REVIEW ARTICLE

Drug management in Tambon health promoting hospitals: a systematic review

Vanida Prasert[1] and Farsai Chanjaruporn[2]

[1] *B.Sc. (Pharm), Department of Pharmacy, Faculty of Pharmacy, Mahidol University, Thailand*
[2] *Ph.D., Department of Pharmacy, Faculty of Pharmacy, Mahidol University, Thailand*

Received: *20 May 2015* ***Revised:*** *10 June 2015* ***Accepted:*** *12 June 2015*
Corresponding author: *Farsai Chanjaruporn* ***Email:*** *farsai.cha@mahidol.ac.th*
Available online: *June 2015*

Abstract

Prasert V and Chanjaruporn F.
Drug management in Tambon health promoting hospitals: a systematic review
Pub. Health Dev. 2015;13(1)55-67

Tambon Health Promoting Hospitals (THPHs) are the first level of public health service system. Before the health service system reform, the THPHs confronted inefficient drug management. Presently, drug management in THPHs develops and expands responsibility to conform health system reformation in Thailand. This study aimed to systematically review the drug management in THPHs to know the current situation of drug management including the efficiency of drug management and patient satisfaction after the reform of the health service system.

A literature search was conducted in the ThaiLIS and the Health Systems Research Institute databases during 2004 to 2015. Results revealed the sixteen articles which met the inclusion criteria. The six dimensions of drug management tasks in THPHs which were used as the criteria consist of drug system management, medical supply management, inventory management, pharmaceutical care, home care pharmacy services and rational drug use promotion. It was found that most THPHs performed efficiently for drug management thus patients satisfied for their services. Moreover, some THPHs performed inefficiently on medical supply and inventory management. The problems and obstacles also revealed inadequacy of the staff and budget. Therefore, government should focus on proper resource allocation and provide crucial supports to enhance efficiency and quality of treatment to the patients.

Keywords: Tambon Health Promoting Hospitals, drug management, systematic review

วารสารสาธารณสุขและการพัฒนา
ปีที่ 13 ฉบับที่ 1 มกราคม - เมษายน 2558

การบริหารจัดการด้านยาในโรงพยาบาลส่งเสริมสุขภาพตำบล

วนิดา ประเสริฐ[1] และฟ้าใส จันท์จารุภรณ์[2]

[1] *B.Sc. (Pharm) ภาควิชาเภสัชกรรม คณะเภสัชศาสตร์ มหาวิทยาลัยมหิดล ประเทศไทย*
[2] *Ph.D. ภาควิชาเภสัชกรรม คณะเภสัชศาสตร์ มหาวิทยาลัยมหิดล ประเทศไทย*

บทคัดย่อ

วนิดา ประเสริฐ และ ฟ้าใส จันท์จารุภรณ์
การบริหารจัดการด้านยาในโรงพยาบาลส่งเสริมสุขภาพตำบล
ว.สาธารณสุขและการพัฒนา. 2558; 13(1)55-67

โรงพยาบาลส่งเสริมสุขภาพตำบล (รพ.สต.) เป็นด่านแรกของการให้บริการด้านสุขภาพ ก่อนการปฏิรูประบบบริการสุขภาพ พบว่า รพ.สต.ประสบกับปัญหาการบริหารจัดการด้านยาที่ไม่มีประสิทธิภาพ ในปัจจุบัน การจัดการด้านยาใน รพสต. ได้พัฒนาและขยายบทบาทมากขึ้นเพื่อให้สอดคล้องกับการปฏิรูประบบสุขภาพในประเทศไทย การศึกษาการบริหารจัดการด้านยาของรพ.สต. นี้มีวัตถุประสงค์เพื่อต้องการทราบสถานการณ์ปัจจุบันของการจัดการด้านยา ครอบคลุม ประสิทธิภาพการจัดการด้านยาและความพึงพอใจของผู้ป่วย

