

Comparing the Hospital Admission Rates in Chronic Conditions of Contracting Unit for Primary Care Management between a Dedicated Primary Care Unit and a Tertiary Care Hospital

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Background: Currently, the people with chronic illness are increasing and attending the primary care unit (PCU). The hospital admission rate with short-term complications of chronic disease can be decreased by the quality of care. The quality of care may be related to the administration of the service providers.

Objective: To compare the rates of hospital admission for short-term diabetic complications, hypertension, and hypertension complications between two administration contexts of PCUs, a dedicated PCU, and a tertiary care hospital.

Material and Method: The present study was a retrospective cohort study between October 2006 and September 2012. To study 33 PCU of Muang Nakhon Ratchasima primary care network under dedicated PCU (the study area) compared with 25 PCU of Muang Khon Kaen primary care network under Khon Kaen Hospital (the compared area). Hospital admission data of the referral hospital and hospital network were collected according to ICD 10 code. Relative risk was used in data analysis.

Results: The hospital admission rates with short-term diabetic complications of the study area between 2010 and 2012 declined significantly from the compared area (RR 0.51 to 0.63). The hospital admission rate of hypertension and complications of hypertension were increasing in both areas. The hospital admission rate of the study area between 2007 and 2010 were statistical significantly lower (RR 0.32 to 0.65).

Conclusion: The hospital admission rate of chronic diseases in the study area is lower than the compared area especially short-term complications of diabetes. Future research should focus on health promotion and prevention outcomes such as prevalence of chronic diseases.

Keywords: Hospital admission, Diabetic, Hypertension, Primary care unit, Short-term complications

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In 2012, an estimated 56 million people died worldwide. Non-communicable diseases (NCD) are responsible for 68% of all deaths with almost three-quarters of deaths occurring in low- and middle-income countries. The four main types are cardiovascular diseases, cancers, chronic respiratory diseases, and diabetes^(1,2). Hypertension is a common co-morbid condition in diabetes and vice versa. According to the Thailand Diabetes Registry, the prevalence of hypertension in adult Thai type 2 diabetic patients is 78.4%⁽³⁾. Patients with type 2 diabetes in combination with hypertension are at increased risk of cardiovascular

diseases and associated clinical complications⁽⁴⁻⁶⁾. The prevalence of diabetes and hypertension are increasing worldwide. Type 2 diabetes estimated to affect 422 million people while hypertension affect 1 billion people worldwide^(7,8). Diabetes and hypertension exerted a significant burden resulting in increased morbidity and mortality, decreased life expectancy, and reduced quality of life, as well as individual and national income losses⁽⁹⁾.

A strategic objective in the fight against the NCD epidemic must be to ensure using cost-effective and sustainable health-care interventions⁽¹⁰⁾. Primary health care had to be strengthened with a concerted and multipronged effort to provide promotive, preventive, curative, and rehabilitative services for reducing the impact of NCD⁽¹¹⁾. Diabetes and hypertension are ambulatory care sensitive conditions

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(ACSC) for which it is possible to prevent acute exacerbations and reduce the need for hospital admission⁽¹²⁾. Hospitalization rate for ACSC is not measures of hospital quality, but rather measures of accessibility and effectiveness of primary health care services⁽¹³⁾. The Agency for Healthcare Research and Quality (AHRQ) used hospital inpatient discharge data to develop a set of Prevention Quality Indicators (PQIs) to assess ACSC hospitalization, diabetes short-term complications admission rate, and hypertension admission rate are PQI composite measures⁽¹⁴⁾.

The universal health care coverage scheme from the year 2002 resulted in a shift in the allocation of funds and the management of primary care in the primary care network. The main contracting hospital, primary care unit (PCU), and private clinic provide network known as the contracting unit for primary care (CUP) locating within the same district under managed of the network administrator (CUP Board).

The contracting unit for primary care refer to an organization which provided curative, promotion, preventive, and rehabilitative services such as ambulatory care, home care, and community care. The CUP made contract with PCU and procure primary care services by paying the necessary cost by capitation. Each CUP has its own catchment area and population. Health services of urban district was an integrated of health services by linking PCU in primary care network that were under the jurisdiction of the tertiary hospital. On October 1, 2007, Nakhon Ratchasima province has established a new model for urban health services by separating primary care from tertiary hospital and setting up the new network so that the PCU was the contracting unit (CUP split). The aim of the present study was to evaluate service results of new model Muang Nakhon Ratchasima primary care network compared to Khon Kaen Hospital primary care network. The present study compared the hospital admission rate with short-term complications of diabetes and hypertension by management between a dedicated PCU and a tertiary care hospital. These indicators were a measure of the quality of primary care and reflect standard care of the health services in primary care.

