Economic Impact on Health-Care Costs Related to Major Diseases Including HIV/AIDS due to Alcohol Drinking among Thai Populations

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ABSTRACT

Objective: The objective of this study was to estimate health-care costs because of diseases caused by alcohol consumption based on health system’s perspective.

Methods: Total direct health-care costs of alcohol drinking were the summation of the costs of alcohol drinking in inpatient and outpatient departments due to chronic diseases and acute conditions using prevalence-based approach. The alcohol-attributable fractions, defined as the proportion of a disease or acute condition in a population attributable to alcohol drinking, were calculated to obtain the number of patients in each disease or acute condition attributable to alcohol drinking. Health-care costs of alcohol drinking were estimated by multiplying the number of patients in each disease category attributable to alcohol drinking with the unit cost of treatment.

Results: Total health-care costs attributed to alcohol in this research were 5491 million baht (i.e., outpatient department [2488 million baht] and inpatient department [3003 million baht]). Cost derived from inpatient department accounted for 55% of the total health-care cost attributed to alcohol.

Conclusions: The result of this study suggested that alcohol drinking was significantly associated with a large number of health-care costs in Thailand. Estimation of health-care costs related to alcohol drinking would provide an important insight into future policy appraisal and evaluation.

Keywords: alcohol, health-care cost, Thailand.

Introduction

Alcohol drinking is linked to more than 60 disease conditions in a series of recent meta-analyses [1–4]. Alcohol drinking has led to health and social consequences via intoxication, alcohol dependence, and other biochemical effects of alcohol. In addition to chronic diseases that may affect drinkers after many years of heavy use, alcohol contributes to traumatic outcomes that kill or disable a relatively young age, resulting in the loss of many years of life because of death or disability and a significant economic loss [5].

To date, several studies on the economic costs of alcohol drinking have been conducted across settings worldwide [6–26]. During the period 1985 to 2006, these studies were conducted in 11 developed countries (i.e., Korea [23], Australia [6,7], Canada [8–10], England and Wales [25], France [12], Japan [13], The Netherlands [14], New Zealand [15], Scotland [16], Sweden [17,26], and the United States [18–21]). Although these studies varied in terms of the research methods and data sources used, they consistently revealed that alcohol consumption imposed a significant economic burden on the society. In addition, it was found that alcohol drinking has a substantial impact on health-care expenditure, ranging from 6.7% to 90.4% of the total direct cost [27,28].

Up to now, health-care costs related to alcohol drinking in the Thai population have not been carefully researched. A previous study in Thailand was conducted to estimate the economic cost of alcohol drinking in 2005 [24]. It was found that the total cost of alcohol abuse ranged from 13,000 million baht to 34,000 million baht. Out of this amount, 349 million baht to 10,970 million baht was accounted for health-care costs associated with only disorders from alcohol abuse and gastrointestinal and liver diseases using inpatient data obtained from the Central Office for Healthcare Information. Nevertheless, the research methodology for the estimation of the economic cost was not clearly indicated. Therefore, the objective of this study was to calculate health-care costs because of the diseases caused by alcohol drinking based on the perspective of health system. Estimation of health-care costs related to alcohol drinking would provide an important insight into future policy appraisal and evaluation.

Methods

Calculation of the Total Cost of Alcohol Drinking in the Thai Population

The total costs of alcohol drinking were the summation of the costs of alcohol drinking in inpatient and outpatient departments due to chronic diseases and acute conditions using prevalence-based approach. These costs referred to direct health-care costs in the Thai population from the specific disease within the sex and age group. The costs in 2006 for new (new incident), mature (have been misusing alcohol for some time), or even former alcohol misusers who might still have problems after they stopped drinking alcohol (e.g., liver cirrhosis) were included. Because the gross cost was estimated, only diseases where alcohol is the risk factor were taken into account.

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Cost of Alcohol Drinking in Outpatient Departments

The cost of alcohol drinking in outpatient departments is calculated by the multiplication of the number of patients with chronic diseases or acute conditions attributable to alcohol consumption, the number of outpatient visits per year, and the unit cost per visit due to those diseases or acute conditions. For more details on the cost calculation method of alcohol drinking in outpatient departments, see Supporting Information, Part I at: http://www.ispor.org/Publications/value/ViHsupplementary/ViH12s3_Chaikledkaew2.asp.

Cost of Alcohol Drinking in Inpatient Departments

On the one hand, the cost of alcohol drinking in inpatient departments is calculated by the multiplication of the number of patients with acute conditions attributable to alcohol in inpatient departments, the unit cost per admission, number of admissions, and proportion of admission by insurance schemes. On the other hand, the cost of alcohol drinking in inpatient departments for each chronic disease is calculated by multiplying the number of patients admitted to hospitals because of that disease with its unit cost. For more details on the unit cost calculation method of alcohol drinking in inpatient departments for acute conditions and chronic diseases, see Supporting Information, Part II at: http://www.ispor.org/Publications/value/ViHsupplementary/ViH12s3_Chaikledkaew2.asp.

