Research Article

Evaluation of Drug Information Service via http://drug.pharmacy.psu.ac.th

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Abstract

This study was aimed to evaluate the quality of the drug information service and the users' satisfactions provided by Faculty of Pharmaceutical Sciences, Prince of Songkla University via http://drug.pharmacy.psu.ac.th. The randomly selected 100 questions from total 10,000 questions during the studied period were assessed for the quality of the service by retrospective observation. The satisfaction of the users was investigated using questionnaires posted on this Universal Resource Locator (URL). The results indicate that during the studied intervals of 2000-2001, 2002-2003, 2004-2005 and 2006-2007, the answer completeness was 94.12%, 65.38%, 85.19% and 83.33%, respectively. The answer straightforwardness was 89.41%, 74.62%, 80.74% and 84.00%, respectively. The reliability of answerers was 94.12%, 61.54%, 74.07% and 63.33%, respectively. The reliability of references used was 88.24%, 53.85%, 66.67% and 63.33%, respectively. The suitability of language level in answering was 100.00%, 88.46%, 100.00% and 86.67%, respectively. The obtained data suggest that the quality of the service via the URL was in suitable level and no significant changes were noted during investigation period. Most responses on the satisfaction on the service via this URL of the users, both providers and receivers, were averagely rated above 3 from 5.

Key Words: Drug information service; Pharmacy service; Pharmacy resource; Service evaluation

Introduction

Drug information service (DIS) is the service that encompasses the activities of specially trained individuals to provide accurate, unbiased, factual information, primarily in response to patient-oriented problems occurred from the healthcare teams (Amerson and Gora-Harper, 2001). Up to now, the number of novel drugs and dosage forms has been increasingly discovered and available worldwide, leading to the challenging and difficult task for the selection and use of current drugs and also drug delivery systems. Therefore, DIS is necessary to perform useful functions such as providing support for clinical pharmacy services, teaching undergraduate and graduate pharmacy students, and performing reviews for pharmacy and therapeutics committees (Rosenberg, 1983). In Thailand, DIS is usually provided by

pharmacists in academic institutes and hospitals via face-to-face communication, telephone, letter, fax and e-mail. The drug information center has been established by the Faculty of Pharmaceutical Sciences, Prince of Songkla University since 1993. Afterwards in 1999, the drug information center afforded DIS via http://drug.pharmacy.psu.ac.th. This URL has been opened for providing information and answering questions about medicine in all aspects to public access for questioning about drug-related issue, with or without anonymity. Then, the faculty lecturers and pharmacists or healthcare professionals from other institutes (e.g. hospital and community pharmacists) reply the questions. The anonymous answerers may answer the questions but these answers are occasionally evaluated by the Drug Information Committee. If incorrect answers or latent advertisements are found, they will be edited or deleted, respectively. The anonymity of enquirers provides the opportunity for the disadvantage groups to access the relevant information involving certain diseases or conditions that they avoid asking in face-to-face situation. The anonymity of answerers provides the opportunity to tap the richness of experiences of practitioners from various fields that may not be accessible in ordinary circumstances. Usually drug information centers have to ascertain their activities in order to improve the quality and to strengthen the capacities of their service (Drew and O'Reilly, 1995; George and Rao, 2005; Asiri et al., 2007).

The aim of this study was to evaluate the quality of the service and the users' satisfactions on the service provided via http://drug.pharmacy.psu.ac.th.

Materials and Methods

Quality evaluation of the service

The quality of the service was involved retrospective evaluation of drug information request for a range of 10,000 questions or a period of 94 months, from January 2000 to November 2007. The 100 questions were randomly selected to evaluate for the qualitative parameters such as completeness, straightfor-wardness, reliability and suitability of language level. All representative questions were independently evaluated by three referees. The referees were 5th year pharmacy students. They were trained for evaluating the quality of the service and under-supervised by two pharmacist lecturers.

For completeness, each question was determined whether its answer was reasonable and complete (score = 1 or 100%) or not (score = 0 or 0%).

