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Retrospective Quality Assessment of a Hospital-Based Drug Information Service

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Research Article

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Abstract

Objective: To retrospectively evaluate the quality of a hospital-based drug information service based on the structure-process-outcome model of quality assessment.

Methodology: A descriptive-evaluative design was utilized to assess the quality of drug information service in a tertiary, government hospital in Manila, Philippines from 2006 to 2008. Three evaluation tools were created, pilot-tested, and eventually employed to measure structure, process, and outcome parameters. The structure assessment employed secondary data obtained from the pharmacy profile, drug information and drug availability worksheets of the pharmacy department. For the process measures, only the drug information worksheets were utilized. Moreover, survey was conducted among the previous users of the service for the outcome evaluation. Results were analyzed using descriptive statistics.

Results: The 24-hour pharmacist-operated drug information service is under one of the divisions of the pharmacy department. Funded by the hospital, it functions mainly for providing support to clinical services, education, and other specialized medication information activities. Drug inquiry forms for three years were collected. There were a total of 932 drug information worksheets and 135 drug availability worksheets retrieved. Majority of the queries were asked by nurses and most of the questions simply asked about the availability of the product. Drug information requests were usually received by phone, answered in less than 5 minutes, and utilized primarily tertiary literature. Process evaluation revealed very satisfactory ratings in clearly noted search questions and appropriate responses. Complete demographic information and timely provision of responses were observed as satisfactory. Out of 932 individuals who requested for drug information, only 38% were found to be eligible. A total of 350 questionnaires were sent out and 245 were retrieved. Majority of the information were used for patient care, specifically, adverse drug reactions and enhancing therapeutic effectiveness. Requesters perceived professional quality, clarity, timeliness, and helpfulness of the drug information responses as very good.

Conclusion: The hospital-based drug information service is comparable to the published information on drug information services provided in other countries. However, certain areas still need improvement, such as creation of a separate unit for drug information, proper documentation and follow-ups, and regular conduct of quality assessment program, for better delivery of quality service.

Key words: drug information service, hospital, quality, quality assessment, retrospective

INTRODUCTION

Quality assessment of health care in different settings has become progressively more crucial. In fact, it has been evident in literature the assessment of health care quality utilizing a structure-process-outcome framework[1][2][3][4][5]. In addition, clinical indicators for each parameter were developed to improve hospital care[6][7][8]. Donabedian categorized all assessment efforts as structure, process, or outcome denoting attributes of the setting, activities involved in the provision of care, and end product of care, respectively[9].

In hospital pharmacy practice, the conduct of quality assessment and improvement activities is necessary[10]. This program can be implemented in clinical, education, research and support services. In the provision of drug information, it is essential that quality assessment of responses should be included in the medication information process[11]. Proper documentation of drug information requests and

responses can be of great help to quality assessment or performance improvement activities.

Quality assessment programs have already been implemented in some countries where drug information centers (DICs) exist such as United States, Europe, Australia, India, Germany, Malaysia, Singapore, and Hong Kong among others[12][13][14][15][16][17][18][19][20][21]. These assessment programs, while different conceptual frameworks were utilized, gave similar results of the good benefits and high satisfaction among the users of DICs, and even claimed positive patient outcomes. Previous studies have indicated that there were DICs that have assessed the quality of their services based on structure[22][23][17][15][24][25][12][26][27], process[28], and outcome[18][28].

In Manila, Philippines, a tertiary and government hospital established a pharmacist-operated drug information service in 1998 in addition to its clinical pharmacy, research, and training services. However, its quality has not been formally assessed since its establishment. This research aimed to retrospectively evaluate the quality of a hospital-based drug information service based on structure-process-outcome framework.

MATERIAL & METHODS

This study employed a descriptive-evaluative design which assessed the quality of drug information service provided by the pharmacy department from 2006 to 2008 in terms of structure, process, and outcome parameters.

Sources of Data

Secondary data obtained from the pharmacy profile, drug information and drug availability worksheets of the pharmacy department were employed for structure evaluation. For the process measures, only the drug information worksheets were utilized. Moreover, a survey was conducted among the previous users of the service for the outcome parameter. Individuals were identified using the drug information worksheets and afterwards screened.

Instrumentation

Three evaluation instruments were created, pilot-tested, and eventually employed to measure the three parameters of quality: a three-page structure evaluation form, a two-page process evaluation form, and a one-page outcome questionnaire.