จากการปฏิรูประบบบริการสุขภาพโดยการทบทวนอย่างเป็นระบบจากฐานข้อมูลอิเล็กทรอนิกส์ของสำนักวิทยบริการและเทคโนโลยีสารสนเทศ (ThaiLIS), สถาบันวิจัยระบบสาธารณสุข (สวรส.) และแหล่งข้อมูลอื่นๆ ในช่วงปี พ.ศ. 2547 ถึง 2558 พบว่ามี 16 งานวิจัยที่ผ่านเกณฑ์การคัดเลือก โดยใช้เกณฑ์การคัดเลือกเกี่ยวกับการบริหารจัดการด้านยาใน 6 มิติ คือ การจัดการระบบยา, การบริหารเวชภัณฑ์, การจัดการคลังยา, การบริการด้านเภสัชกรรม, การดูแลผู้ป่วยด้านยาต่อเนื่องที่บ้านและการส่งเสริมการใช้ยาอย่างสมเหตุผล ผลการศึกษา พบว่า รพ.สต.ส่วนใหญ่มีประสิทธิภาพในการจัดการด้านยา ยังผลให้ผู้ป่วยเกิดความพึงพอใจ ในขณะที่ยังมีบาง รพ.สต. ที่ยังมีปัญหาในเรื่องของการบริหารเวชภัณฑ์และการจัดการคลังยา ปัญหาที่สำคัญ คือ การขาดแคลนเจ้าหน้าที่และงบประมาณในการบริหารจัดการด้านยาที่ไม่เพียงพอ ดังนั้นรัฐบาลควรพิจารณากระจายกำลังคนให้เหมาะสมและให้การสนับสนุนในส่วนที่เกี่ยวข้อง เพื่อเพิ่มประสิทธิภาพและคุณภาพของการรักษาให้กับผู้ป่วย

คำสำคัญ: โรงพยาบาลส่งเสริมสุขภาพตำบล, การบริหารจัดการด้านยา, การทบทวนอย่างเป็นระบบ

Introduction

Tambon Health Promoting Hospitals (THPHs) are the important first level of public health service system that aims to establish the patterns of health care service leading to healthy living and cost-effectiveness of health resources.[1,2] The process of drug management in primary health care is very important and has many complications in health system.[3] The good efficiency of drug management will help to save drug budget and help people to receive good quality and proper medicine.[4] According to previous studies, before the health service system reformation, it was found that drug management in THPHs was inefficient in terms of inappropriate drug use, lack of good practice in the management of drug inventory and staff lack of medicine knowledge.[5-7] The standard criteria for drug management tasks in a THPH are classified into six dimensions; drug system management, medical supply management, inventory management, pharmaceutical care, home care pharmacy service and rational drug use promotion.[8] The pharmacy unit has as its functions in the drug system of THPH to ensure that all patients receive appropriate medicines, medicines inventory system is of quality standard, good pharmaceutical care is performed and rational drug use in the community is well established. Thus, good system of drug management in the THPHs could be considered as the extremely important factor to ensure the best quality of healthcare service. Thorough review of literatures concerning drug management in THPHs would help to better understand the current drug management situation as well as any important problems and obstacles that THPHs are facing. Once the review is finalized, further analysis and sets of intervention can be carried out to see how to improve the situation for better drug management in THPHs.[9] This study aimed to know the current situation of drug management, after the reformation of the health service system in two aspects including efficiency of drug management and patient satisfaction of pharmaceutical service.

Methods

A comprehensive search of the Thai Library Integrated System (ThaiLIS) and the Health Systems Research Institute (HSRI) databases was performed to gather the publications published during 2004 to 2015. The combination of the search terms used to identify potential studies regarding drug or medicine in the Primary Health Care Unit and Tambon Health Promoting Hospital. Bibliographies of identified articles and related reviews were also manually searched for additional references. Two review authors independently performed the study selection. Studies were included if they met the following criteria: 1) the title is related to the drug management in the Primary Health Care Unit and THPH and 2) contained drug management tasks in THPHs, based on 6 dimensions in the Manual for the Management of THPH, which consist of drug system management, medical supply management, inventory management, pharmaceutical care, home care pharmacy service and rational drug use promotion.[1] Data from eligible studies were then independently extracted by 2 authors, using standardized data extraction forms. For each study, the information extracted comprised of the study design, setting, samples, drug management, outcome measured and problems or obstacles of THPHs. The findings were then organized into coherent themes using a narrative review approach, which identified common elements in the studies reviewed.

Results

A total of 668 identified articles were retrieved from the database, 10 studies were eligible for the thorough review.[4-13] After searching bibliographies of the identified studies and the related reviews, 6 additional studies were further identified[14-19], resulting in 16 studies included in the review, as shown in Figure 1.