Sensitivity Analysis

Probabilistic sensitivity analysis was used to analyze uncertainty of the data by randomly sampling some parameters using Monte Carlo Simulation. In this study, unit cost in inpatient and outpatient departments was varied. Probabilistic sensitivity analyses were conducted and ran a thousand iterations with random sampling from the data distributions. For each of the uncertain variables in the model, we defined a range and distribution of variation for the probabilistic sensitivity analysis. The distribution of all variables was assumed to be gamma distribution.

Results

Alcohol-Attributable Fraction of Chronic Diseases and Acute Conditions

The alcohol-attributable fractions (AAFs) of 33 chronic diseases and 9 acute conditions are presented in Table 1. For Table 1, see Supporting Information, Part III at: http://www.ispor.org/Publications/value/ViHsupplementary/ViH12s3_Chaikledkaew2.asp. Alcohol-related diseases and conditions with AAF equal to 100% were alcohol abuse, alcohol cardiomyopathy, alcohol dependence, alcohol gastritis, alcohol poisoning, alcohol polyneuropathy, alcohol psychosis, chronic pancreatitis, alcohol induced, degenerative of nervous system, ethanol toxicity, excess alcohol blood level, fetal alcohol damage, methanol toxicity, and other ethanol poisoning.

Most of chronic conditions and acute conditions were not wholly attributable to alcohol. Some diseases (e.g., cholecystitis, diabetes mellitus, hemorrhagic stroke in female, ischemic heart stroke, low birth weight in females, and ischemic heart disease) had negative AAFs, meaning that alcohol had a protective effect on these diseases. Nevertheless, only diseases or conditions with positive AAFs were considered, because the cost estimates were represented as the gross cost and not the net cost in this study.

Unit Cost of Each Disease and Acute Condition by Department

Table 2 presents unit costs in each diseases in inpatient and outpatient departments. For Table 2, see Supporting Information, Part IV at: http://www.ispor.org/Publications/value/ViHsupplementary/ViH12s3_Chaikledkaew2.asp. Cost per visit in outpatient departments was between 68 baht and 1785 baht. The lowest and highest costs per visit were alcohol cardiomyopathy (68 baht) and alcohol dependence (1785 baht), respectively. Unit cost per admission was between 5,731 baht and 29,408 baht. Mostly, the average cost per admission reimbursed by the Civil Servant Medical Benefit Scheme was higher than that reimbursed by the Universal Coverage.

Total Health-Care Cost of Alcohol Drinking

The total health-care cost of alcohol drinking was the summation of costs associated with chronic diseases and acute conditions in inpatient and outpatient departments. The top five leading causes of health-care costs were road traffic accident (1232 million baht), HIV/AIDS (1088 million baht), alcohol abuse (574 million baht), epilepsy (537 million baht), and alcohol dependence (430 million baht), respectively. Table 4 (see http://www.ispor.org/Publications/value/ViHsupplementary/ViH12s3_Chaikledkaew2.asp) demonstrates total health-care costs attributable to alcohol classified by type of service and sex. Among all diseases, the number of hospitalizations among male patients was about three times (168,549 hospitalizations from males and 50,250 hospitalizations from females) more than that of females. The number of outpatient visits among males was about eight times more than that of female patients. Moreover, males consumed about three times higher health-care costs attributed to alcohol than females. Health-care costs attributed to alcohol in both outpatient (2498 million baht) and inpatient departments (3003 million baht). Fifty-five percent of total health-care costs attributed to alcohol were health-care costs in inpatient departments. Therefore, total health-care costs attributed to alcohol in this study were 5491 million baht. Table 3 shows the total health-care cost attributable to alcohol classified by type of disease. For Tables 3 and 4, see Supporting Information, Part V at: http://www.ispor.org/Publications/value/ViHsupplementary/ViH12s3_Chaikledkaew2.asp.

Discussion

Alcohol drinking has a substantial consequence for public health in Thailand. Health-care costs of alcohol drinking among the Thai population in the year 2006 were estimated to be 5491 million baht. Results of this study may be difficult to be compared with other countries because of the difference in the pattern of alcohol drinking and prevalence of drinking. When comparing our study with the previous study in Thailand that estimated the economic costs of alcohol abuse in 2005 [24], it was found that the health-care cost of alcohol drinking ranged
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from 349 million baht to 10,970 million baht, whereas health-care costs in this study ranged from 5451 million baht to 5531 million Baht. The differences between the two studies could be explained by the fact that the previous study included only health-care costs in terms of time spent for medical treatments. In addition, health-care costs estimated in the previous study were derived only from the inpatient database from the Central Office for Healthcare Information, and only included disorders from alcohol abuse and gastrointestinal diseases including liver disease, whereas this study considered 42 alcohol-related diseases and conditions. As a result, the previous study used 16,383 hospital admissions, whereas our study included more than 218,799 hospital admissions to calculate health-care costs. In addition, HIV/AIDS was included in the health-care cost calculation but not in the previous study, because there have been pieces of evidence supporting that HIV/AIDS might be caused by alcohol drinking because alcohol drinkers were more likely to have unsafe sex than abstainers [4,38].

