Disease Patterns among Thai Adult Population: An Analysis of Data from the Hospitalization National Health Insurance System 2010

Siriluck Anunnatsiri MD*,
Sirirat Reungjui MD*, Yupa Thavornpitak MSc**,
Piyalak Pukdeesamai MPH***, Pisaln Mairiang MD*

Department of Medicine, Faculty of Medicine, Khon Kaen University, Khon Kaen, Thailand
*** Department of Biostatistics and Demography, Faculty of Public health, Khon Kaen University, Khon Kaen, Thailand**
*** Phanomphrai Community Hospital, Roi Et, Thailand*

Background: *Disease pattern is an important informational tool used by policymakers in setting priorities, strategies and allocating budgets to address the precursors or causes of health problems.*
Objective: *To analyze the common diseases in the adult population using in-patient information from the three health insurance coverage schemes in the fiscal year 2010.*
Material and Method: *The authors analyzed the data on in-patients with 23 major disease groups as per ICD-10 coding. The data were analyzed to obtain the number of patients, number of admissions, number of hospital mortalities, mortality rates and length of hospital stays.*
Results: *The total number of adult in-patients was 3,876,792 presenting for admission 4,863,935 times. Infectious and parasitic diseases were the most common causes of admission. Diseases of the circulatory system resulted in the highest number of mortality rate (8.72%). Intracerebral hemorrhage, neoplasm, septicemia, liver failure, coronary heart disease, HIV/AIDS, status epilepticus, pneumonia, accidents and acute renal failure were the top ten diseases with a high mortality rate.*
Conclusion: *The review indicated communicable diseases are the most common disease group although non-communicable diseases were also important because of their high mortality rate.*

Keywords: *Disease pattern, Thai adult population*

Data of disease patterns and disease burdens in Thailand of the year 1999 and 2004 had been reported[1,3]. Data from the three national health insurance systems included: number of patients and admissions as per the International Classification of Diseases version 2010 (ICD-10) coding, mortality, hospital stay (day) and charges per admission per disease. These data enabled a comparison of the disease patterns and impact of health interventions. This information is essential for consideration of appropriate responsive policy (affecting resources allocation) and medical education.

Objective

The objective was to analyze the disease patterns including common disease groups, length of stay and mortality in the adult Thai population (persons over 19 years of age) through use of the in-patient information from (a) the Social Security scheme (SSS) (b) the Medical Welfare scheme (MWS) and (c) the Civil Servant Medical Benefit scheme (CSMBS). The current review emphasizes the caliber of health problems (number of patients and hospital admissions), the mortality rates and the length of hospital stays. The results would help for assessing the magnitude of problem and planning for resource allocation and health education and prevention programs to the community.

Material and Method

The information analyzed was garnered from the in-patient Medical Expense Forms for the fiscal year 2010 (between October 1, 2009 and September 30, 2010) from the National Health Security Office (NHSO), Thailand and in-patient data from the CSMBS from the Comptroller General's Department and the Social

Correspondence to:
Mairiang P, Department of Medicine, Faculty of Medicine, Khon Kaen University, Khon Kaen 40002, Thailand.
Phone: 043-363-664
E-mail: pisaln_m@hotmail.com

Security Office. These three health insurance systems cover about 96% of all Thai population.

The data were checked for accuracy by examining for (a) overlapping information (b) repeated visit dates (c) missing items (d) incorrect coding and (e) incorrect fiscal year.

The baseline characteristics of patients included: age, sex, admission rate, mortality rate and hospital admission day (to be used for the calculation of length of stay). The groups of disease presentations were based on the 23 main groups of diseases in the ICD-10[2] which data of group of diseases were only extracted from the principle diagnosis category. The present study outcomes were (a) number of patients (persons/year) (b) number of admissions (times/year) (c) number of hospital mortalities (d) mortality rate (% of cases count) and (e) length of hospital stay (days) for each of the 23 main groups of diseases.

The statistics were analyzed using SPSS for Windows version 13. Continuous data and categorical data were expressed as mean ± standard deviation and percentage, respectively.