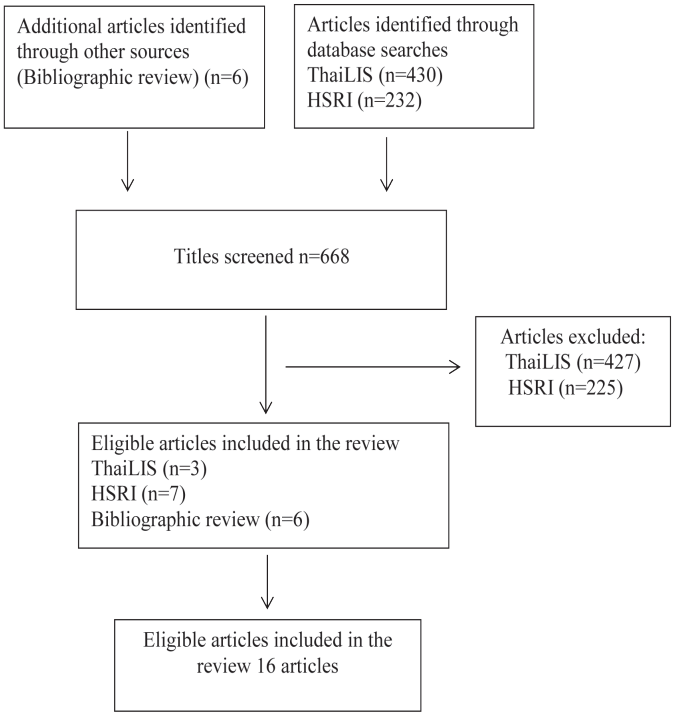

Figure 1 The systematic review process

Characteristics of the studies

Characteristics of all sixteen studies[4-19] were presented in Table 1. Six studies were conducted in Northeastern region[6,8,13,14,17,18] five in Central region [5,9,11,15,19] three in Northern region[10,12,16] and two in Southern region of Thailand.[4,7] The study population of nine studies were the staff of THPHs[4,5,7,8,10,11,13,15,19] three studies were patients who received healthcare service[9,12,17] and four studies were both staff and patients.[6,14,16,18]

Dimensions of drug management

Based on the standard criteria in the Manual for the management of THPH, drug management tasks in THPHs are classified into 6 dimensions: 1. drug system management; 2. medical supply management; 3. inventory management; 4. pharmaceutical care; 5. home care pharmacy service; and 6. rational drug use promotion.[20] Of all the studies, six studies explored only two dimensions[10,11,13,15,18,19] five studies evaluated only one dimension.[4,5,14,16,17] The other three studies evaluated three dimensions[7-9] and two studies investigated four dimensions.[6, 12] Of the six dimensions, it was found that pharmaceutical care was explored most frequently in seven studies[6,8,9,12,16,17,19] while the medical supply management[6,7,10,13,15,18] inventory management[6,7,10,13,15,18] and home care pharmacy service[4,5,6,8,12,14] were explored equally in six studies. Drug system management was investigated in five studies[7, 9,11,12,19] and rational drug use promotion was explored only in four studies.[8, 9, 11, 12]

The outcome of drug management

According to this systematic review, the outcomes of drug management was classified into two main categories i.e. efficiency and satisfaction. Efficiency in this regard means that staff had high level of performance and quality of drug management in the Primary Health Care Unit. For example, the people had received proper drugs with sufficient amount and staffs had provided efficient drug dispensing and consulting. For satisfaction, based on the studies reviewed, this refers to the patients' value judgment

Table 1 Characteristics of the studies

Study	study site	Study design	Type & Number of sample
Tongsakol S, 2004	The southern region	Descriptive research	Staff n=227
Sirisomboon R, 2005	The central region	Participatory action research	Staff n=25
Chomemonkol W, 2007	The central region	Quasi-experimental research	Staff n=25
			Patients n=57
Pinichsatil N, 2008	The southern region	Descriptive research	Staff n=4
Poomsuwan S, 2009	The northeastern region	Descriptive research	Staff n=100
Wiboonsirikul K, 2010	The central region	Descriptive research	Patients n= 32
Sirithanawutichai T, 2010	The northeastern region	Participatory action research	Patients n=45
			Health volunteers n=15
Intoyos N, 2011	The northern region	Quasi-experimental research	Staff n=10
Sumpradit N, 2012	The central region	Quasi-experimental research	Staff n=97
Kitikannakorn N, 2012	The central region	Descriptive research	Staff n=248
Paogaima P, 2013	The northern region	Descriptive research	Patients n=25
Srilamart S, 2013	The northeastern region	Descriptive research	Staff n=248
Khangsri D, 2013	The northern region	Participatory action research	Patients n=136
			Staff n=15
Wangsuk P, 2014	The northeastern region	Action research	Patients n=21
Keangwong N, 2014	The northeastern region	Action research	Patient n=46
			Staff n=15
Kunthong K, 2015	The central region	Action research	Staff n=8