Material and Method

The present study was a retrospective cohort study between October 2006 and September 2012. The results of the study were the admission rate of short-term diabetic complications and hypertension.

Study setting and compared setting

The setting was purposive sampling. The study area was Muang Nakhon Ratchasima primary care network that separated of management from tertiary hospital; health service was administrated by PCU. The compared area was primary care network of Khon Kaen Hospital, health service was administrated by hospital. Primary care network of the study area and the compared area had 33 and 25 PCU respectively.

Sample size and sampling technique

Sample size was calculated in the WinPepi program version 11.62. The probability sampling method was stratified random sampling. The using parameters were, 1) confidence interval level of 95%, 2) acceptable difference was 0.05, 3) study population in study area was 33 PCU and compared area was 25 PCU, 4) proportion in study area was 0.7 and compared area was 0.5, and 5) stratum was 2.

The results of sampling were 27 PCU in study area and 22 PCU in compared area but all of PCU were used to be sample for complete information.

Data collection

Demographic characteristics data of the primary care network were collected by questionnaire. Numbers of the universal health care coverage population age 15 years and older registered at PCU and numbers of patients age 15 years and older were admitted with ICD-10 principal diagnosis code for diabetes short-term complications and hypertension or complications of hypertension according to PCU code were collected by the hospital data center.

The diabetes short-term complications admission rate was defined as admissions for diabetic short-term complications per 100,000 population age 15 years and older registered at PCU. The hypertension admission rate was defined as admissions for hypertension or complications of hypertension per 100,000 population age 15 years and older registered at PCU.

Statistical analysis

The descriptive statistics in term of percent were used in demographic characteristics data of primary care network. Relative risk was used to compare the hospital admission rate between the study area and the compared area with 95% confidence interval (95% CI). A statistical significance was defined as *p*-value less than 0.05.

Ethics statement

The present study was approved by the Ethics Committee for Human Research at the Khon Kaen University (HE561130).

Results

Characteristics of primary care network

In fiscal year 2012, there were 30.3% of PCU in the study area with daily doctor service, and 69.7% with doctor service at least one day per week, most of them with doctor service two days per week (30.3%). There were 16% of PCU in the compared area with daily doctor service, and 84% with doctor service in some day, most of them with doctor service one to three day per month (44%). The ratio of nurse per population in the study and the compared area were 1:1,901 and 1:3,110 respectively (Table 1).

Compared diabetes short-term complications admission rate

The diabetes short-term complications admission rate of the study area in fiscal year 2007 (before CUP split) was 68.9 per 100,000. In the year after, the admission rate was decreased and lowest in fiscal year 2011 (45.6 per 100,000). The diabetes short-term complications admission rate of the compared area in fiscal year 2007 was 14.7 per 100,000 that significant lower than the study area in the same year. In the year after, admission rate was increased and highest in fiscal year 2010 (91.3 per 100,000). Admission rate of the study area was lower than the compared area significantly in fiscal year 2010 to 2012 (RR 0.51 to 0.63) (Table 2).

Compared hypertension admission rate

The hypertension admission rate of the study area in fiscal year 2007 (before CUP split) was 19.0 per 100,000. In the year after, admission rate were increased and highest in fiscal year 2012 (109.3 per 100,000). The hypertension admission rate of the compared area in fiscal year 2007 was 47.2 per 100,000. In the year after, admission rate was increased and highest in fiscal year 2010 (106.3 per 100,000). Admission rate of the study area was lower than the compared area significantly in fiscal year 2007 to 2010 (RR 0.32 to 0.65) but not different in the year after (Table 3).

Discussion

All of PCU in the present study serviced by doctor but the study area was serviced by doctor more

often. Because of the study area was administrated by PCU so they were authorized to manage service delivery by themselves. Diabetes short-term complications admission rate of the study area was decreased and lower than the compared area, especially

Table 1. Demographic characteristics of primary care network in fiscal year 2012

Characteristics	Study area, n (%)	Compared area, n (%)
Type of CUP	Primary care unit	Tertiary care hospital
Numbers of PCU in network	33	25
Doctor service in PCU (days/week)		
- 5	10 (30.3)	4 (16.0)
- 4	1 (3.0)	-
- 3	4 (12.1)	1 (4.0)
- 2	10 (30.3)	-
- 1	8 (24.3)	9 (36.0)
Doctor service in PCU (days/month) - 1 to 3	-	11 (44.0)
Ratio of nurse per population	1:1,901	1:3,110