Ethics approval followed an assessment by the Ethics Committee, Khon Kaen University, as per the guidelines of the Helsinki Declaration.

Results
Number of patients and admissions
In the fiscal year 2010, there were 47,966,734 adults in the population (*i.e.,* over 19 years of age), representing 74.07% of the total Thai population (64.7 million). The female to male ratio was 1.06. Approximately 96% of the adult population (46,208,964 persons) was registered in one of the three health insurance systems (*viz.,* the SSS, the CSMBS or the MWS). The total number of adult in-patients were 3,876,792 persons generating 4,863,935 admissions (83.9 persons or 105.3 visits per 1,000 population) accounting for 70.69% of all in-patients. The top five diseases causing hospital readmission were neoplasm, diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism, diseases of the respiratory system, diseases of the circulatory system and diseases of the genitourinary system.

Based on the 22 ICD-10 disease groupings, the top ten causing hospitalization among adults were (1) certain infectious and parasitic diseases (A00-B99) (2) childbirth and the puerperium (C00-D48) (3) diseases of the digestive system (K00-K93) (4) diseases of the respiratory system (J00-J99) (5) injury, poisoning and certain other consequences of external causes (S00-T98) (6) diseases of the circulatory system (I00-I99) (7) diseases of the genitourinary system (N00-N99) (8) neoplasm (C00-D48) (9) symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified (R00-R99) and (10) endocrine, nutritional and metabolic diseases (E00-E90) (Table 1).

The female to male ratio was 1.36 and only six disease groups were more common among males, including (1) external causes of morbidity and mortality (*e.g.,* car accident, poisoning), for which all of the patients were male (2) mental and behavioral disorder (*e.g.,* alcohol-related risk behavior, schizophrenia) (M:F = 1.88) (3) injury & poisoning and certain other consequences of external causes (*e.g.* head trauma, fracture, animal poisoning, pesticides) (M:F = 1.86) (4) diseases of the nervous system (M:F = 1.21) (5) diseases of the digestive system (M:F = 1.21) and (6) diseases of the skin and subcutaneous tissue (M:F = 1.21).

The groups of common diseases causing hospitalization among each age group were different as shown in Fig. 1.

Length of hospital stay
Overall, the mean ± SD length of hospital stay was 4.44 ± 8.69 days. The top five disease groups causing long hospitalizations were (1) mental and behavioral disorder 14.35 ± 27.79 days (2) disease of the musculoskeletal system and connective tissue 7.65 ± 11.89 days (3) congenital malformation 7.20 ± 15.98 days) (4) malignancy 7.10 ± 11.66 days and (5) disease of the skin and subcutaneous tissue 6.29 ± 12.25 days. The length of hospital stay increased with advancing age in all groups except the mental and behavior disorder group (Fig. 2).

Number of hospital mortalities and mortality rate (MR)
The overall mortality rate among adult hospitalized patients was 3.23%. The major disease groups causing the highest hospital mortality were (1) disease of the circulatory system (27,075 cases, MR 8.72%), (2) infectious and parasitic disease (21,634 cases, MR 4.40%), (3) disease of the respiratory system (20,952 cases, MR 6.41%), (4) malignancy (20,719 cases, MR 12.09%) and (5) disease of the digestive tract (9,718 cases, MR 2.35%).

