

Burden of Human Immunodeficiency Virus (HIV) Infection in Hospitalized Thai Adults: An Analysis of Data from the National Health Insurance System 2010

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Background: Human immunodeficiency virus (HIV) infection continues to be a major health problem worldwide. Whether several intervention programs are successful enough to ameliorate the significant hospitalization burden created by these patients is not known.

Objective: To analyze the burden of HIV infection on patient-hospitalization and death in the adult population using in-patient information from the three health insurance coverage schemes from the fiscal year 2010.

Material and Method: The authors analyzed the data on in-patients with ICD-10 coding B20-B24 HIV disease to obtain the admission and mortality rate, length of hospital stay and hospital charges.

Results: The admission rate among adult HIV-infected patients was 91.8 times per 100,000 adult population. The most common age group affected by the disease was the 26-40 year-olds (59%). The most common condition causing hospitalization was opportunistic infection (83.6%), of which tuberculosis was the highest. The mortality rate was 10.3% and increasing with age. AIDS-related symptoms, malignancy and opportunistic infections were the major impacts on mortality.

Conclusion: HIV/AIDS still constitutes a major disease burden among the adult Thai population. Increased public awareness and prevention and access to early HIV diagnosis and treatment could be key factors for lowering the burden of disease and improving clinical outcomes.

Keywords: Burden of disease, HIV, Thai adult population

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Human immunodeficiency virus (HIV) infection persists as a major global health and economic burden. The main costs expended are for saving affected patients from opportunistic diseases and for providing life-long anti-retroviral therapy (ART). An estimated 34 million people worldwide were living with HIV at the end of 2010: approximately 2.7 million were newly infected in 2010. Globally, AIDS-related deaths have declined from 2.2 million in 2005 to 1.8 million in 2010 and-notwithstanding scaling up universal access to ART-deaths have increased in Eastern Europe, Central and East Asia, Middle East and North Africa⁽¹⁾.

In Thailand at the end of 2009, the estimated number of people living with HIV was 530,000 cases

(prevalence among adults = 1.3%) and 28,000 deaths occurred that year⁽²⁾. The burden of hospitalization among these patients due to their susceptibility to opportunistic illnesses has been observed to decline since implementation in 2001 of the National Access to Antiretroviral treatment program for People Living with HIV/AIDS (NAPHA)⁽³⁾. Whether or not this program will be successful enough to ameliorate the significant burden of hospitalization among these patients is not known. An assessment of HIV burden provides important information on the current national situation vis-a-vis the disease and political and budgetary plans for prevention, management and control of the disease.

Objective

The authors objective was to analyze the HIV infection burden in the adult Thai population (persons over 19 years of age) through use of the in-patient information from the (a) the Social Security scheme (SSS) (b) the Medical Welfare scheme (MWS) and (c)

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the Civil Servant Medical Benefit scheme (CSMBS). The core of our review was the size of health problems, viz., (a) number of hospital admissions (b) mortality rates (c) length of hospital stays (d) hospital charges and (e) health insurance system.

Material and Method

The information analyzed was extracted from the in-patient Medical Expensing Forms for the fiscal year 2010 (October 1, 2009 and September 30, 2010) from the National Health Security Office (NHSO), Thailand and the in-patient data from the Civil Servants Benefit scheme from the Comptroller General's Department and the Social Security Office.

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, hospital admission day and hospital charges. ICD-10 coding B20 to B24 human immunodeficiency virus (HIV) disease were selected for analysis⁽⁴⁾. The present study outcomes included (a) number of admissions (times/year) (b) number of hospital deaths and mortality rates (c) length of hospital stay (days) and (d) hospital charges (Baht).

The statistics were processed using SPSS for Windows version 11.