The structure evaluation form was adapted from Rosenberg et al (2004)[12] and American Society of Health System Pharmacists (1996)[11]. This consisted of the characteristics of the drug information center, scope of the services, drug information inquiries received, resources, participation in education, quality assessment program, and funding. Requesters, time taken to respond, mode of receipt, information sources, and request category were utilized for drug inquiries.

Moreover, the process evaluation form was adapted from Malone et al (2006)[29] and American Society of Health System Pharmacists (1996)[11]. This consisted of indicators for documentation of requests and responses such as complete requestor's background demographic data, appropriate background information, clearly noted search questions, comprehensive search strategy and reference selection, evaluation and documentation of retrieved literature and information, appropriate and timely provision of response, and clearly documented follow-up communication. A four-point system was added per criterion to further evaluate its quality.

Lastly, the one-page outcome questionnaire was adapted from the suggested outcome measures of American Society of Health System Pharmacists (1996)[11] and Bertsche et al (2007)[18]. The first part contained the profile of the respondent together with the query previously asked and response given to them by pharmacist. The second part consisted of impact of information (patient care, education or research) and user's satisfaction. The latter utilized the following indicators: professional quality, clarity, timeliness and helpfulness of the information and was evaluated using a five-point system.

Data Collection Procedure

Permission from the hospital director was sought prior to the conduct of the study and respondents' participation was voluntary. Structural characteristics were evaluated using the three-page tool. Drug information worksheets and drug availability forms were utilized as data sources for the drug inquiries received.

Furthermore, drug information worksheets were employed for the process measures. One evaluation form corresponded to one drug inquiry record. For the outcome evaluation, the self-administered questionnaires were filled up with the profile, previous inquiry, and response given to the respondent. These were then personally distributed to and collected from the respondents per ward or department.

Data Analysis

Prior to the analysis, each retrieved record or questionnaire was assigned with codes and the data were encoded in Microsoft Excel. Data were analyzed using SPSS version 17.0. Descriptive statistics was used for the structure, process, and outcome data.

RESULTS

Structure

The pharmacy department of the study hospital provides a pharmacist-operated drug information service under its training, research, and clinical services section. It has a drug information library

which also serves as the drug information unit and where most of the computers, telephone, and tertiary resources were situated. In addition, it serves as the area for clinical, education, and research functions. Funded by the hospital, the drug information service operates on a 24-hour basis mainly for the purposes of providing support to clinical services, education, and other specialized medication information activities to hospital staff and other institutions.

Table 1. Drug information inquiries received from 2006 to 2008

VARIABLES	ATTRIBUTES	2006	2007	2008
		FREQ (%)	FREQ (%)	FREQ (%)
Individuals requesting for drug information [a]		N = 349	N = 408	N = 175
	Physician	9 (2.3)	15 (3.7)	12 (6.9)
	Pharmacist	48 (13.8)	29 (7.1)	26 (14.9)
	Nurse	240 (68.8)	306 (75.0)	116 (66.3)
	Non-HCPs	0 (0.0)	1 (0.3)	1 (0.6)
	Consumer	4 (1.2)	7 (1.7)	2 (1.1)
	Not indicated	48 (13.8)	50 (12.3)	18 (10.2)
Time taken to respond to drug inquiries[a]		N = 349	N = 408	N = 175
	≤ 5 minutes	201 (57.6)	107 (26.2)	82 (46.9)
	6–15 minutes	52 (14.9)	21 (5.2)	19 (10.9)
	16–30 minutes	5 (1.4)	3 (7.4)	1 (0.6)
	31–60 minutes	2 (0.6)	1 (2.5)	1 (0.6)
	Not indicated	89 (25.5)	276 (67.7)	72 (41.1)
Mode of receipt[a]		N = 349	N = 408	N = 175
	Direct access	6 (1.7)	107 (26.2)	21 (12.0)
	Phone	311 (89.1)	272 (66.7)	150 (85.7)
	Not indicated	32 (9.2)	29 (7.1)	4 (2.3)
Information resources [a][c]		N = 394	N = 446	N = 191
	Tertiary	290 (73.6)	179 (40.1)	110 (57.6)
	Alternate	64 (16.2)	54 (12.1)	32 (16.8)
	No indicated	40 (10.2)	213 (47.8)	49 (25.7)
Information request category[d]		N = 4822	N = 2663	N = 875
	Availability[a][b]	3485 (72.3)	1796 (67.4)	464 (53.0)
	Identification[a]	28 (0.6)	48 (1.8)	24 (2.7)
	Pharmacokinetic[a]	2 (0.0)	1 (0.0)	0 (0.0)
	Formulation[a]	23 (0.9)	10 (1.1)	10 (1.1)
	Indications[a]	8 (0.3)	8 (0.9)	8 (0.9)
	Dosage[a]	7 (0.3)	8 (0.9)	8 (0.9)
	Administration[a]	14 (0.5)	5 (0.6)	5 (0.6)
	Compatibility[a]	203 (7.6)	104 (11.9)	104 (11.9)
	Stability[a]	43 (1.6)	15 (1.7)	15 (1.7)
	Therapy evaluation[a]	1 (0.0)	3 (0.3)	3 (0.3)
	Drug interaction[a]	9 (0.3)	3 (0.3)	3 (0.3)
	Adverse effects[a]	1 (0.0)	2 (0.2)	2 (0.2)
	Precautions/ Warning/Contra[a]	0 (0.0)	2 (0.2)	2 (0.2)
	Cost[a][b]	498 (18.7)	221 (25.3)	221 (25.3)
	Others[a]	11 (0.4)	6 (0.7)	6 (0.7)