For straightforwardness, the answers for each question was evaluated for the straightfor-wardness using rating scale from 1 to 5, where 5 indicates excellent straightforwardness (rating scale 5 equivalent to score = 1 or 100%), rating scale 4 for very good (score = 0.8 or 80%), rating scale 3 for good (score = 0.6 or 60%), rating scale 2 for adequate (score = 0.4 or 40%) and rating scale 1 for poor (score = 0.2 or 20%).

For reliability, the relationship between the status of answerers and the category of questions was determined for the requirement of the references as arbitrary set before performing the assessment as in Table 1, and the suitability between the references used and the category of questions was checked as arbitrary set before performing the assessment as in Table 2. If the status of answerers and the references used were reliable for the category of questions, the scores were 1 (or 100%). If not, the scores were 0 (or 0%).

For suitability of language level, the language level used in the answers was considered for the suitability to the status of the enquirers. For example, English or technical terms could be used if the enquirer status was healthcare personnel or pharmacy student (score = 1 or 100%) but they were not suitable if the enquirers were not in medical field (score = 0 or 0%).

Table 1 The consideration for reliability from the references required which depended on the status of answerers and category of questions.

Category of questions		**Status of answerers**				
		Specialists	Pharmacists		Students of the faculty	Unspecified persons
			Lecturers of the faculty	Other		
Availability		-	-	-	/	/
Identification		-	-	/	/	/
Disease &Therapeutic		-	/	/	/	/
General product information		-	/	/	/	/
Compatibility & Stability		-	/	/	/	/
Dosage/Administration		-	-	/	/	/
Pharmaceutics (Compounding, Formulation)		-	/	/	/	/
Pharmacokinetics	Calculation	-	/	/	/	/
	No Calculation	-	/	/	/	/
Therapy evaluation/Drug of choice		-	/	/	/	/
Traditional medicine		-	-	-	/	/
Drug interaction (Drug, Laboratory, Disease, Food)		-	/	/	/	/
Adverse effect		-	/	/	/	/
Poisoning/Toxicology		-	/	/	/	/
Teratogenicity		-	/	/	/	/
Lactation/Infant risk		-	/	/	/	/
Laws/Policy		-	/	/	/	/
Others		*	*	*	*	*

Note: / = References were required; - = References were not required; * = References were considered case by case.

Evaluation of satisfaction of the users on the service

The satisfaction of the users on the drug information service via http://drug.pharmacy.psu.ac.th was investigated using posted questionnaires. The questionnaires asking the satisfaction on the service, for example, rapidity of achievement, esthete of web page, easiness of searching, quality of answers, time frame for reply and overall assessment, were posted on this URL from September 2008 to November 2009. The scoring was in five-choice satisfaction level, i.e., very poor (score = 1), poor (score = 2), fair (score = 3), good (score = 4) and excellence (score = 5).

Results and Discussion

In preliminary studies, it was confirmed that all three referees could give the consistently interpreted results for all assessments as demonstrated in Table 3. Moreover, they independently rated for the same 16 questions and the results showed no statistical differences (p = 0.93, one-way ANOVA test, data not shown).

The assessment results were shown in Table 4 according to the following topics: the percentage of the qualitative parameters such as completeness, straightforwardness, reliability of answerers, reliability of references used and suitability of language level of the answers during the study period.

Table 2 The consideration for reliability from the suitability between references used and category of questions.