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

Results

In the fiscal year 2010, there were 44,048 admissions of HIV-infected, adult patients; accounting for 0.9% of total adult admissions (*i.e.*, 4,863,926 times) or 91.8 times per 100,000 adult population. The most common age group affected by the disease was the 26-40 year-olds (25,984; 59%), followed by the 41-60 (14,704; 33.4%), 19-25 (2,454; 5.6%) and over 60 year-olds (906; 2%). Overall, males were more frequently affected (26,295; 59.7%) and this trend persisted in all age groups (*viz.*, 54.4%, 57.8%, 63.8% and 62% for 19-25, 26-40, 41-60 and 60+ year-olds, respectively). The admission rate was highest in the central region (123.5 times per 100,000 adult population), followed by the South (96.9 times per 100,000), the North (87.1 times per 100,000) and the Northeast (71.2 times per 100,000).

Approximately, 79% of hospitalized, adult,

HIV-infected patients used the MWS, while the remaining 18.3% and 2.5% were supported by the SSS and the CSMBS, respectively. The level of hospital where most adult, HIV-infected hospitalizations occurred was the primary hospital (14,879 times, 33.8%) followed by the tertiary (12,682 times; 28.8%), secondary (10,763 times; 24.4%) and private (5,724 times; 13%) hospitals.

The most common condition resulting in hospitalization among HIV-infected adult patients was ICD-10 B20 HIV disease resulting in infectious and parasitic diseases (36,807 times, 83.6%); followed by B24 unspecified HIV disease (4,491 times, 10.2%), B23 HIV disease resulting in other conditions (1,710 times, 3.9%), B22 HIV disease resulting in other specified diseases (665 times, 1.5%) and B21 HIV disease resulting in malignant neoplasm (375 times, 0.9%). The distribution of the group of diseases resulting in admission among HIV-infected adult patients according to the system of health insurance coverage was not different (Table 1).

In the infectious and parasitic diseases group, there were 23,256 of 36,807 (63.2%) admissions for which the pathogens were identified, including: tuberculosis, the most common opportunistic infection (10,461 times, 28.4%), followed by *Pneumocystis jirovecii* pneumonia (PCP) (7,102 times, 19.3%), mycoses other than candidiasis (3,332 times, 9.1%), bacterial infection (987 times, 2.7%), viral infection except cytomegalovirus (645 times, 1.8%), candidiasis (557 times, 1.5%) and cytomegalovirus (172 times, 0.5%). Multiple opportunistic infections resulting in admission occurred 8,911 times (24.2%) (Fig. 1).

Among HIV-related malignancy, hematological malignancy (284 times, 75.7%) was the most common malignancy related to hospitalization in adult, HIV-infected patients. Of these, lymphoma (241 times, 84.9%) was the most common. The remaining were other or unspecified malignant neoplasm (55 times, 14.7%), Kaposi sarcoma (25 times, 6.7%) and multiple malignant neoplasm (11 times, 2.9%).

Length of hospital stay and Hospital charges

Overall, the median (IQR) length of hospital stay was 5 (3-10) days. The hospital stay was longest for opportunistic infections with a median (IQR) of 6 (3-11) days, followed by malignancy and other specific disease (*e.g.*, encephalopathy, wasting syndrome, multiple diseases classified elsewhere) with a median (IQR) of 5 (2-11) and 5 (3-10) days, respectively. The median (IQR) length of hospital stay was longest in the

CSMBS [7 (4-14) days], followed by the SSS [6 (4-11) days] and the MWS [5 (3-10) days] (Table 1).

The overall median (IQR) for hospital charges was 10,793 (5,778-21,182) Baht. The highest cost of hospitalization was admission due to malignancy with a median (IQR) of 17,624 (8,684-41,302) Baht, followed by other specific diseases (*e.g.*, encephalopathy, wasting syndrome, multiple diseases classified elsewhere) and infections with a median (IQR) of 11,786 (5,379-26,714) and 11,614 (6,317-22,541) Baht, respectively. The median (IQR) for hospital charges was highest in the SSS [16,919 (8,745-35,824) Baht], followed by the CSMBS [14,776 (7,660-28,789) Baht], and the MWS [9,751 (5,331-18,358) Baht] (Table 1).