[a]Source – drug information worksheets
[b]Source – drug availability worksheets
[c]More than one information resources can be used per inquiry
[d]More than one question can be asked by an inquirer

Table 2. Process parameter results from 2006 to 2008

VARIABLES	2006 (N= 349)	2007 (N = 408)	2008 (N = 175)
	MEAN (SD)	MEAN (SD)	MEAN (SD)
Complete demographic information	3.47 (0.74)	3.16 (0.68)	3.25 (0.78)
Appropriate background information	1.02 (0.13)	1.08 (0.27)	1.03 (0.17)
Clearly noted search questions	3.76 (0.60)	3.61 (0.73)	3.61 (0.68)
Comprehensive search strategy and reference	2.02 (0.50)	1.56 (0.64)	1.83 (0.62)
Evaluation of retrieved literature	2.56 (0.88)	1.78 (0.98)	2.15 (1.03)
Documentation of retrieved literature	2.44 (0.85)	1.72 (0.93)	2.02 (0.95)
Appropriate response	3.67 (0.72)	3.77 (0.64)	3.62 (0.80)
Timely provision of response	3.20 (1.30)	1.97 (1.40)	2.77 (1.48)
Clearly documented follow-up	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)
Overall score	**2.57 (0.64)**	**2.18 (0.70)**	**2.36 (0.72)**

During normal business hours (8 AM to 5 PM; weekdays), an average of 12 pharmacists per year are assigned in drug information service. These personnel perform other clinical functions, with clinical pharmacy and research backgrounds, and three of whom had obtained master's degree units.

Then, from 5 PM onwards (weekdays only) and weekends, the service is provided by dispensing pharmacists in the main in-patient pharmacy. Received questions vary from compatibility to cost of the drug products and documented using drug information worksheets. Pharmacists in the outpatient and satellite pharmacies can answer questions on drug availability and cost of the product and received queries were documented in drug availability forms. The senior pharmacist assigned in drug information service prepares reports by summarizing the queries per information request category. These forms are filed for documentation and future purposes.

Table 3. Outcome evaluation results from 2006 to 2008

VARIABLES	ATTRIBUTES	2006	2007	2008
		FREQ (%)	FREQ (%)	FREQ (%)
Purpose of information		n = 112	n = 163	n = 59
	Patient care	80 (71.4)	98 (60.1)	39 (66.1)
	Education/research	31 (27.7)	65 (39.9)	20 (33.9)
	Others	1 (0.9)	0 (0.0)	0 (0.0)
Impact of information on patient care		n = 258	n = 260	n = 123
	Avoided adverse drug reactions	74 (28.7)	79 (30.4)	33 (26.8)
	Enhanced therapeutic effectiveness	50 (19.4)	62 (23.9)	31 (25.2)
	Improved appropriateness of therapy	38 (14.7)	47 (18.1)	19 (15.5)
	Improved condition of patient	41 (15.9)	41 (15.8)	24 (19.5)
	Improved compliance	31 (12.0)	31 (11.9)	16 (13.0)
	Others	24 (9.3)	0 (0.0)	0 (0.0)
Impact of information on education or research		n = 81	n = 71	n = 49
	Educated medical and paramedical professionals	20 (24.7)	22 (31.0)	14 (28.6)
	Educated patients	21 (25.9)	15 (21.1)	12 (24.5)
	Contributed to development of research activities	21 (25.9)	15 (21.1)	11 (22.5)
	Improved or upheld standards of practice	18 (22.2)	19 (26.7)	12 (24.5)
	Others	1 (1.2)	0 (0.0)	0 (0.0)