The top twelve specific diseases resulting in a high mortality rate were (1) stroke caused by intra-cerebral hemorrhage (MR 30.41%) and subarachnoid hemorrhage (MR 28.5%), (2) neoplasm including malignant neoplasm of bronchus and lung (MR 25.99%)
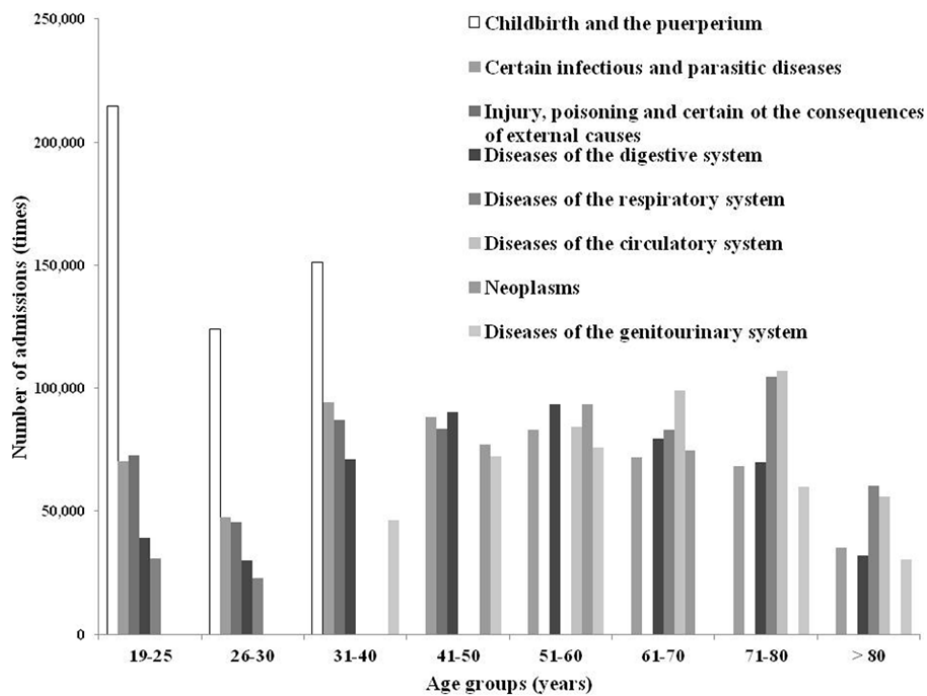
Fig. 1   Top admitted five major groups of diseases of each age groups
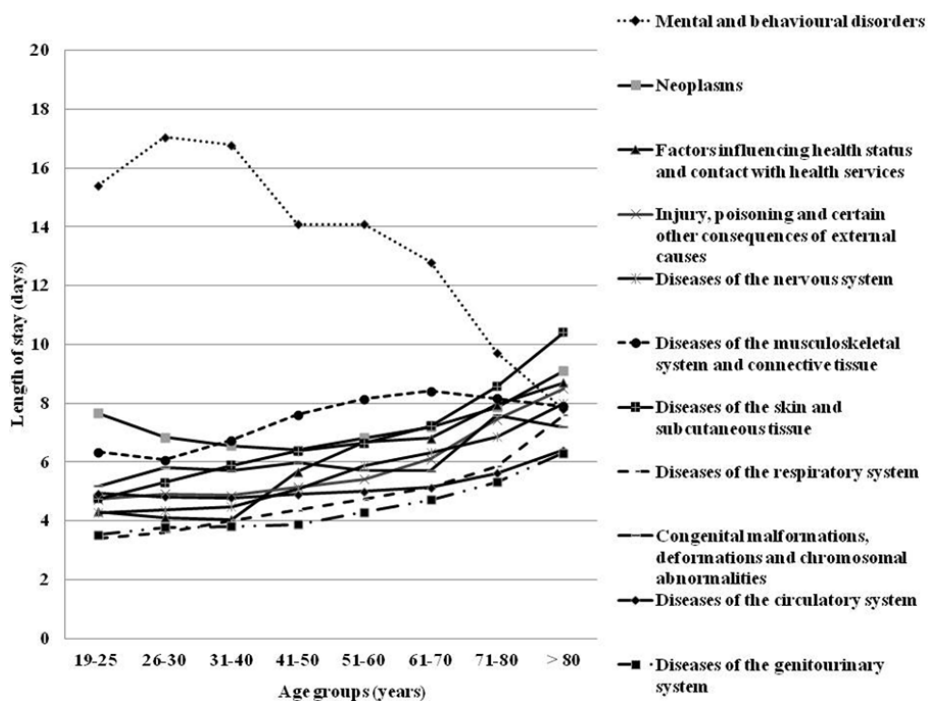

