



Outcomes of Pharmaceutical Care Services in Promoting rational Drug Use

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ABSTRACT

Pharmacists provide pharmaceutical care service in order to support rational drug use. However, still lack of evidence to show its outcomes. Therefore, this cross-sectional descriptive study and qualitative study were conducted to evaluate the outcomes of pharmaceutical care services and to clarify pharmaceutical care services format for promoting rational drug use in chronic patients. Outcomes of pharmaceutical care service in Lampang Hospital both in outpatients and inpatients in fiscal year 2015 were collected. Doctors, nurses and pharmacists anticipated in pharmaceutical care services were in depth interviewed regarding the satisfaction of pharmaceutical service, the suitable and benefit for staff and patient, suggestion for pharmaceutical services and policy suggestion. Data were analyzed using descriptive statistics. The results revealed that pharmacist who provided pharmaceutical care services promoted effective use of drug use by audit and feedback inappropriate prescriptions, promoted safety use of drug by preventing adverse drug events and drug-drug interaction, increased patient compliance use of drug and reduced drug cost from medication reconciliation process. Data from in-depth interviewing found that pharmacists who provide pharmaceutical care services, doctors and nurses who are co-worker were satisfy with currently providing pharmaceutical care services and had consensus that the pharmacy services were more effective and rational use support. Patients got correct drug, had more safety in drug use, could use drug correctly and appropriately and save cost. This research confirmed that we should have pharmaceutical care services or clinical pharmacists in chronic patient care services as tools to promote rational drug use in health care setting.

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Introduction

Rational Drug Use; RDU, by definition of the sub-committee for develop national list of essential medicine, means using medicine when has indication, quality and effectiveness with evidence-based support, get more clinical-benefit than risk of using, has cost effective as health economic, avoid poly-pharmacy, concern of drug resistance, use drug in the formulary, result in stepwise treatment as in

drug-using guideline, by using individualized-dose with right method of administration and frequency as in clinical pharmacology for an adequate of time, patient is accepted and can use the drug correctly and continuously, the funds health security or welfare can sustainability reimburse, using drug without discrimination so every patient can equally access to drug and do not be denied to have the deserve drug.[1] In health care service of patient treatment using drug therapy, the rational drug use will occurred

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when there are factors to support rational drug use. Then in 2014, subcommittee of national drug use under national drug system development committee announce the 6 main keys, to promote rational drug use, namely PLEASE[2-3] which detail of each factors are as follows;

P: Pharmacy and Therapeutics Committee (PTC) competency; is to strengthen operative unit of Pharmacy and Therapeutics Committee.

L: Labeling and leaflet; is the operation that let patient get standard drug labeling, supplemental drug labeling and public drug leaflet from clinic.

E: Essential RDU tools are

- 1) Essential drug therapy recommendation
- 2) Evidence-based hospital formulary
- 3) Essential laboratory investigation
- 4) Essential information system for RDU
- 5) System for drug use monitoring and feedback
- 6) Essential policy for RDU

A: Awareness for RDU principles among health personnel and patients; is to create mechanism, system and activity for support promoting awareness for Rational Drug Use in health personnel and patients.

S: Special population care; is the safe use of drug therapy on liver disease patients, kidney diseases patients, pregnancy women, breast-feeding women, child and elderly including other special case patients who are the target of each clinic.

E: Ethics in prescription; make clear and ethics practices in selection, prescription and interaction with medicine company and medicine representative appropriately.

In health care service, chronic patients such as diabetes patients, high blood pressure patients, chronic obstructive pulmonary disease patients and asthma, heart disease patients, are patients that must have continuous treatment. And drug therapy is signification part in patient caring process. The treatment expectation that patient will cured or the symptom will be relieved or the progression of disease will slow down or no complication of disease which will lead to better quality of life. The mentioned treatment will accomplished, patients have to be treated with drug rationally.