Mortality

The overall in-hospital mortality rate among adult, HIV-infected patients was 10.3% (4,518 deaths). The mortality rate increased with age: 7.7% (189 deaths of 2,454 admissions), 9.4% (2,447 deaths of 25,984 admissions), 11.8% (1,732 deaths of 14,704 admissions), and 16.6% (150 deaths of 906 admissions) among 19-25, 26-40, 41-60 and 60+ year-olds, respectively. The mortality rate was not significantly different between males and females (2,783 deaths of 26,295 male admissions, 10.6% vs. 1,735 deaths among 17,753 female admissions; 9.8%). The mortality rate in the MWS [3,756 deaths (10.8%)] was similar to the rate in the CSMBS [115 deaths (10.4%)], but both were nominally higher than the SSS [647 deaths (8%)] (Table 1).

The mortality rate was highest for other specific diseases (*e.g.*, encephalopathy, wasting syndrome, multiple diseases classified elsewhere) (100 deaths, 15%), followed by malignancy (46 deaths, 12.3%) and opportunistic infections causing admission (4,037 deaths, 11%). Among opportunistic infections,

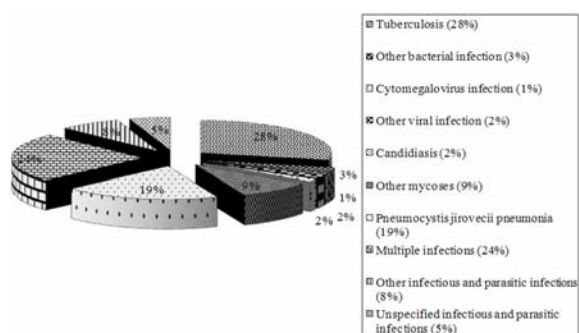


Fig. 1 Distribution of infectious and parasitic diseases causing admission among HIV-infected, Thai adult patients

Table 1. Distribution of the groups of diseases resulting in hospitalization, length of hospital stay, hospital charges, and mortality rate among HIV-infected, Thai adults according to their health insurance system coverage

Parameter	Health insurance system		
	Social Security scheme	Medical Welfare scheme	Civil Servant
Medical Benefit scheme			
Number of admissions (%)			
Total	8,057 (18.3)	34,881 (79.1)	1,110 (2.5)
B20 HIV disease resulting in infectious and parasitic diseases	6,635 (82.4)	29,285 (84.0)	887 (80.0)
B21 HIV disease resulting in malignant neoplasm	98 (1.2)	253 (0.7)	24 (2.2)
B22 HIV disease resulting in other specified disease	122 (1.5)	504 (1.4)	39 (3.5)
B23 HIV disease resulting in other condition	354 (4.4)	1,303 (3.7)	53 (4.8)
B24 Unspecified HIV disease	848 (10.5)	3,536 (10.1)	107 (9.6)
Length of hospital stay (days), [Median (IQR)]	6 (4-11)	5 (3-10)	7 (4-14)
Hospital charges (baht), [Median (IQR)]	16,919 (8,745-35,824)	9,751 (5,331-18,358)	14,776 (7,660-28,789)
Mortality rate, Number deaths (%)	647 (8%)	3,756 (10.8%)	115 (10.4%)

HIV-infected patients who had multiple infections had the highest mortality (1,324 deaths, 14.9%), followed by PCP (911 deaths, 12.8%), mycoses other than candidiasis (404 deaths, 12.1%) and other bacterial infection (93 deaths, 9.4%), other infection and parasitic diseases (263 deaths, 9.4%) and tuberculosis (868 deaths, 8.3%).

Discussion

The present study is a subsection of the "Health Situation Analysis of Thai People 2010: Implications for Health Education and Health service Reform" described elsewhere. According to the combined database of the three health insurance schemes providing coverage to 96% of Thais, the most common cause of admission in the adult Thai population was communicable diseases, of which septicemia and HIV infection comprised the major disease burden. Compared to the overall burden of disease in Thailand from 2004, the burden of HIV infection has persisted despite the successes of the national program ensuring access to ART⁽⁵⁾. HIV infection mainly affects the working-age group of the population, is related to both HIV-related illnesses and non-AIDS events and needs life-long treatment with both high psycho-social and economic costs to the nation.