Table 4. Requester' satisfaction on drug information response

DIMENSION	2006 (n = 87)	2007 (n = 113)	2008 (n = 45)
	MEAN (SD)	MEAN (SD)	MEAN (SD)
Professional quality	4.08 (1.13)	4.41 (0.74)	3.84 (1.11)
Clarity	4.01 (1.18)	4.24 (0.92)	3.60 (1.20)
Timeliness	3.91 (1.21)	4.03 (1.00)	3.29 (1.36)
Helpfulness	4.22 (1.14)	4.39 (0.83)	4.00 (1.11)
Overall score	**4.06 (1.17)**	**4.27 (0.87)**	**3.68 (1.20)**

Drug inquiry forms for three years were collected. There were a total of 932 drug information worksheets and 135 drug availability worksheets retrieved. Results revealed that year 2006 had the most number of queries but decreased in 2007 to 2008 (Table 1). Majority of the queries were asked by nurses and most of the questions simply ask about the availability of the product. Queries on availability and cost of products were received by pharmacists in outpatient and satellite areas. Compatibility and stability of drugs were the most frequently asked questions encountered by pharmacists assigned in drug information service and in-patient dispensing areas. Requests were usually received by phone, answered in less than five minutes, and utilized primarily tertiary literature.

Process

The pharmacy department utilized a systematic method in responding to drug information queries. Results revealed very satisfactory ratings in clearly noted search questions and appropriate responses (Table 2). Complete demographic information and timely provision of response were perceived as satisfactory. However, search strategy, evaluation, and documentation of literature were observed to be unsatisfactory. Background data were incompletely documented and received very unsatisfactory ratings similar to follow-up which was never performed. Overall, assessment in this parameter revealed unsatisfactory results and showed a decline from 2006 to 2007.

Outcome

Out of 932 individuals who requested for drug information, only 38% (n=350) were found to be eligible. A total of 350 questionnaires were sent out and 245 (199 nurses; 46 pharmacists) or 70% were

retrieved. This response rate is considered high especially that questionnaires were self-administered. Respondents for 2007 gave the highest response rate.

Majority of the information were used for patient care rather than utilized for education or research (Table 3). More patient care impact was observed on avoiding adverse drug reactions and enhancing therapeutic effectiveness. Impact of information for education or research showed a high percentage on educating medical and paramedical professionals and almost equal proportions on educating patients, contributing to development of research activities and improving standards of practice.

Requesters of drug information perceived professional quality, clarity, timeliness, and helpfulness of the information as very good (Table 4). However, there was a decrease in the level of satisfaction ratings in 2008 which affected the mean values. Majority of the comments or suggestions stated by the respondents were regarding the provision of the pharmacy department with updated intravenous drug compatibility chart in every ward and a 24-hour service for any query to accommodate afternoon and night duty.

DISCUSSION

The structure evaluation revealed that the drug information service shared the same location with other clinical pharmacy services. It served to be the most appropriate area inside the department since different drug information resources were maintained in this section. However, this is in contrast in other countries with separate structural units specializing in drug information provision [12][13][19][23][24][30]. Additionally, it should be noted that a 24-hour drug information service offered in this study hospital is comparable with other drug information centres providing 24-hour services [12] and other units answering calls during normal business hours but has a pharmacist who is available 24 hours a day to answer emergency questions [31]. An average of 12 pharmacists assigned in the drug information unit and dispensing pharmacists respond to queries. This is relatively high compared to one (1) to five (5) pharmacists in drug information centres in published literature [12][20][23].

Furthermore, the number of inquiries received was comparable to those reported in drug information centres in United States and Singapore with more than 2000 queries in a year [20][24]. However, there was a difference in the nature or complexity of query received. An increase in the number of inquiries encountered in this hospital is due to queries on availability and cost of products usually received by pharmacists in different dispensing areas. Compatibility and stability of drug (in most cases, the intravenous drugs) were the most frequently asked questions received by pharmacists assigned in drug information service and in-patient dispensing area. Drug information units in other countries frequently receive questions on adverse effects, dosage, or drug interactions [15][20][24]. Majority of the individuals who requested for information were nurses in contrast to other countries wherein physicians obtained the highest percentage of inquirers [20][26]. This could be due to reasons that drug information practices are not yet well-established and promoted to healthcare professionals, most especially the physicians in the hospital.