THPHs = Tambon Health Promoting Hospitals, n = number of sample

and succeeding reactions to the stimuli they perceive in the health environment just before, during and after the course of their clinical visit. The indicator for patients' satisfaction in this study consists of quality of drug, effective service behavior of staff and drug education.[21] According to the result, it was found that seven studies evaluated efficiency[4,5,7,13,15,18,19] while two studies evaluated satisfaction[9,12] and seven studies investigated both efficiency and satisfaction.[6,8,10,11,14,16,17] Thirteen studies were considered as having efficient implementation of drug management [4-8,10,11,13,14, 16-19] while one study showed that medical supply management and inventory management were not efficient[15]. Every study showed good satisfactory result.[6,8,9,10,11,12,14,16,17] Most studies revealed that effective drug management in THPHs had relationship with reduction of drug related problems, increasing patient knowledge on proper care of drug as well as improving staff's prescription behaviors on irrational drug use and lessening deterioration and expired drug.[4-14,16-19] Although there were some studies on inefficient management of medical supplies and inventory which negatively reflected the efficacy and safety of drug for the patients.[15] The main results were shown in Table 2.

Problem or barriers on drug management

Two factors, as reviewed from literature, which hindered achievement of drug management of THPHs were management factors and organization factors. The management factors consist of the lack of coordination between the hospitals network and communities, the lack of drug management knowledge of staff, the lack of budget and the lack of staff motivation.[21,22] The organizational factors included staff shortage, excess workload of staff, staff turnover rate, poor information systems and technology.[23-25] The result showed that these two factors impeded the improvement of drug management in the THPHs. The study found that management factors were considered as the main problem in ten studies.[5-8,10,12-15,18,19] In four studies[4, 9, 16, 17] the problems caused by organizational factors were reported and in two studies[11,15] the problems from both factors were identified.

Discussions

Drug management has 6 dimensions; drug system management, medical supply management, inventory management, pharmaceutical care, home care pharmacy service and rational drug use promotion.[20] Current situation of drug management in THPHs revealed that management of THPHs was effective particularly in the area of drug system management, pharmaceutical care, home care pharmacy service and promotion of rational drug use. The review showed that as the Antibiotic Smart Use project[11] was carried out to provide the evidence base clinical guidelines for rational drug use for the health care provider of THPHs, positive attitudes among the staff in the THPHs for antibiotic drug prescriptions were identified as a result. The implementation of project had reduced unnecessary antibiotic drug prescriptions.[11] This was supported by a study in the Australian general practitioners in the rural and remote areas, who had positive attitude towards Evidence Base Medicine (EBM) which led to behavioral change among the staffs to rationally prescribe medicines for their patients.[26,27] Moreover, this led to increase the staff's ability to improve knowledge and skill to control chronic illness in the patients, such as tubercu-

Table 2 The outcome of drug management

Study	Dimension explored						Major result	Problems	
	DM	MM	IM	PC	HC	RDP		O	M
Tongsakol S, 2004					✓		Home health care service was significantly improved (p <0.000). Staff could perform home health care service efficiently.	✓	
Sirisomboon R, 2005					✓		The program could improve home health care service to pass standard criteria of health center. In addition, patients were controlled and monitored disease every month. Knowledge of patients and health volunteer were improved.		✓
Chomemonkol W, 2007		✓	✓	✓	✓		The program could help to pass the standard criteria of the health centers including drug service, counseling and home health care. The patient satisfaction was at high level.		✓
Pinichsatil N, 2008	✓	✓	✓				All THPHs passed standard criteria of drug management. Well performance in tasks such as keeping drug in inventory by First Expire First Out rule, keeping the medicine in proper temperature, and reporting updated rate of inventory update were identified.		✓
Poomsuwan S, 2009				✓	✓	✓	Rate of cured achievement in tuberculosis patients was 96.67%, knowledge and skill to control tuberculosis was improved and high patient satisfaction was achieved.		✓
Wiboonsirikul K, 2010	✓			✓		✓	High patient satisfaction was achieved, patient's knowledge about medicines was enhanced, and blood sugar and blood pressure could be better controlled.	✓	

Note: DM = drug system management, MM = medical supply management, IM = inventory management, PC = pharmaceutical care, HC = home care pharmacy service, RDP = rational drug use promotion, O = organization factors, M = management factors, INR = International Normalized Ratio, ADR= Adverse Drug Reaction, THPHs = Tambon Health Promoting Hospitals

Table 2 The outcome of drug management (Cont.)