The present study found that HIV infection accounted for 0.9% of total admissions among the adult population, which was dramatically lower than the 18.6% reported in a previous study on admissions between 1993-1996. This change probably reflects the success of the national program ensuring access to ART to prevent progression of the disease resulting in complications. Notwithstanding, overstating the decline of the problem of HIV should be avoided because the setting of the previous study was a hospital specializing in treatment of cases of infectious diseases including HIV⁽⁶⁾.

The AIDS-defining illnesses (either infections or malignancies) are still the common causes of hospitalization among this group of patients. As with previous reports, tuberculosis still ranks at the top of opportunistic infections and is significantly related to mortality^(7,8). Aside from tuberculosis, PCP and systemic mycoses are important diseases resulting in hospitalization among these patients and also associated with significant mortality. AIDS-related malignancies, especially lymphoma, are the other illnesses linked to hospital admission and death. A lack of awareness of HIV status, patient ignorance regarding

available treatments (*i.e.*, due to socioeconomic stressors or fear of drug-related adverse effects) and poor anti-retroviral drug adherence are the main contributing factors to delayed HIV diagnosis or inadequate uptake of ART, putting patients at risk of opportunistic diseases.

Evidence indicates that one-third of HIV-infected people in need of treatment in Thailand are not receiving it. In addition, one-half of all people who begin ART in Thailand already have an advanced stage of HIV infection⁽¹⁾. Self-reported, anti-retroviral drug adherence may be low in real world practice; one study conducted in a research clinic in Bangkok revealed that only 57% of participants took $\geq 95\%$ of the prescribed dose⁽⁹⁾. This evidence highlights the need for public intervention in order to (a) increase awareness of HIV status (b) ensure access to early HIV diagnosis and treatment and (c) improve drug compliance and adherence.

Recent ART guidelines for asymptomatic HIV-infected patients-which increase the CD4 cell count threshold from 200 to 350-500 cells/mm³ and emphasize HIV/TB co-infection as an indication for initiating the ART-could help to reduce patients at risk of contracting opportunistic diseases and mortality^(10,11). This recent recommendation has not, however, been fully implemented in Thailand; especially among HIV-infected patients being treated under the MWS and the SSS healthcare systems, which continue to use the old guideline of a CD4 threshold of < 200 cells/mm³ before starting ART in asymptomatic, HIV-infected patients. Starting ART at this point in the care trajectory is too late because evidence shows that a late start results in a greater risk of complications: implementation of the current guideline should therefore be expedited in order to improve the patient outcomes⁽¹²⁾. Lack of facilities for evaluating the opportunistic diseases is one the contributing factors to delayed diagnosis and treatment of the diseases; therefore, increased diagnostic facilities and/or improvement of the referral system(s) ensuring timely access to essential investigations and treatment should help to improve patient outcomes.

Based on data from the health insurance system in Thailand, the SSS expended the greatest amount treating HIV-infected patients and had the lowest mortality. By comparison, the CSMBS expended the second highest amount but the mortality rate was not different from the MWS that expended the least budget for taking care of these patients. These results probably reflect the free access to expensive drugs in,

and medical interventions by, the CSMBS. Further study is needed to determine whether these greater expenditures are medically justified and appropriate for improving the patient outcome.

Conclusion

The present study reveals that HIV/AIDS persists as a major disease burden resulting in hospitalization among the Thai adult population and is a significant cause of death. Opportunistic infections, especially tuberculosis, are the major cause of hospitalization among these patients and significantly affect clinical outcomes. Emphasis on public awareness and prevention, early HIV diagnosis and treatment and free access to ART with close monitoring of drug adherence could reduce the burden of this disease and improve clinical outcomes.

Study limitations

There are some limitations of the present study. First, the data represented the number of admissions, not the number of patients; therefore there may be an overestimate of the prevalence of disease due to the natural course of chronic diseases. Second, there were no details of the diseases under each ICD coding so the data do not sufficiently specify the burden of disease.