Although this figure was the best possible estimate at this time, it seemed to be underestimated. In this study, only 42 diseases and conditions were included because there has been insufficient evidence related to the causes of diseases related to alcohol. In addition, for some diseases, there has been no study providing data for the calculation of pooled estimate of age-specific relative risks for any alcohol relationship. In addition, the cost per visit was calculated by using the data obtained from the Center of Health Equity Monitoring, Faculty of Medicine, and Naresuan University, which covered 81 hospitals in 18 provinces. The data were collected retrospectively from an electronic database and relevant medical records. As a result, it was difficult to correct incomplete data. Moreover, we did not cover the hospitals in Bangkok or the university hospitals where patients had more severity or patients consumed higher costs. The costs of patients who are employees under the Social Security Scheme or patients in private hospitals were not covered in this study. Because the costs were determined from health system’s perspective, the costs based on the perspective of the patient or society (e.g., direct nonmedical cost and indirect cost) were not determined.

The results of this study showed the protective effects of alcohol drinking (AAF < 0) on diseases such as cholelithiasis, diabetes mellitus, low birth weight in females, ischemic heart disease, ischemic stroke, and hemorrhagic stroke in females. In addition, according to current epidemiological standards, there has been some evidence of a protective effect of moderate drinking on ischemic stroke, diabetes, cholelithiasis, or gallstones [39]. In this study, however, we did not consider the net cost, and only gross cost was calculated. It is difficult to measure ethanol intake for health benefits, which decreases the risk factor of each disease. From the point of view of public policy, the external costs imposed by the users upon the rest of society are relevant, and private benefits due to alcohol drinking are not considered [11].

The results of this study suggested that alcohol drinking was significantly associated with a large number of health-care costs in Thailand. Health-care costs related to alcohol drinking would provide an important insight into future policy appraisal and evaluation information. The cost estimates in this study did not necessarily indicate the amount of money that could be saved as a result of the introduction of efficient government policy measures to reduce the harm associated with alcohol misuse. In fact, the introduction of any such policy may increase prevention or research costs in the short run. The costs estimated here included both avoidable and unavoidable costs. Avoidable costs were those that could not have been incurred if there had been no problems associated with alcohol drinking. Some avoidable costs of alcohol drinking were associated with acute harm such as injuries from road accidents. Avoidance of these harms would result in both immediate and longer term savings.

For future epidemiological research, we would like to add a word of caution with respect to the optimistic assumptions such as the relative risks for different diseases and different consumption categories. Clearly, alcohol caused cancer cases and other diseases that were considered as the best possible estimates given the current knowledge. Most importantly, the assessment method for the prevalence of alcohol drinking categorized by sex and age group should be generalized to the Thai population. Direct method should be used to estimate the AAFs in some alcohol-related harm. In addition, future research should carefully select its measure based on the specific aim of the study and based on the population under consideration. For example, the outcome linked to heavy drinking occasions, age groups with high variability of drinking, and other outcomes linked to chronic diseases and with low variability of drinking (e.g., moderate drinking pattern with meal and light often drinking before meal) should be assessed. Moreover, the World Health Organization guideline [40] should be followed. The study should include four major cost components, namely, 1) health-care costs [30] of productivity loss due to premature deaths, and absenteeism and presenteeism; 2) costs of criminal justice and law enforcement; and 3) costs of property damages due to road traffic accidents. These major cost components may reflect the real economic impact of alcohol to the society in the Thai population.

Conclusions

According to this study, health-care costs were associated with alcohol consumption in 42 diseases and conditions. Health-care costs attributable to alcohol were estimated at 5491 million baht, ranging between 5451 million baht and 5531 million baht in 2006. Health-care costs attributable to alcohol were higher among males than females. Costs incurred at inpatient departments accounted for 55% of total health-care costs. The top five leading causes of health-care cost were road traffic accident (1232 million baht), HIV/AIDS (1088 million baht), alcohol abuse (574 million baht), epilepsy (537 million baht), and alcohol dependence (430 million baht), respectively. The Thai government would provide a justification or otherwise for resources spent on reducing the harm associated with alcohol misuse, and help to appropriately target specific problems and policies such as the impact of prevention, treatment, and enforcement strategies. Improved cost estimates are important in assisting policymakers to develop more complete cost-benefit analyses of policies and programs aimed at reducing the harm associated with alcohol drinking.

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References


For additional references, see Supporting Information, part IV http://www.ispor.org/Publications/value/ViHsupplementary/ViH12s3Chaikledkaew2asp.