Study	Dimension explored						Major result	Problems	
	DM	MM	IM	PC	HC	RDP		O	M
Sirithanawutichai T, 2010	✓						Average scores of knowledge and self-care behavior in diabetes mellitus patients was significantly increased. Blood sugar was decreased from 198.04 mg/dl to 166.04 mg/dl when compared with before the program implementation.	✓	
Intoyos N, 2011	✓		✓				The average inventory turnover ratio was reduced from 6.67 months to 1.31 months. The inventory cost saving was 1,006,416.55 baht and the benefit-to-cost ratio was 80.03. Stakeholder's satisfaction was at high level for the modified VMI.	✓	
Sumpradit N, 2012	✓					✓	The Antibiotics Smart Use project led to behavioral change to rationally prescribe medicines for patients which reduced unnecessary antibiotic drug prescriptions and minimized expenditure on unnecessary antibiotics.	✓	✓
Kitikannakorn N, 2012		✓	✓				All THPH staffs could not perform efficient drug inventory management following the standard criteria; the lists of medical supplies were not updated, medical supplied was over 3 months, the poor storage condition in the refrigerator, incomplete labeling products, and left over expired medicine were identified.	✓	✓
Paogaima P, 2013	✓			✓	✓	✓	Drug compliance was increased and drug problem was reduced. In addition, rational drug use was achieved.		✓

Table 2 The outcome of drug management (Cont.)

Study	Dimension explored						Major result	Problems	
	DM	MM	IM	PC	HC	RDP		O	M
Srilamart S, 2013		✓	✓				Efficiency of drug management was at high level (mean = 4.04)		✓
Khangsri D, 2013				✓			When compared before and after the development of drug dispensing and counseling services, drug problems were significantly decreased from 53.7% to 16.2%. The patient's satisfaction was at high level.	✓	
Wangsuk P, 2014				✓			INR levels were controlled at the normal level. ADR was reduced to 2.24%. The patient's satisfaction was at high level.	✓	
Keangwong N, 2014		✓	✓				Drug management passed the standard criteria at the desired level. Inventory rate and the value of expired medicines were significantly decreased.		✓
Kunthong K, 2015	✓			✓			When compared before and after the development of medication service system, the medication errors were decreased.		✓

losis, diabetes and hypertension in the patients.[4, 5, 9, 14] Besides, high satisfaction was achieved, staff and patient's knowledge about medicines was enhanced so that drug related problems were reduced.[16, 17] Results found conformed to one study which showed that drug related problems and drug cost for patients were reduced. In addition, patients reported improved convenience in taking medications and expressed appreciation on quality medication therapy management programs.[28] In part of medical supply management and inventory management, most staff was able to control and improve efficiency of drug inventory in accordance with the standard criteria of the Primary Health Care Unit. The result showed that the inventory turnover ratio and inventory cost were reduced and efficiency of drug management was at high level.[6,7,10,13,18] For those THPHs which had problems of drug inventory management were due to the workload and lack of good cooperation with Contracting Unit for Primary Care (CUP) as THPH supporter.[15] It was suggested that CUP should assist in providing drug management knowledge and be good mentor for THPHs.[29] Good drug management in the primary care led to quality and efficiency of primary cares so that the people in the area could be able to receive proper and safety drugs. Also, drug problems and medication errors could be prevented. Treatment efficiency and quality of life for the patients could be increased and rational drug use in the community could be well achieved.[30] In terms of satisfaction, staff and patients were highly satisfied. The review studies extrapolated that it might be because the activities performed in THPH were very well managed and good cooperation within the community was well established.[6, 8-12, 14, 16, 17] Furthermore, management factors and organizational factors had affected efficiency of drug management in the THPHs which were similar to the finding of many researches that reviewed obstacles in the drug management. They were comprised of shortage of staff, poor drug management knowledge, and lack of professional skill, training, education and coordination between health-related sectors. In addition, the problems of equipment and machines inadequacy, insufficiency of budget were also identified.[27,30] The results conformed to the problems raised by the Ministry of Public Health in the Criteria Development for Manpower which illustrated the lack of multidisciplinary staff, budget and equipment. Thus, it is recommended that the staff should be provided with appropriate drug management training programs. Furthermore, the staff motivation should also be improved by setting suitable numbers of working hours, patient load, and salary, and by improving resources and facilities issues.[32]