Lampang Hospital is the regional hospital sized 800 beds, having chronic patients who must be treated continuously at special medicine clinic in main clinic not less than 12,000 people. The mission of the pharmacist is to provide pharmaceutical care which is the direct, responsible provision of medication-related care for the purpose of achieving definite outcomes that improve a patient's quality of life. The pharmacist who provided pharmaceutical care service participated with doctor and nurse on pharmaceutical care services for chronic outpatient in medical clinics for more than 10 years. And serve the pharmaceutical care for inpatient in medicine ward for more than 15 years and cardiac and thoracic surgery ward for more than 2 years. The main role of pharmacist in pharmaceutical care services are medication reconciliation, monitoring patient drug therapy in order to identify potential and actual drug-related problems, resolve actual drug-related problems, and prevent potential drug-related problems and patient drug counseling for correctly and safely drug use. More over pharmaceutical care service

pharmacist will support clinical data to create academic information of drug for selecting drug into hospital drug list, create drug treatment hospital guideline, monitor and evaluate drug usage and follow up the adverse drug event.

From above information, it shown that pharmacist role in pharmaceutical care service is a part of drug using process that support rational drug use. However, still lack of systematic analyzing, collecting, compiling of operating format, creating report, the analysis of effect in national drug policy, knowledge and skill formation guideline of pharmacist who will operating pharmaceutical care service to be effective and acknowledged by multidisciplinary. Therefore, researchers were interested in analyzing current pharmaceutical care service and it's outcomes on rational drug use. These may apply to be the operation protocol for pharmacist providing pharmaceutical care service and to use as information for hospital policy in promoting rational drug use, developing human resourcing in rational drug use according to national drug system development committee policy.

Objectives

1.1 To study the outcomes of pharmaceutical care services in rational drug use.

1.2 To study pharmaceutical care services format for promoting rational drug use in chronic patients.

Material and Methods

This research was an analytical research to study outcomes of pharmaceutical care service on effect of rational drug use and qualitative research to study pharmaceutical care service format that support rational drug use in chronic patients which lead to policy proposal in formatting pharmaceutical care services promoting rational drug use as following process.

1. Review literature concerning national drug policy, rational drug use and supporting rational drug use guideline.

2. Collect and analyze outcomes of pharmaceutical care services in fiscal year 2015.

3. In-depth interview with pharmaceutical care service pharmacists, anticipated doctors and nurses about the hospital pharmaceutical care services for chronic patients, the satisfaction of pharmaceutical service, the suitable and benefit for staff and patient, the rational drug use support, suggestion for pharmaceutical services and policy suggestion.

4. Analyze data to be pharmaceutical care services suggestion for support rational drug use following national drug system development committee policy.

This research was ethnics for human-research approved by Lampang Hospital ethics committee.

Results

This research was divided into 3 parts which were outcomes of pharmaceutical care services, In-depth interviewing with concerning staff and analyzing data to be pharmaceutical care services suggestion.

Outcomes of pharmaceutical care services

After collecting outcomes data of pharmaceutical care services in fiscal year 2015 in rational drug use support activities both for outpatients and inpatients. The results revealed that the main role of clinical pharmacist who work on pharmaceutical care services were counseling patients drug therapy, screening medication error of prescription, monitoring patients drug therapy in order to detect drug-related problem for solving or preventing the drug-related problem and do medication reconciliation process. Those roles were related to rational drug use and shown that clinical pharmacist was one tool that made rational drug use happening in patients care setting in following topics,

Promote effective drug use

In drug using process whether for preventing or to treatment reach most effectiveness from drug use, it is necessary for patients to receive medications appropriate to their clinical needs in doses that meet their individual requirements, for an adequate period of time. Since the audit and feedback process in prescription, pharmacists screen and correct prescription results in patients got the right drugs as mentioned. The operating outcomes in fiscal year 2015, there were screening in outpatients for 18,061 times and found prescribing error 367 times as

percentage of 2.0. Mostly was error in an incorrect dosage (table 1). And screening in inpatients for 15,666 times and found prescribing error was 519 times as percentage of 3.3. Mostly still was the error in an incorrect dosage (table 2). Besides prescription screening, pharmacists also serve pharmaceutical care in detecting drug related problem (DRP) which are the main task of pharmaceutical care services. After service at outpatient 18,061 times, inpatient 15,666 times, found DRP 5,961 times as percentage of 33.0 and 2,032 times as percentage of 13.0, respectively. Where DRP that mostly found in outpatient were non compliance in drug usage, secondary were under dose problem, mostly DRP in inpatients were need additional drug therapy, secondary were under dose problem. When pharmacist found mentioned problem, they will consult with doctor in-charge solving for patient' problems by getting the right dose make patients get appropriate dose to accomplish the treatment.