Fig. 2   Major disease groups causing long hospitalization by age groups

and malignant neoplasm of liver and intrahepatic bile ducts (MR 21.87%), (3) septicemia (MR 23.10%), (4) hepatic failure (MR 17.29 %), (5) acute myocardial infarction (MR 15.16%), (6) human immunodeficiency virus disease (MR 14.86%), (7) status epilepticus (MR 13.04%), (8) pneumonia (MR 11.97%), (9) injury

Table 1. Number of patients, admissions and sex of in-hospital, adult patients in 2010, as per the 22 ICD-10 disease groupings

Disease groups	No. of patients			No. of admissions		
	Persons/yr	%	M/F ratio	Times/yr	%	M/F ratio
A00-B99 Certain infectious and parasitic diseases	491,746	12.7	0.86	559,732	11.5	0.89
O10-O99 Childbirth and the puerperium	425,051	11.0	0.00	507,023	10.4	0.00
S00-T98 Injury, poisoning and certain other consequences of external causes	415,827	10.7	1.86	447,277	9.2	1.87
K00-K93 Diseases of the digestive system	413,453	10.7	1.21	506,013	10.4	1.23
J00-J99 Diseases of the respiratory system	327,010	8.4	0.98	460,571	9.5	1.13
I00-I99 Diseases of the circulatory system	310,522	8.0	0.99	428,820	8.8	0.99
N00-N99 Diseases of the genitourinary system	298,258	7.7	0.52	392,498	8.1	0.58
R00-R99 Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	196,018	5.1	0.77	213,661	4.4	0.77
C00-D48 Neoplasms	171,319	4.4	0.64	357,400	7.4	0.70
H00-H59 Diseases of the eye and adnexa	154,798	4.0	0.73	181,702	3.7	0.73
E00-E90 Endocrine, nutritional and metabolic diseases	150,917	3.9	0.56	188,833	3.9	0.56
M00-M99 Diseases of the musculoskeletal system and connective tissue	124,244	3.2	0.84	148,595	3.1	0.84
L00-L99 Diseases of the skin and subcutaneous tissue	94,094	2.4	1.21	106,192	2.2	1.22
F00-F99 Mental and behavioral disorders	70,044	1.8	1.88	87,136	1.8	1.91
G00-G99 Diseases of the nervous system	67,737	1.7	1.21	80,691	1.7	1.25
O00-O08 Pregnancy with abortive outcome	54,836	1.4	0.00	58,255	1.2	0.00
D50-D89 Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	46,093	1.2	0.58	70,811	1.5	0.63
H60-H95 Diseases of the ear and mastoid process	31,041	0.8	0.38	33,234	0.7	0.38
Z00-Z99 Factors influencing health status and contact with health services	27,273	0.7	0.91	28,249	0.6	0.93
Q00-Q99 Congenital malformations, deformations and chromosomal abnormalities	4,535	0.1	0.65	5,227	0.1	0.68
Others	1,971	0.05	0.76	2,007	0.04	0.76
V01-Y98 External causes of morbidity and mortality	4	< 0.01	∞	4	< 0.01	∞
P00-P96 Certain conditions originating in the perinatal period	4	< 0.01	1.00	4	< 0.01	1.00
Total	3,876,792	100	0.74	4,863,935	100	0.76

Table 2. Number of hospital deaths and mortality rates (per case count and per number of admissions) according to the disease groups of principle diagnosis

Disease groups of principle diagnosis	Number of patients (persons)	Number of hospital deaths (persons)	Mortality rate (%)
Diseases of the circulatory system	310,522	27,075	8.72
Certain infectious and parasitic diseases	491,744	21,634	4.40
Diseases of the respiratory system	327,010	20,952	6.41
Neoplasms	171,319	20,719	12.09
Diseases of the digestive system	413,453	9,718	2.35
Injury, poisoning and certain other consequences of external causes	415,826	8,335	2.00
Diseases of the genitourinary system	298,258	6,317	2.12
Endocrine, nutritional and metabolic diseases	150,917	1,997	1.32
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	196,018	1,921	0.98
Diseases of the musculoskeletal system and connective tissue	124,244	1,896	1.53
Diseases of the skin and subcutaneous tissue	94,094	1,876	1.99
Diseases of the nervous system	67,737	1,693	2.50

including injury of intra-abdominal organs (MR 11.88%) and intracranial injury (MR 8.74%), (10) acute renal failure (MR 10.2%), (11) bacterial meningitis (MR 10.04%) and (12) toxic effects of pesticides (MR 9.68%).