Conclusion

Presently, THPHs are trying to develop efficient drug management system and increase satisfaction for patients[33]. The finding of this systematic review has significant implications for drug management standard to efficiently perform drug management activities and improve patient satisfaction on the service of staff. These good outcomes would lead to drug safety and treatment efficiency. Many of the problems identified in this study could be addressed by a comprehensive drug management assessment. Solutions to those problems could be solved by drug system improvement in the THPHs. Therefore, there is a need for the government to put more focus on proper resources allocation and

provide crucial supports to enhance patient's accessibility to quality treatment of the healthcare system in Thailand.[34] Future research is needed to identify interventions or implementation that is effective in improving drug management in THPH.

References

1. Sooppawong C, Chunharassamee S, Siriluk S. Manual of Health Service in Tambon Health Promoting Hospitals. The War Veterans Organization of Thailand Under Royal Patronage of His Majesty the King: The Ministry of Public Health; 2009. (in Thai)
2. Nurot S. Intened performance enhencement of pharmacy department in public health centers, Bangkok metropolitan administration. [Master of Pharmacy in Program of consumer Protection in Public Health]. Nakhon Pathom Province, Silpakorn University; 2010.
3. Panyawuttikai P. Primary Health Care Unit: Case Study – Prachuab Hospital: Pharmacy Service. J Health Res; 2002. (in Thai)
4. Thongsakul S. Primary Care Services Provided by Health Centers in Phang-Nga Province. [Master of Nurse in Community Health Nursing Program]. Songkla Province, Prince of Songkla University; 2004.
5. Sirisomboon R. The home visiting development of Prasook Health Center, Inburi District, Singburi Province. [Master of Art in Development Strategy]. Lop Buri Province, Ratchapattepsattree University; 2005.
6. Chommongkol W. Developing Standard Qualites of Health Centers in Amphoe Na Wa, Changwat Nakhon Phanom [Master of Public Health in Health System Management Program. Mahasarakam Province, Mahasarakam University; 2007.
7. Pinichsatil N. Drug system development in Primary Health Care Center at Langu. Srisasaluk J, Tusniyom S, editors. The Routine to Research. 1st ed. Nonthaburi Province: sahamitprintting and publishing; 2008. 261-2. (in Thai).
8. Poomsuwan S. Development of Tuberculosis controlled system by Participation of Tuberculosis controlled network, Pukheaw Sub-District, Chaiyapume Province. Srisasaluk J, Limsawat W, Tusniyom S, editors. The Routine to Research. 1st ed. Nonthaburi Province: Sahamit Printting and Publishing; 2009. 72-3. (in Thai).
9. Wiboonsirikul K, Rattanamanee K. Outcome Of Medication Therapy Management Services In Health Promoting Hospital Tambon Hansung, Bangpahan District, Phra Nakhon Si Ayutthaya Province. Journal of Preventive Medicine Association of Thailand 2010; (1):24-36. (in Thai).
10. Intuyot N. Improving the inventory management system using modified vendor managed inventory: a case study of Primary Care Units in Klonglan District, Kampaengpetch. J Health Res 2011;2: 241-51 (in Thai).
11. Sumpradit N, Chongtrakul P, Anuwong K, Pumtong S, Kongsomboon K, Butdeemee P, et al. Antibiotics Smart Use: a workable model for promoting the rational use of medicines in Thailand. Bull World Health Organ. 2012 Dec 1;90(12):905-13..
12. Paogaima P, Srihanam N, Aumput S. Rational drud use in Chronic Patients at Nonglom Tambon Health Promoting Hospitals. Tusniyom S, editors. The Routine to Research. 1st ed.

Nonthaburi Province: Sahamit Printting and Publishing; 2013. 16-7. (in Thai).