Promote safety about drug use

In pharmaceutical care services, both outpatient and inpatient found DRP that may caused un safety in patient drug use such as overdose, receiving not essential drug therapy for patient, choosing drug that not suitable for their clinical needs, receiving drug-drug interaction, receiving precaution drug or patients got adverse-effect from drug use. These problems, when pharmacist found out those patients

Table 1. Outcomes of pharmaceutical care services in outpatient in fiscal year 2015

Activities	Diabetes	Chronic obstructive pulmonary disease and asthma	Heart disease using warfarin	Total
Total amount of patients using services	6,960	1,457	9,644	18,061
Found DRP (times)	1,750	595	3,616	5,961
- Additional drug therapy	32	1	0	33
- Unnecessary drug therapy	20	0	0	20
- Wrong drug	15	0	0	15
- Dosage too low	38	0	2,060	2,098
- Drug interaction	1	0	0	1
- Adverse drug reaction	16	29	271	316
- Contraindication	4	0	0	4
- Dosage too high	35	0	702	737
- Non compliance	1,589	565	387	2,541
- Miscellaneous	0	0	196	196
Audit and Correct Prescribing Error (times)	27	1	339	367
- Omission	3	0	69	72
- Wrong Drug	2	0	6	8
- Wrong Dose	10	0	135	145
- Duplicate Drug	6	1	12	19
- Wrong Strength	0	0	4	4
- Wrong Patient	0	0	1	1
- Wrong time interval	1	0	0	1
- Wrong Quantity	5	0	63	68
- Wrong preparation	0	0	3	3
- Incomplete prescription	0	0	21	21
- Miscellaneous	0	0	25	25
Total reduced cost (baht)	984,294	254,456	-	1,238,750

Table 2. Outcomes of pharmaceutical care services in inpatient in fiscal year 2015

Activities	Medicine Ward	Cardiac and Thoracic Surgery ward	Total
Total amount of patients using services (person)	9,780	5,886	15,666
Found DRP (times)	1,506	526	2,032
- Additional drug therapy	792	256	1,048
- Unnecessary drug therapy	132	86	218
- Wrong drug	170	12	182
- Dosage too low	213	41	254
- Drug interaction	8	16	24
- Adverse drug reaction	0	10	10
- Contraindication	0	7	7
- Dosage too high	126	56	182
- Compliance	64	6	70
- Miscellaneous	1	41	42
Advised patients before take medication home (times)	485	474	959
Audit and Correct Prescribing Error (times)	480	39	519
- Omission	0	0	0
- Wrong Drug	60	0	60
- Wrong Dose	326	39	365
- Duplicate Drug	0	0	0
- Wrong Strength	0	0	0
- Wrong Patient	0	0	0
- Wrong time interval	0	0	0
- Wrong Quantity	0	0	0
- Wrong preparation	94	0	94
- Incomplete prescription	0	0	0
- Miscellaneous	0	0	0
Write ADR report(reports)	13	6	19
Counseling new patient using Warfarin	-	48	48

got, they would consult doctor in-charge for solving made patients safety. Last year, outcomes in pharmaceutical care services of outpatient found un safety problem about overdose, patients got adverse-effect from drug use, receiving not essential drug for patient, choosing drug that not suitable for their clinical needs, receiving precaution drug and receiving interaction drugs for 737 cases, 316 cases, 20 cases, 15 cases, 1 case and 1 case, respectively (table 1). In pharmaceutical care services of inpatient found un-safety problem about receiving not essential drug for patient, overdose, choosing drug that not suitable for their clinical needs, receiving drug-drug interaction, patients got adverse-effect from drug use and receiving precaution drug for 218 cases, 182 cases, 182 cases, 24 cases, 10 cases and 7 cases, respectively (table 2).