Reference	Category of questions																
	Availability	Identification	Disease & Therapeutic	General product information	Compatibility & Stability	Dosage/Administration	Pharmaceutics (Compounding, Formulation)	Pharmacokinetics	Therapy evaluation/Drug of choice	Traditional medicine	Drug interaction (Drug, Laboratory, Disease, Food)	Adverse effect	Poisoning/Toxicology	Teratogenicity	Lactation/Infant risk	Laws/Policy	Others
Drug Facts and Comparisons	-	/	-	/	-	/	-	/	/	-	/	/	-	/	/	/	*
Drug Information Handbook; Pediatric Dosage Handbook	-	/	/	/	/	/	-	/	/	/	/	/	/	/	/	/	*
Medication Teaching Manual: The Guide to Patient Drug Information	-	-	/	-	-	/	-	-	-	-	-	/	-	/	/	-	*
Martindale: The Complete Drug Reference	-	/	/	/	/	/	/	/	/	-	/	/	/	/	/	-	*
Remington's Science and Practice of Pharmacy	-	/	/	/	/	-	/	/	/	-	/	/	/	/	/	-	*
MIMS; MIM Annual	/	/	-	/	-	/	-	-	-	-	/	/	/	/	/	/	*
Pharmacotherapy: A Pathophysiologic Approach	-	-	/	/	-	/	/	/	/	-	/	/	-	/	/	-	*
Applied Therapeutics: The Clinical Use of Drugs	-	-	/	-	/	/	-	/	/	-	/	/	/	/	/	-	*
Textbook of Therapeutics: Drug and Disease Management	-	-	/	-	-	/	-	/	/	-	/	/	/	/	/	-	*
AHFS Drug Information	-	-	-	/	/	/	-	/	-	/	/	/	/	/	/	-	*
Drug Information for the Health Care Professional (USP DI)	-	/	-	/	/	/	/	/	-	/	/	/	/	/	/	/	*
Harrison's Principles of Internal Medicine	-	-	/	-	-	/	-	-	/	/	-	-	-	-	-	-	*
Handbook on Injectable drugs	-	-	-	/	/	/	/	-	-	-	-	-	-	-	-	-	*
Drug Interaction Facts	-	-	-	-	-	-	-	-	-	-	/	-	/	-	-	-	*
Handbook of Nonprescription Drugs	-	-	/	/	-	/	-	-	/	/	/	/	/	/	/	/	*
Handbook of Clinical Drug Data	-	-	/	/	/	/	-	/	-	-	/	/	-	-	/	-	*
Drugs in Pregnancy and Lactation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	/	/	*
United States Pharmacopeia–National Formulary (USP-NF)	-	-	-	-	/	-	-	-	-	-	-	-	-	-	-	-	*
British Pharmacopoeia (BP)	-	-	-	-	/	-	-	-	-	-	-	-	-	-	-	-	*
Merck Index	-	-	-	-	/	-	-	-	-	-	-	-	-	-	-	-	*
Goodman & Gilman's The Pharmacological Basis of Therapeutics	-	-	/	/	-	-	-	/	/	-	/	/	/	/	-	-	*
Medline	-	/	/	/	/	/	-	/	/	/	/	/	/	/	/	/	*

Table 2 The consideration for reliability from the suitability between references used and category of questions. (Continued)

Reference	Category of questions																
	Availability	Identification	Disease & Therapeutic	General product information	Compatibility & Stability	Dosage/Administration	Pharmaceutics (Compounding, Formulation)	Pharmacokinetics	Therapy evaluation/Drug of choice	Traditional medicine	Drug interaction (Drug, Laboratory, Disease, Food)	Adverse effect	Poisoning/Toxicology	Teratogenicity	Lactation/Infant risk	Laws/Policy	Others
International Pharmaceutical Abstracts (IPA)	-	-	/	/	/	/	/	-	-	-	/	/	-	/	-	-	*
British National Formulary (BNF)	-	-	/	/	/	/	/	-	-	-	/	/	-	/	-	-	*
Others	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

Note: / = References were required; - = References were not required; * = References were considered case by case.

Table 3 An example showing the consistency of interpreted results for all assessments of Question Number 104 from three referees.

Assessment	Score from referee		
	First	Second	Third
Completeness	1	1	1
Straightforwardness	5	5	5
Reliability of answerers	1	1	1
Reliability of references used	1	1	1
Suitability of language level	1	1	1

Table 4 The percentage of the qualitative parameters such as completeness (C), straightforwardness (S), reliability of answerers (R-A), reliability of references used (R-R), and suitability of language level (L) of the answers during the study period.