CUP = contracting unit for primary care; PCU = primary care unit

Table 2. Compared diabetes short-term complications admission rate

Fiscal year	Admission rate (per 100,000)		RR	95% CI	p-value
	Study area	Compared area			
2007	68.9	14.7	4.68	2.86 to 7.66	<0.001
2008	60.8	53.2	1.14	0.81 to 1.61	0.441
2009	50.9	67.5	0.75	0.54 to 1.05	0.092
2010	46.4	91.3	0.51	0.37 to 0.69	<0.001
2011	45.6	81.9	0.56	0.41 to 0.76	<0.001
2012	47.1	74.2	0.63	0.47 to 0.86	0.003

RR = relative risk

Table 3. Compared hypertension admission rate

Fiscal year	Admission rate (per 100,000)		RR	95% CI	p-value
	Study area	Compared area			
2007	19.0	47.2	0.40	0.25 to 0.64	<0.001
2008	19.9	62.8	0.32	0.20 to 0.51	<0.001
2009	61.3	93.7	0.65	0.49 to 0.87	0.004
2010	66.9	106.3	0.63	0.48 to 0.82	<0.001
2011	98.0	100.3	0.98	0.77 to 1.24	0.847
2012	109.3	103.4	1.06	0.85 to 1.32	0.622

in the last three fiscal year (after CUP split) with statistically significant (p -value <0.05). On the other hand, admission rate of the compared area was increased continuously. In fiscal year 2007 to 2012, admission rate of the study area was 68.9, 60.8, 50.9, 46.4, 45.6, and 47.1 per 100,000 respectively. Overview of Thai's population in the same year was 192.5, 201.3, 201.2, 208.5, 204.0 and 211.0 per 100,000⁽¹⁵⁾. When compared with other countries, diabetes short-term complications admission rate of United Kingdom and United States of America was 32 and 63.8 per 100,000^(16,17). It could be seen that admission rate of study area resembled to developed countries and lower than overview of Thai's population. According to AHRQ, the potential conditions which hospitalization could be avoided are high quality and continuity primary care⁽¹⁸⁾. High levels of continuity of family physician care were associated with reduced hospitalizations in elderly people with diabetes within a universal coverage of health insurance system⁽¹⁹⁾. Primary Care service provided by nurse practitioners was associated with a decreased risk of hospitalization without distinction to services provided by family doctor⁽²⁰⁾.

The hypertension admission rate was increased in both areas but the study area was still lower than the compared area in the first four years with statistically significant (p -value <0.05). In fiscal year 2007 to 2012, admission rate of study area was 19.0, 19.9, 61.3, 66.9, 98.0, and 109.3 per 100,000 respectively. Overview of Thai's population in the same year was 133.5, 133.4, 127.2, 121.8, 133.0, and 130.6 per 100,000⁽¹⁵⁾. When compared with other countries, hypertension admission rate of United Kingdom and United States of America was 11 and 54.3 per 100,000^(16,17). It could be seen that admission rate of the study area resembled to developed countries in first two years then increased continuously but still lower than the overview of Thai's population. Because of population growth and ageing, the prevalence of hypertension in most Asian countries has increased over the last 30 years and more dramatically in the last 10 years. Several factors contributed to such changes lifestyle, modernization, and urbanization were considered to be contributing factors⁽²¹⁾. The trends of hypertension could be related to the better diagnosis of hypertension in the ambulatory setting. The increased hospitalization rates of hypertension as a secondary diagnosis in which many patients with hypertension had their blood pressure under controlled, but were hospitalized due to complications, including coronary heart disease, or stroke⁽²²⁾.

There are many factors that caused results differ between the study and the compared area. The CUP of both areas was urban primary care network that had sophisticated structure and peoples can choose service at anywhere. But CUP in the study area was split outpatient, health promotion and prevention budgets from tertiary hospital. The PCU in the study area had better services in health promotion and prevention because they could manage drugs and materials including human resource by themselves. These factors caused the numbers of doctor and nurse service in the study area were higher than the compared area.

The limitation of the present study should be noted. Admission data in both areas were collected only Universal Coverage Scheme, did not include Civil Servant Medical Benefit Scheme and Social Security Scheme. Administrative data did not contain patients admitted in private hospital. The present study did not last long enough to evaluate ultimate outcome of health prevention and promotion that caused decrease prevalence of chronic diseases. The strengths of the present study should also be noted. First, the objectively measured outcomes were reliable. Second, all of PCU in the study and the compared area were used to be sample.

Conclusion

The new model for urban health services by separated primary care from tertiary hospital had authorized to manage service delivery by themselves caused better services, especially decreased in diabetes short-term complications admission rate. Reflect the performance of services and management.

What is already known on this topic?

Regarding health system management in Thailand, one study assessed the financial situation of primary care, management style of CUP, and information system for management of primary care system of twelve provinces locating in twelve National Health Security Office regions. However, no study assessed outcomes that represented service quality.

What this study adds?