Increase compliance of patient drug use

In pharmaceutical care services, both outpatient and inpatient found non-compliance in drug therapy. Especially outpatient pharmaceutical care services found out that pharmaceutical care services in 3 chronic patient groups about 18,061 times got DRP 5,961 times which are non-

compliance in drug use problem 2,541 times as percentage of 42.6 of all DRP (table 1). And these patients, pharmacists would I give the advice, detect the cause of not take the medication as prescribe and find out the solutions to make more comply of drug use results in success treatment that made patient get the most benefit from drug therapy.

Drug cost reduction

In previous medications of follow up outpatients, including chronic diabetes patients, and chronic obstructive pulmonary disease and asthma patients, were verified using medication reconciliation process. Pharmacists emphasized patients to bring back previous drug every time. When they came for follow up appointment and doctors prescribed as previous drug, pharmacists would manage patient previous drug whether which drug can continue using and reduce the amount in prescription but still remain the same goal to let the patient have drug as prescribed and sufficient amount before next follow up. These process results in reduce drug dispensing from pharmacy which were cost reduction of hospital medication. The outcomes of year 2015, previous drug

management of 6,960 diabetes patients, 1,457 chronic obstructive pulmonary disease and asthma patients could reduce drug dispensing from pharmacy for the values of 984,294 baht (average 141 baht/person) and 254,456 baht (average 175 baht/person), respectively. The total values were 1,238,750 baht or 103,229 baht/person. (table1) Besides, the benefits of pharmaceutical care services mention previously, pharmacists also evaluated the clinical outcome for outpatients of each disease after receiving pharmaceutical care services, how clinical results of patients were. And the study shown that percentage of diabetes patient who can control blood sugar was 44.0, percentage of chronic obstructive pulmonary disease and asthma patients had ER visit and have to admit were 10.7

and 10.5, respectively, percentage of warfarin patients had INR in target range was 45.2. (table 3)

Outcomes of in-depth interview with concerned staffs

After in-depth interviewed with concerned staffs i.e. pharmacists, doctors, nurses who are involved in pharmaceutical care services about hospital drug services of chronic patients, the satisfaction of drug services, suitability and benefit to operation staff and patients, rational drug use support, the improvement of hospital drug services and policy suggestion. The interviews found that;

Table 3. Clinical outcomes of pharmaceutical care in chronic outpatients

Clinical outcomes	Total (percent)
Diabetes	
patients can control blood sugar at 70-130 mg/dl	3,062 (44.0)
patients has HbA1C < 7	2,195 (31.5)
Chronic obstructive pulmonary disease and Asthma	N=1,457
COPD patients got ER visit after seeing pharmacist (person)	59 (10.7)
Admit COPD patients after seeing pharmacist (person)	58 (10.5)
Asthma patients divided by group control	
• Control asthma (person)	430 (51.9)
• Partly control asthma (person)	245 (29.6)
• Un-control asthma (person)	153 (18.5)
Heart disease using warfarin	
INR in target range	4,354 (45.2)
INR below target range	2,690 (27.9)
INR above target range	1,045 (10.8)
Found adverse event	
• Major bleeding (times)	39
• Thrombosis (times)	35

1) Hospital drug services for chronic patients.

There were systems for pharmacist working on pharmaceutical care services for outpatient who had diabetes, chronic obstructive pulmonary disease and asthma, heart disease using warfarin and for working on pharmaceutical care services for patient in medical ward, cardiac and thoracic surgery ward by working with doctors and nurses. The main tasks of pharmacists were medication reconciliation, monitoring drug therapy of patients, detecting patient DRP either for fixing actual problem or for prevent problem that may caused from drug, give drug information to concern staff both in hospital and network, counsel and supervise drug use to patient for correctly and safety drug use such as test drug allergy, gave patient instructions on how to use inhaler, adjust dosage according to renal function and select drug preparation to suit patient, monitor and evaluate drug use, follow the adverse drug reaction. Furthermore, pharmacists will support clinical data and academic drug information for pharmacy and therapeutic committee to select drug into hospital formulary and create hospital drug use guideline.