Discussion

The most common cause of admission was communicable diseases (A000-B99 Infectious and parasitic diseases); among which septicemia (53,306 persons; 57,518 admissions), HIV infection (30,404 persons; 44,048 admissions) and pneumonia (107,687 persons; 117,982 admissions) were responsible for 12,313 deaths (MR 23.10%), 4,518 deaths (MR 14.86%) and 12,891 (MR 11.97%), respectively. Deaths from HIV/AIDS reported in 2004 numbered 26,400 males and 11,000 females, which indicates a decrease from previous reports[3]. Better accessibility to anti-retroviral therapy and the more effective regimens (*i.e.,* HAART) might explain this improvement[4].

The top non-communicable diseases in-patients were (1) disease of the circulatory system (cerebrovascular diseases, ischemic heart diseases), (2) neoplasm, (3) head injury, (4) diabetes mellitus and (5) renal failure and chronic liver disease. Many of the factors associated with these non-communicable diseases are avoidable or preventable. Appropriate and adequate treatment of metabolic syndromes, hypertension, hyperlipidemia as well as lifestyle modifications can prevent premature death from cerebrovascular diseases, ischemic heart diseases,

diabetes mellitus and renal failure[5]. Meanwhile national policies on development of community-based strategies and capacity building for prevention and control of alcohol use as well as strategies for improving diet, physical activity and health (DPAS) might decrease deaths from traffic accidents (caused by driving under the influence of alcohol) and chronic liver diseases (caused by alcoholism, hepatitis and parasitic infestation)[6].

Malignant neoplasm of the liver (hepatocellular carcinoma) and intrahepatic bile ducts (cholangiocarcinoma) were the most common causes of admission among malignancies (34,125 admissions) and had a high mortality rate (21.87%). The risk factor for intrahepatic bile duct cancer is opisthorchiasis, which is acquired by eating raw fresh water fish (cyprinid) infested with metacercaria. This can be prevented simply by not eating raw fresh water fish.

The risk factors for hepatocellular carcinoma are chronic hepatitis B, chronic hepatitis C and alcohol-induced liver diseases. Effective preventive measures will decrease the risks. These include ceasing alcohol consumption, getting treatment for hepatitis B and C and vaccinating non-immunized person with hepatitis B vaccine.

Lung cancer was also a common cause of death (3,431 cases, MR 25.99%). The major risk factor for lung cancer is tobacco smoking. The role of tobacco control policies in Thailand is a model for many countries for successfully reducing tobacco related

deaths[7].

The psychiatric patients were common among the population age between 25-55 year old (average prevalence 8.06 per 1000 in male and 7.3 per 1,000 in female)[8]. These might explain the prevalence and high admission rate and length of hospital stay among the younger age groups (19-50 year old) (Fig. 2). The mental and behavioral disorders were mostly associated with use of alcohol, schizophrenia, anxiety disorders and depression that need the long duration of treatment, rehabilitation program and group therapy for alleviating and preventing the diseases.

Conclusion

The present study revealed that infectious and parasitic diseases were the most common causes of admission. Septicemia, HIV/AIDS and lower respiratory tract infection were among the top infectious causes of death. The non-communicable diseases-such as diseases of the circulatory system, neoplasm, status epilepticus, accidents, renal and liver failure-were important disease burdens due to their high mortality rate. Many non-communicable diseases can be prevented by avoidance and/or treatment of, the risk factors.

