) [Table 1].

However, the comparison of effectiveness of the DIS center between the pre- and post-DIS awareness program showed a non-significant increment in the total volumes of consultation [Figure 6].

DISCUSSION

This study is the first description of DIS activities in a Malaysian public hospital. The demand for getting

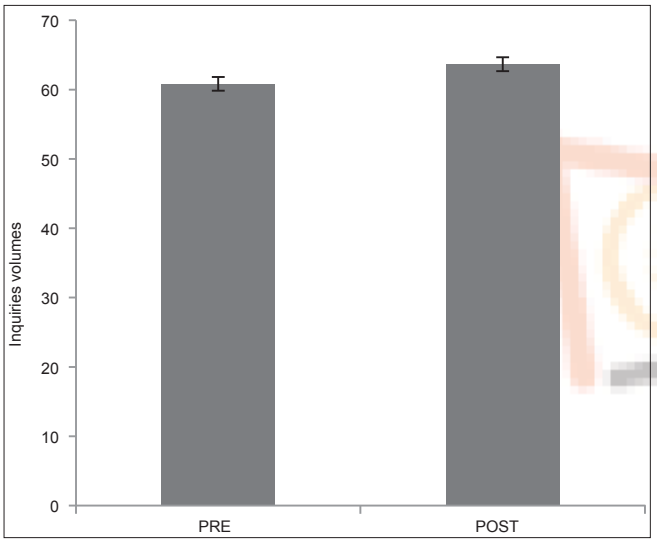

Figure 6: Comparison of the inquiries volume between the pre and post of the awareness program (*n*=6)

Table 1: Number of drugs inquiries (*n*=781) by therapeutic groups (ATC-classification). Inquiries may have included more than 1 drug

	n	%
Alimentary tract (A)	52	6.7
Drugs for peptic ulser and gastro-oesophageal reflux disease (GORD) (A02B)	5	0.6
Insulins and analogues (A10A)	6	0.8
Oral blood glucose lowering drugs (A10B)	12	1.5
Blood and blood forming organs (B)	64	8.2
Antithrombotic agents (B01A)	31	4.0
Iron preparation (B03A)	9	1.2
IV solutions additives (B05X)	11	1.4
Cardiovascular system (C)	45	5.8
Low-ceiling diuretics, thiazides (C03A)	5	0.6
Beta blocking agents (C07A)	5	0.6
Selective calcium channel blockers with mainly vascular effects (C08C)	5	0.6
Cholesterol and triglyceride (C10A)	7	0.9
Dermatologicals (D)	15	1.9
Antiseptics and disinfectants (D08A)	6	0.8
Systemic hormonal preparations, excluding sex hormones and		
Insulins (H)	50	6.4
Posterior pituitary lobe hormones (H01B)	6	0.8
Corticosteroids for systemic use, plain (H02A)	19	2.4
Antithyroid preparations (H03B)	8	1.0
Anti-parathyroid hormones (H05B)	5	0.6
Antiinfectives for systemic use (J)	295	37.8
Tetracyclines (J01A)	10	1.3
Beta-lactam antibacterials, penicillins (J01C)	49	6.3
Other beta-lactam antibacterials (J01D)	83	10.6
Sulfonamides and trimethoprim (J01E)	12	1.5
Macrolides, lincosamides and streptogramins (J01F)	13	1.7
Aminoglycoside antibacterials (J01G)	11	1.4
Quinolone antibacterials (J01M)	11	1.4
Other antibacterials (J01X)	18	2.3
Antimycotics for systemic use (J02A)	10	1.3
Drugs for treatment of tuberculosis (J04A)	18	2.3
Direct acting antivirals (J05A)	50	6.4
Antineoplastic and immunomodulating agents (L)	16	2.0
Cytotoxic antibiotics and related substances (L01D)	8	1.0
Musculoskeletal system (M)	42	5.4
Antiinflammatory and antirheumatic products, non-steroids (M01A)	17	2.2
Muscle relaxants, peripherally acting agents (M03A)	5	0.6
Muscle relaxants, centrally acting agents (M03B)	5	0.6
Drugs affecting bone structure and mineralization (M05B)	9	1.2
Nervous system (N)	98	12.5
Opioids (N02A)	17	2.2
Antiepileptics (N03A)	33	4.2
Dopaminergic agents (N04B)	5	0.6
Antipsychotics (N05A)	5	0.6
Antidepressants (N06A)	12	1.5
Psychostimulants, agents used for ADHD and nootropics (N06B)	7	0.9
Antiparasitic products, insecticides and repellents (P)	26	3.3
Antimalarials (P01B)	10	1.3
Antinematodal agents (P02C)	7	0.9
Respiratory system (R)	23	2.9
Adrenergics, inhalants (R03A)	8	1.0
Antihistamines for systemic use (R06A)	10	1.3
Sensory organs (S)	15	1.9
Antiinfectives (S01A)	7	0.9
Various (V)	23	2.9
All other therapeutic products (V03A)	22	2.8