2) The satisfaction of pharmacy services.

Pharmacists who provide pharmaceutical care services, doctors and nurses who are co-worker were satisfy with currently providing pharmaceutical care services and had consensus that the pharmacy services were more effective. By screening patients drug therapy both before and after seeing doctor to confirm whether patients were comply with treatment plan or prescribe or not regarding drug, dosage regimen, administration, drug interaction, adverse drug reaction. Furthermore, there were counseling patient drug therapy, searching drug information and interchanging patient information between doctor, nurses and pharmacists.

3) Suitability and benefit to patients and staff.

3.1 Patients.

Patients get correct drug, had more safety in drug use, could use drug correctly and appropriately and save cost.

3.2 Staff.

Patient treatment were more effective, had more confident in patient treatment and care, had more rational drug use in prescription, easier operation and less dispensing error.

4) Rational drug use support.

There was harmonious opinion that this pharmacy services were rational use support. By patients got indication drug and essential for treatment, patients didn't receive unnecessary or duplicate drug, reduce infected chance and prevent antimicrobial resistance, patients received quality and cost-effectiveness drug, patients had knowledge on drug use so they could use drug properly.

5) The improvement of pharmacy services in hospital

5.1 Create pharmacy services area to be more privacy and connected to dispensing unit.

5.2 Expand pharmaceutical care services in other departments to fully provide this care services especially department that had elderly, used high alert drugs and used high amount of drug such as medicine department for diabetes, asthma, chronic obstructive pulmonary disease, surgery department and orthopedics department.

5.3 Develop man power of pharmacists and improve pharmaceutical care services skill to support pharmacy services in hospital since at present, someday, there's no substitute pharmacist and some pharmacists still not work proactively in such care.

5.4 Improve communication between department and staff to focus on patient benefit such as patient didn't have to walk forth and back, write report to doctor for adjust the dosage.

5.5 Improve information system to support staff operation. For example, specific program and data base for pharmaceutical care services, on-line information.

6) Policy suggestion.

6.1 Present pharmaceutical care service model to hospital executive to expand the service to other departments and present to Ministry of Public Health for develop pharmaceutical care services in other hospitals.

6.2. Suggest operation regulations in pharmaceutical care for hospital pharmacist and train pharmacist to have more skill on proactively provide pharmacy service.

6.3. Develop referral system for pharmacy services in multilevel hospital network include community pharmacy.

Development of pharmaceutical care services suggestion

To support rational drug use as National Drug System Development Committee policy, it should have pharmacists providing pharmaceutical care services and fully support them. In example of model and approaches of pharmaceutical care service in chronic patients in Lampang Hospital that support rational drug use, can adapt

to operate in other hospital and set as operation model and also pharmaceutical care service training model that support rational drug use.

Discussion

This research proposal confirmed that we should have pharmacists who work on pharmaceutical care services or clinical pharmacists in chronic patient care services. And promote clinical pharmacist as tools to promote rational drug use in health care setting. And to confirm case study of Health Insurance System Research Office in 2011 that the operation of promote and supervise drug use in 3 role-model hospitals: Lampang Hospital, Police Hospital and Siriraj Hospital made more acknowledge on rational drug use. Besides of great reduction amount on drug expense, it help calk from drug use and prevent corruption[4]. According to international study, they found that pharmaceutical care services results in prevent adverse drug reaction, reduce illness and death from inappropriate drug use and reduce drug expense from irrational drug use.[5] Also provide more safety on drug use to patient through the activities of pharmaceutical care services [6] and promote rational drug use.[7] Which hospitals set up the role and responsibility of Pharmacy and Therapeutics Committee to set up the prescription review system and audit and feedback system which are one of the pharmaceutical care services are correspond with 3rd recommendation from 10 recommendations to improve use of medicines in developing countries.[8]

Conclusion

Outcomes of pharmaceutical care services in chronic diseases supported rational drug use both for outpatients and inpatients. Thus pharmaceutical care services or clinical pharmacists in chronic patient care services should be provided as tools to promote rational drug use in health care setting.

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