Study limitations

There are some limitations of the present study. First, the number of admissions was not the same as the number of patients because one patient might have been admitted several times over the natural course of a chronic disease. The common diseases of in-patient might therefore have appeared to be a chronic disease. Second, the mortality rate was only the hospital mortality since the cultural preference-for many chronic and end-stage diseases (*e.g*., chronic renal failure, end-stage malignancies)-is to be discharged and cared for at home. A solution might be to link the data from the death certificate reporting system. The prevalence of diseases resulting admission may underestimate because only the data of primary diagnosis were used and the data were not included the patients whom were self payment or use the other healthcare insurance systems.

Acknowledgement

Potential conflicts of interest

None.

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รูปแบบของโรคในประชากรไทยวัยผู้ใหญ่: ผลการวิเคราะห์จากข้อมูลในระบบประกันสุขภาพ ปี พ.ศ. 2553

ศิริลักษณ์ อนันต์ณัฐศิริ, ศิริรัตน์ เรืองจุ้ย, ยุพา ถาวรพิทักษ์, ปิยะลักษณ์ ภักดีสมัย, พิศาล ไม้เรียง

ภูมิหลัง: *รูปแบบของโรคเป็นข้อมูลที่มักจะถูกนำมาใช้ในการประเมินภาวะสุขภาพของประชากร นอกจากจากนี้ ยังเป็นข้อมูลสำคัญที่ถูกนำมาใช้ในการกำหนดนโยบายเพื่อจัดลำดับความสำคัญของปัญหา การกำหนดแนวทางและ จัดสรรงบประมาณในการแก้ไขปัญหาสุขภาพของประชากรได้อย่างเหมาะสมต่อไป*

วัตถุประสงค์: *โครงการนี้มีวัตถุประสงค์ที่จะวิเคราะห์ปัญหาสุขภาพในประชากรผู้ใหญ่ไทย โดยใช้ข้อมูลผู้ป่วย ที่เข้ารับการรักษาในโรงพยาบาลจากฐานข้อมูลในระบบประกันสุขภาพปี พ.ศ. 2553*

วัสดุและวิธีการ: *โครงการวิจัยนี้ได้วิเคราะห์ข้อมูลผู้ป่วยที่เข้ารับการรักษาในโรงพยาบาลโดยแบ่งเป็น 23 กลุ่มโรค ตามระบบ ICD-10 โดยศึกษาข้อมูลเกี่ยวกับจำนวนผู้ป่วยและจำนวนครั้งของการเข้ารับการรักษาในโรงพยาบาล จำนวนและอัตราการเสียชีวิตในโรงพยาบาลและระยะเวลาการนอนโรงพยาบาล*

ผลการศึกษา: *ประชากรไทยวัยผู้ใหญ่เข้ารับการรักษาในโรงพยาบาลทั้งสิ้น 3,876,792 ราย รวมการรักษาทั้งหมด 4,863,935 ครั้ง โรคติดเชื้อเป็นสาเหตุที่พบบ่อยที่สุดของการเข้ารับการรักษาในโรงพยาบาล ในขณะที่โรคของ ระบบหลอดเลือดสมองและหลอดเลือดหัวใจพบเป็นสาเหตุที่ทำให้ผู้ป่วยเสียชีวิตมากที่สุด (ร้อยละ 8.72) โรคที่มีอัตราการเสียชีวิตสูง 10 อันดับแรก ได้แก่ โรคหลอดเลือดสมองแตก, มะเร็ง, การติดเชื้อในกระแสเลือด, ตับวาย, โรคหลอดเลือดหัวใจอุดตัน, โรคเอดส์, โรคชักต่อเนื่อง, ปอดอักเสบ, อุบัติเหตุและไตวายเฉียบพลัน*

สรุป: *จากการศึกษาพบว่าโรคติดเชื้อยังคงเป็นปัญหาสุขภาพที่สำคัญในประชากรไทยวัยผู้ใหญ่ อย่างไรก็ตาม โรคไม่ติดต่อเช่น โรคของระบบหลอดเลือดสมองและหัวใจ มะเร็ง ตับวาย อุบัติเหตุ และไตวายเฉียบพลัน เป็นสาเหตุ การเสียชีวิตสำคัญในประชากรกลุ่มนี้*