13. Srilamart S, Bouphan P, Drug Management of Health Personnel at Sub-District Health Promoting Hospitals in Khon Kaen Province. KKU Res J (GS) 2013; 13(2): 121-32 (in Thai).
14. Sirithanawutichai T, Wongsauwasup A, Nophuan W and Krueanak T. The Effectiveness of Village Health Volunteers in Muang District, Mahasarakham Province Making Visits to The Homes of Diabetes Mellitus Patients. J Sci Technol MSU 2010; 29(4):439-45. (in Thai).
15. Kitikannakorn N and Duangchan S. Ability in Medical Supply Inventory Management of Primary Care Units (PCUs). Buddhachinaraj medical journal 2012; 29(1):27-35. (in Thai).
16. Khangsri D, Awiphan R and Suwannaprom P. Participation of Primary Health Care Personnel in the Development Process for Drug Dispensing and Counseling Services. Thai Journal of Pharmacy Practice 2013; 5(2):91-107. (in Thai).
17. Wangsuk P and Sangyoi S. Development of a Network for Care of Patients on Warfarin among Health Promoting Hospitals. Journal of Health Science 2014; 23(1):46-51. (in Thai).
18. Keangwong N. The Quality Development of Medicines Management of Health Promotioning Hospital in Muangsamsib Contracting Unit For Primary Care, Muang Sam Sib, Ubon Ratchathani Province. Research and Development Health System Journal 2014; 7(2):302-9 (in Thai).
19. Kunthong K and Fuangchan A. Development of medication service system to reduce medication error for patients with chronic diseases at Phakhai Primary Care Unit, Ayutthaya. IJPS; 11(Supplement) : 82-8 (in Thai).
20. Warachit P, Tiptaradol S, Rayawa N. The Manual of Tambon Health Promoting Hospitals Management. 1st ed. Nonthaburi Province: The Ministry of Public Health; 2012. (in Thai).
21. Al-Khaldi Y, Al-Sharif A, Al-Jammal M, Kisha A. Difficulties faced when conducting primary healthcare programs in rural areas. SMJ 2002; 23: 384–7.
22. Khoja T, Kabbash I. Perception of mid-level health managers about primary healthcare implementation obstacles. Tanta Med J 1997; 26: 841–61.
23. Al-Shammari S, Khoja T, Al-Subai A. Job satisfaction and occupational stress among primary care centre doctors. Int J Ment Health 1995; 24: 85–95.
24. Al-Khashman A. Screening for hypertension: assessing the knowledge, attitudes, and practice of primary health physicians in Riyadh, Saudi Arabia. SMJ 2001; 22: 1096–100.
25. Kalantan K, Al-Taweel A, Abdulghani H. Factors influencing job satisfaction among PHC physicians in Riyadh, Saudi Arabia. Ann Saudi Med 1999; 19(5):424-6.
26. Taylor J, Wilkinson D, Blue IA, Dollard JT. Evidence-based rural general practice: barriers and solutions in South Australia. Rural Remote Health. 2002 Jan-Dec; 2(1):116.
27. Young JM, Ward JE. Evidence-based medicine in general practice: beliefs and barriers among Australian GPs. J Eval Clin Pract 2001 May;7(2):201-10.
28. Shimp LA, Kucukarslan SN, Elder J, Remington T, Wells T, Choe HM, et al. Employer-based patient-centered medication therapy management program: evidence and recommendations

for future programs. J Am Pharm Assoc 2012; 52(6):768-76.

29. Sombat A. Capability in Medical Supply Inventory Management of Health Promoting Hospitals in Huaithapthan District Health System, Sisaket. Yasothon Medical Journal 2012; 14(3): 128-41. (in Thai).
30. Al-Ahmadi H, Roland M. Quality of Primary Health Care in Saudi Arabia: a comprehensive review. Int J Qual Health Care 2005 Aug; 17(4):331-46
31. Margolis SA, Al-Marzouq S, Revel T, Reed RL. Patient satisfaction with primary health care services in the United Arab Emirates. Int J Qual Health Care 2003 Jun;15(3):241-9.
32. Sirikarin S, AumThong M. The criteria development for human resource management of ministry of public health. Office of Public Health Administration. 1st ed. Nonthaburi Province: The Ministry of Public Health; 2012. (in Thai).
33. Bureau of Health Service System Development. Manual of Primary Health Care Unit standard evaluation and quality assurance. Nonthaburi Province: Department of Health Service Support, Ministry of Public Health; 2004. (in Thai).
34. Rojanakat T. Evaluation of practice in standard of medical inventory control and dispensing service in primary care unit network of Lampaimat Hospital. Thai Pharm Health Sci 2007; 2(3): 305-10. (in Thai).