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Potential conflicts of interest

None.

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ภาระโรคติดเชื้อไวรัสเอชไอวีในประชากรไทยวัยผู้ใหญ่: ผลการวิเคราะห์จากข้อมูลในระบบประกันสุขภาพ ปี พ.ศ. 2553

ศิริลักษณ์ อนันต์ณัฐศิริ, ยุพา ถาวรพิทักษ์

ภูมิหลัง: การติดเชื้อไวรัสเอชไอวียังคงเป็นปัญหาทางสาธารณสุขที่สำคัญทั่วโลก แม้ว่าในปัจจุบันจะมีความพยายามในการควบคุมสถานการณ์ของโรคและการเข้าถึงยาที่ใช้ในการรักษา แต่วิธีการดังกล่าวจะส่งผลให้การเข้ารับการรักษาในโรงพยาบาลของผู้ป่วยกลุ่มนี้ลดลงหรือไม่ยังไม่เป็นที่ทราบแน่ชัด

วัตถุประสงค์: โครงการนี้มีวัตถุประสงค์ที่จะวิเคราะห์ปัญหาสุขภาพจากการติดเชื้อไวรัสเอชไอวีในประชากรผู้ใหญ่ไทย โดยใช้ข้อมูลผู้ป่วยที่เข้ารับการรักษาในโรงพยาบาลจากฐานข้อมูลในระบบประกันสุขภาพปี พ.ศ. 2553

วัสดุและวิธีการ: โครงการวิจัยนี้ได้วิเคราะห์ข้อมูลผู้ป่วยที่เข้ารับการรักษาในโรงพยาบาลโดยใช้ข้อมูลกลุ่มโรครหัส B20-24 ตามระบบ ICD-10 โดยศึกษาข้อมูลเกี่ยวกับจำนวนครั้งของการเข้ารับการรักษาในโรงพยาบาล อัตราการเสียชีวิตในโรงพยาบาลและระยะเวลาการนอนโรงพยาบาล

ผลการศึกษา: ประชากรไทยวัยผู้ใหญ่ที่มีการติดเชื้อไวรัสเอชไอวีเข้ารับการรักษาในโรงพยาบาลคิดเป็น 91.8 ครั้งต่อประชากรวัยผู้ใหญ่ 100,000 ราย อายุของผู้ป่วยที่เข้ารับการรักษาในโรงพยาบาลมากที่สุดอยู่ในช่วง 26-40 ปี (ร้อยละ 59) โรคติดเชื้อฉวยโอกาส (ร้อยละ 83.6) เป็นสาเหตุที่พบบ่อยที่สุดของการเข้ารับการรักษาในโรงพยาบาล โดยโรคที่พบบ่อยที่สุดคือ วัณโรค อัตราการเสียชีวิตโดยรวมของผู้ป่วยอยู่ที่ร้อยละ 10.3 โดยพบว่าอัตราการเสียชีวิตเพิ่มขึ้นตามอายุ อาการที่สัมพันธ์กับโรคเอดส์ โรคมะเร็งและโรคติดเชื้อฉวยโอกาสเป็นสาเหตุการเสียชีวิตที่สำคัญในประชากรกลุ่มนี้

สรุป: จากการศึกษาพบว่าโรคติดเชื้อเอชไอวียังคงเป็นปัญหาสุขภาพที่สำคัญในประชากรไทยวัยผู้ใหญ่ การรณรงค์ให้ประชากรมีความตื่นตัวและความรู้เกี่ยวกับโรคนี้ รวมถึงวิธีการป้องกันโรค การได้รับการวินิจฉัยโรคตั้งแต่วัยเริ่มแรก และการเข้าถึงการรักษาด้วยยาต้านไวรัสได้อย่างรวดเร็วเป็นปัจจัยสำคัญที่จะช่วยลดภาระของโรคนี้และช่วยให้ผู้ป่วยมีคุณภาพชีวิตที่ดีขึ้น