[a]Only subgroups with more than 5 inquiries are mentioned, ATC=Anatomical therapeutic chemical

drug information is rising not only to the healthcare personnel, but also among the patients and public. In this study, it was found that there were an increased number of queries to the DIS unit from September 2009 to August 2010. This period was selected because we wanted to evaluate the effectiveness of the awareness program that was held to promote the DIS unit to healthcare professional, patients and the public.

A total of 747 drug information query forms were received during the study period with the highest utilization in January 2010. In March 2010, an awareness program was carried out in order to promote the DIS unit. It was observed that the numbers of queries showed an increment after the awareness program. However, the increase in the number of utilisation of DIS was not consistent as the number dropped 3 months after the program. It was believed that the awareness program could attract users to utilize DIS but only within a short period. The awareness program could not retain users' interests in using the service. Probably, by carrying out the program more frequently, users' interest to use DIS could be sustained.

Next, from the analysis, it was found that most of the target participants during the awareness program were the main utilizer of the service offered. Pharmacists maximally utilized the services as they are the largest proportion of the requestors [Figure 3]. This finding was similar with other studies[17,18] that reported that pharmacists have been benefited from the service the most which comprise more than 50% of the consult volume.[18] Even though the DIS unit was opened to the public, fewer queries were inquired by this group [Figure 3]. This could be because the public was less aware about the service compared to other groups in this study. From the data showed, it can be suggested that doctors and pharmacists could come into play to promote the service of drug information to the patients. Patients should be notified that by having sufficient medication knowledge or information, their therapeutic outcome could be improved and optimized.

The DIS unit received many types of queries regarding drugs from the healthcare providers, patients and the public. The reasons queries were sent to DIS were to get the unbiased information about drugs and, in some cases, to get instant answers.[1,2] In this present study, the most frequently inquiries asked were related to dosages and routes of administration. These included drug usages in renal or liver failure patients as well as in pregnancy or lactating women. Our results were comparable with findings reported by George and Rao[7] and Pradhan[18] in which they were reported the same pattern of inquiries.

Tertiary source such as textbooks and secondary source such as electronic databases were the most commonly used references for answering the queries. Micromedex was the most preferred drug information reference in the DIS unit. However, supports from updated references from pharmacy-related textbooks (e.g. the Drug Information Handbook, MIMS and BNF) are also needed in order to maintain the continuity of the service, as reported by Pradhan.[18] Ministry of Health and Hospital Sungai Buloh's drug formularies, product leaflets, websites and articles from the journals were also used to answer the queries but to a lesser extent.

In this study, the largest proportion of inquiries was on anti-infective drugs (ATC-classification J) with most queries regarded the beta-lactam antibacterials (J01D), direct acting antiviral (J05A) and penicillin (J01C). The use of these drugs is highly prevalent in Hospital Sungai Buloh as the main medical services offered by the hospital are related to infectious diseases. Most of the inquiries were regarding the dosage adjustment for pediatric and adverse drug reactions. According to Pohjanoksa-Mäntylä *et al.*,[19] the reason this category of drugs was frequently inquired was because those drugs were the most commonly prescribed drugs for patients.

Subsequently, another large proportion of the inquiries was related to the nervous system drugs (ATC-classification N) with most inquiries regarding antiepileptics (N03A), opioids (N02A) and antidepressant (N06A). The inquiries that has commonly been asked were regarding the dosage adjustment and its contraindications as most of these drugs are not recommended or contraindicated during pregnancy and lactation.

CONCLUSION

It can be concluded that the provision of sufficient and accurate drug information to the healthcare providers, patients and the public, as that provided by the Pharmacy Department of Hospital Sungai Buloh, is crucial to ensure the optimization of therapy. Therefore, services such that provided by the DIS unit should be fully utilized. Therefore, more awareness program should be held frequently to promote and encourage the full utilization of the services.

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