Years	N	Mean of % C	Mean of % S	Mean of % R-A	Mean of % R-R	Mean of % L
2000-2001	17	94.12 ± 0.06	89.41 ± 0.08	94.12 ± 0.06	88.24 ± 0.08	100.00 ± 0.00
2002-2003	26	65.38 ± 0.09	74.62 ± 0.09	61.54 ± 0.10	53.85 ± 0.10	88.46 ± 0.06
2004-2005	27	85.19 ± 0.07	80.74 ± 0.08	74.07 ± 0.08	66.67 ± 0.09	100.00 ± 0.00
2006-2007	30	83.33 ± 0.07	84.00 ± 0.07	63.33 ± 0.09	63.33 ± 0.09	86.67 ± 0.06

Note: N = Number of studied questions in the interval. There were no statistical differences of all assessments between all time intervals ($p > 0.05$).

It was found that the quality of the service was high (>80% for all assessments) during 2000-2001. Later, especially between 2002 and 2003, the averages of assessments for the quality of the service seemed to slightly reduce but without statistical differences. However, there were no obvious reasons for the observed change during the period 2002-2003.

From the beginning, the inquirers who were healthcare personnel such as doctors, nurses and hospital pharmacists could provide specific data about patients' age, patients' weight, chronic diseases, drug allergy, symptoms and others information. However, when the URL were publicly known and inquiries came from various groups of visitors, unclear questions and questions without enough basic data were found more often. This made answering a difficult task. However, no significant changes of all assessments for the quality of the service were noted ($p > 0.05$).

Asiri et al. (2007) evaluated the profile of the requestors, the number and content of questions received by drug and poison information center (DPIC) in Saudi Arabia during the period 2000-2002. They have concluded that another possible way to improve the interest for the DPIC service is the establishment of the URL. In the present study, it was found that 10,000 questions were received within 94 months or in average of 3.5 questions per day. The satisfaction of users on the service was obtained from answers on 18-item and 41-item questionnaires from answerers (provider's perspective) and enquirers (public perspective), respectively. The data indicated that the satisfaction of most users, both providers and receivers, on the service via this URL was in fair-to-good level as exhibited in average rating of above 3 from 5 in Tables 5 and 6, respectively. However, some improvements are required. For instance, the questions should be grouped with proper keywords for easier searching and the time frame for reply should be reduced.

Conclusions

The drug information service, provided by Faculty of Pharmaceutical Sciences, Prince of Songkla University via http://drug.pharmacy.psu.ac.th, could cater the need of healthcare personnel, patients and others. Its quality on answer completeness, answer straightforwardness, reliability of answerers, reliability of references used and suitability of language level in answering was reasonably acceptable.

Table 5 The percentage of the answers on the questionnaires about the satisfaction of answerers on the service (n = 18).

Satisfaction on:	Average score (5 scores)
Rapidity of achievement	3.33 ± 0.59
Esthete of web page	3.00 ± 0.59
Easiness of searching	2.83 ± 0.86
Quality of answers	
Straightforwardness	3.17 ± 0.51
Completeness	3.17 ± 0.51
Fitting	3.06 ± 0.64
Understanding	3.17 ± 0.71
Overall	3.22 ± 0.55

Table 6 The percentage of the answers on the questionnaires about the satisfaction of enquirers on the service (n = 41).

Satisfaction on:	Average score (5 scores)
Rapidity of achievement	3.69 ± 0.64
Esthete of web page	3.03 ± 0.52
Easiness of searching	3.05 ± 0.96
Time frame for reply	2.86 ± 1.13
Quality of answers	
Straightforwardness	3.41 ± 0.87
Completeness	3.23 ± 0.73
Useful	3.87 ± 0.96
Reliability	3.62 ± 0.86
Fitting	3.46 ± 0.90
Understanding	3.26 ± 1.03
Suitable language level	3.39 ± 1.04
Overall	3.56 ± 0.87

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