For the process evaluation, all of the steps were performed by pharmacists except conducting a follow-up. Based on the drug information worksheets utilized, a great deal of incomplete data was observed. Complete documentation is necessary for quality assessment and other performance improvement activities [11]. Since this study is retrospective in design, the only source of data for process measures were the records retrieved. Obtaining complete background information, which is considered necessary in individualizing the response to meet the client's needs, was found to be the weakness of the service. Most of the drug information responses were used for patient care. Therefore, a high percentage of noted background information should be observed. Documenting the sources of information utilized should be the strong point to achieve very satisfactory ratings in comprehensive literature selection, evaluation, and documentation of literature retrieved. However, there were records without documented literature and incomplete citations of the sources used. In most cases, only one source of information and tertiary literature were used in answering a drug information request. There were information that might not be located in tertiary literature; therefore, consultations with secondary and primary sources are then necessary. This suggests that a comprehensive search strategy and reference selection must be conducted. Responses provided in inappropriate manner indicate that efforts expended could be wasted. The satisfactory ratings obtained for this parameter could be due to deficiency in the appropriate information resources available in the drug information unit, problems encountered in internet access, or less proficiency in searching resources and information. These problems once resolved could actually increase the evaluation ratings.

For the outcome evaluation, most of the responses provided were used for patient care rather than education or research. This was comparable to studies conducted in Malaysia, India, and United Kingdom wherein received inquiries were for purposes related to direct patient care[15][19][28]. Since the setting is hospital-based, it is quite clear that queries concern better patient care. Outcomes applicable were identified by health care professionals who asked for drug information. A

high percentage was noted on avoiding adverse drug reactions and enhancing therapeutic effectiveness since most of the queries were received from health care professionals directly involved in monitoring patient's conditions. In general, most of the inquirers rated the response as very good in terms of professional quality, clarity, timeliness, and helpfulness. However, even if a high mean rate was shown, there was a decrease in the level of satisfaction from 2007 to 2008.

This quality assessment utilizing structure-process-outcome framework may provide positive impact on the drug information services of the study hospital. Identified areas for improvement may also contribute in enhancing the skills of pharmacists in evaluating medication information and providing pharmaceutical care to patients. This expansion in the roles of pharmacists from traditional dispensing and compounding to patient-oriented services is a crucial element in pharmacy education and training. To address this paradigm shift, clinical pharmacy or drug information courses were incorporated in different pharmacy curricula[32][33]. In addition, literature revealed preparedness of students to provide pharmaceutical care[34] and competence in dispensing and addressing drug incompatibilities prior to clinical practice[35].

This study, however, is not without limitations. Evaluation on the structure, process, and outcome parameters of quality of drug information service was conducted in a retrospective approach. Quality assessment was only based on the records retrieved from the pharmacy department. For the structure evaluation, drug information inquiries received were only obtained from the documented information on the drug information and drug availability worksheets. Some queries might not be documented. Also, only the question-answer service was evaluated based on its utilization (nature of query received, clients, and others) and other drug information activities were only measured based on its presence or absence in drug information provision. For the process parameter, drug information worksheets were utilized. Documentation was the only measure if the pharmacy department complies with the systematic method in responding to drug information requests. Meanwhile, the identification of the respondents for the outcome evaluation relied only on the existing records. Due to incomplete demographic information documented and other healthcare professionals were not already affiliated with the hospital, only 38% eligible participants were included in the outcome evaluation.

CONCLUSION

Structure evaluation revealed that most of the structural characteristics of the drug information service in this hospital were comparable with the drug information centers in other countries. However, having a separate structural unit and appropriate information resources still needs action. Furthermore, process measures showed that the procedure in providing the service followed the systematic method. However, not all steps were completely performed. Complete documentation of requests and responses and conduct of follow-ups are essential to improve the quality of the service.

Moreover, there was a great impact of information on patient care and drug information responses were found to satisfy the inquirers. An outcome assessment may be placed in the drug information worksheet with questions which ask about the purpose of the request, applicable outcome, or level of satisfaction. Generally, deficiencies in structural characteristics may be a contributing factor to the unsatisfactory results in process measures and consequently affect satisfaction from the users of information. Regular conduct of quality assessment on drug information service will result most likely to excellent quality ratings on structure, process, and outcome parameters.

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AUTHORS' CONTRIBUTIONS

Ms. Ng did the conceptualization, conduct of the study, data analysis, and manuscript write-up. Dr. Loquias significantly contributed in the overall conception, analysis, and interpretation of study results.

PEER REVIEW

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CONFLICTS OF INTEREST

The authors declare that they have no competing interests.