In primary care service, the service has limited quality due to the lack of continuous development. This is a financial limitation and human resource development system managed by a CUP board comprising of representatives from the hospital and its' network. The present study developed a new model

for urban health services by separating primary care from tertiary hospital, which has decentralized management to PCU who provided health services at the front line. Future research should focus on health promotion and prevention outcomes to reduce the prevalence of chronic diseases.

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Potential conflicts of interest

None.

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เปรียบเทียบการเข้ารับการรักษาในโรงพยาบาลในกลุ่มโรคเรื้อรัง โดยการบริหารจัดการเครือข่ายบริการปฐมภูมิระหว่างหน่วยบริการปฐมภูมิและโรงพยาบาลตติยภูมิ

นวลฉวี เพิ่มทองชูชัย, อมร เปรมกมล

ภูมิหลัง: ปัจจุบันผู้ป่วยโรคเรื้อรังมีจำนวนมากขึ้นและสามารถรับบริการที่หน่วยบริการปฐมภูมิได้ การเข้ารับการรักษาในโรงพยาบาลด้วยภาวะแทรกซ้อนในกลุ่มโรคเรื้อรังสามารถลดลงได้ด้วย การดูแลอย่างมีคุณภาพ ซึ่งคุณภาพของการดูแลมีความสัมพันธ์กับการบริหารจัดการของผู้ให้บริการ

วัตถุประสงค์: เพื่อเปรียบเทียบอัตราการเข้ารับการรักษาในโรงพยาบาลด้วยภาวะแทรกซ้อนระยะสั้นของโรคเบาหวาน โรคความดันโลหิตสูง และภาวะแทรกซ้อนของโรคความดันโลหิตสูง ระหว่างการบริหารจัดการเครือข่ายบริการปฐมภูมิในสองบริบท คือ แบบหน่วยบริการปฐมภูมิเป็นแม่ข่ายและแบบโรงพยาบาลตติยภูมิเป็นแม่ข่าย

วัสดุและวิธีการ: เป็นการศึกษาแบบย้อนหลัง (retrospective cohort study) ระหว่าง เดือนตุลาคม พ.ศ. 2549 ถึง เดือน กันยายน พ.ศ. 2555 โดยศึกษาหน่วยบริการปฐมภูมิเครือข่ายบริการปฐมภูมิอำเภอเมืองนครราชสีมา ที่มีหน่วยบริการปฐมภูมิเป็นแม่ข่ายจำนวน 33 แห่ง (พื้นที่ศึกษา) เปรียบเทียบกับหน่วยบริการปฐมภูมิเครือข่ายบริการปฐมภูมิอำเภอเมืองขอนแก่น ที่มีโรงพยาบาลศูนย์ขอนแก่นเป็นแม่ข่าย จำนวน 25 แห่ง (พื้นที่เปรียบเทียบ) เก็บข้อมูลการนอนโรงพยาบาล ตามรหัส ICD 10 ของโรงพยาบาลรับส่งต่อของเครือข่ายและโรงพยาบาลแม่ข่าย วิเคราะห์ข้อมูลโดยหาความเสี่ยงสัมพัทธ์ (relative risk)

ผลการศึกษา: อัตราการเข้ารับการรักษาในโรงพยาบาลด้วยภาวะแทรกซ้อนระยะสั้นของโรคเบาหวานของพื้นที่ศึกษาระหว่างปีงบประมาณ พ.ศ. 2553-2555 ลดลงและต่ำกว่าพื้นที่เปรียบเทียบอย่างมีนัยสำคัญทางสถิติ (RR 0.51-0.63) อัตราการเข้ารับการรักษาในโรงพยาบาลด้วยโรคความดันโลหิตสูงและภาวะแทรกซ้อนของโรคความดันโลหิตสูงเพิ่มขึ้นทั้งสองพื้นที่ อัตราการเข้ารับการรักษาในโรงพยาบาลระหว่างปีงบประมาณ พ.ศ. 2550-2553 ของพื้นที่ศึกษิต่ำกว่าพื้นที่เปรียบเทียบอย่างมีนัยสำคัญทางสถิติ (RR 0.32-0.65)

สรุป: อัตราการเข้ารับการรักษาในโรงพยาบาลของกลุ่มโรคเรื้อรังในพื้นที่ศึกษิต่ำกว่าพื้นที่เปรียบเทียบโดยเฉพาะอัตราการเข้ารับการรักษาในโรงพยาบาลด้วยภาวะแทรกซ้อนระยะสั้นของโรคเบาหวาน การศึกษาในอนาคตควรมุ่งดูที่ผลลัพธ์การสร้างเสริมสุขภาพและป้องกันโรคเช่นความชุกของโรคเรื้อรัง