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Age-standardized Cancer Mortality Rates in Phanom Phrai District, Roi Et Province, Thailand

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Abstract

Cancer is the top leading cause of death in Roi Et, a northeastern province in Thailand. Common cancers based on prevalence were liver and intrahepatic cholangiocarcinoma (ICC), breast, colon, lung, and cervical cancers. This study was conducted to estimate age-standardized rates (ASR) of cancer mortality during 2010 in Phanom Phrai, a district in Roi Et, and compare the adjusted rates with the national ASR during 2008. The study population consisted of Thai citizens who died of cancer in Phanom Phrai during 1 Jan to 31 Dec 2010. ASR were calculated using the Segi standard population. ASR of all cancers was 69 per 100,000 population ($/10^5$). ASR of colorectal cancer in Phanom Phrai during 2010 ($10.0/10^5$) was higher than that of the national ASR in 2008 ($6.5/10^5$) and ASR of this cancer among men ($14.7/10^5$) was three times higher than that of women ($5.1/10^5$). ASR of liver and ICC ($22.6/10^5$), lung ($10.9/10^5$), cervix ($7.6/10^5$), and breast ($1.6/10^5$) in Phanom Phrai during 2010 were lower than those of the national ASR in 2008. ASR can be used to calculate cancer mortality rates for all provinces, allowing comparison and epidemiologic studies for more effective intervention.

Keywords: cancer, standardization, age-standardized rate, mortality, Thailand

Introduction

During 2006-2010 in Thailand, the leading cause of death was cancer, with mortality rate of 83.1-91.2 per 100,000 population ($/10^5$).¹ In 2010, the top three cancer mortality rate were caused by liver cancer and intrahepatic cholangiocarcinoma (ICC) ($22.0/10^5$), lung cancer ($14.6/10^5$), and breast cancer ($7.7/10^5$).² Roi Et, a northeastern province in Thailand, had the fourth highest incidence of cancer.³ Among males, top five cancer incidences were liver and ICC ($34.9/10^5$), lung ($10.3/10^5$), colorectal ($8.6/10^5$), leukemia ($5.2/10^5$), and lymphoma ($3.4/10^5$). In females, breast cancer was the most common cancer ($17.2/10^5$), followed by liver and ICC ($11.3/10^5$), cervical cancer ($9.8/10^5$), colorectal cancer ($8.4/10^5$), and lung cancer ($4.7/10^5$).⁴

In 2012, Chulabhorn Hospital, National Health Examination Survey Office, Roi Et Provincial Health Office and Ministry of Public Health collaborated and conducted a prospective cohort study to determine incidence and mortality of diseases, especially in cancers and cardiovascular diseases (CVD). Phanom Phrai District in Roi Et province was the study site. However, information on burden of incidence and mortalities of cancers was needed to estimate prior to carry out this project. Hence, this study was performed in order to estimate age-standardized rates

(ASR) of cancer mortality in Phanom Phrai during 2010 and compare it with ASR of the national cancer mortality in 2008.

Methods

A descriptive study was conducted. Death data was retrieved from the death registry of Phanom Phrai Hospital and the National Health Security Office (NHSO). Cancer data was obtained from the cancer registry based in Roi Et Hospital and International Agency for Research on Cancer (IARC) of World Health Organization.⁵ The study population was defined as people who died of cancer in Phanom Phrai District during 1 Jan to 31 Dec 2010. The inclusion criterion was people living in Phanom Phrai District and died of all causes during 1 Jan to 31 Dec 2010. People without information on age, gender, address, and date and cause of death were excluded from the study. ASR of cancer mortality in Phanom Phrai during 2010 was calculated, and compared to national and global ASR in 2008 using Segi standard population.⁶

Statistical Analysis

Data was analyzed by Epi Info version 3.5.3.⁷ Mortality rate⁸ was the number of death during 1 Jan to 31 Dec 2010 divided by mid-year population in

Phanom Phrai District during 2010. Age-direct standardized mortality rate of each type of cancer was calculated with Segi standard population.⁶ Standard error of ASR was calculated as well.⁹

Results

Records of total 570 deaths were reviewed and 91 (16%) were excluded. Cancer was the second most common cause of death in Phanom Phrai, with ASR equal to 69/10⁵. Of these, 91 cancer deaths were identified, including 52 (57%) males and 39 (43%) females. Median ages among males and females were 64 and 68 years, and interquartile ranges were 40-77 and 58-78 years respectively. The cancer mortality rate in 2010 increased with age for both genders. Mortality rate among males aged 10-19 years and those 50-69 years were lower than those of females. In the other age groups, mortality rate among males were higher than those of females since the male population decreased (Figure 1).

We compared mortality rate by types of cancer with the national mortality rate in 2008. Top five cancer deaths in Phanom Phrai were liver and ICC, followed by colorectal, cervical, lung and hematological cancers, and contributed to 80% of all cancer deaths. As for the national mortality rate, top cancer sites were similar to Phanom Phrai, except the fifth was breast cancer (Figure 2). After ages were adjusted, top five ASR in Phanom Phrai during 2008 and the national ASR in 2010 were similar to unadjusted mortality rate (Figure 3). However, the rank of cancer mortality changed. In Phanom Phrai, although the unadjusted mortality rate of lung cancer ranked the fourth, it became the second after adjusting. Colorectal and cervical cancers were shifted to the third and fourth respectively. In addition, mortality rate also changed and after adjusting, the rate decreased for all top five cancers while the national mortality rate increased after adjustment.

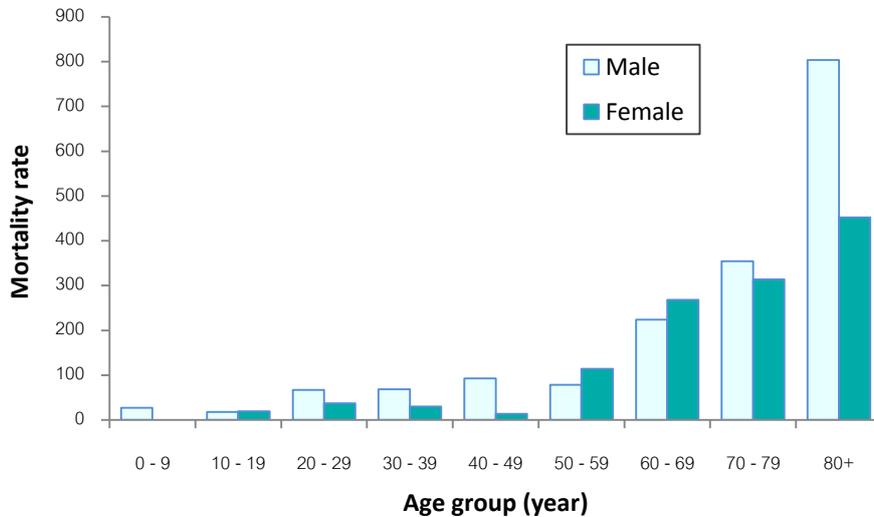


Figure 1. Mortality rates of cancer per 100,000 population by age group and gender in Phanom Phrai District, Roi Et Province, Thailand, January - December 2010 (n=91)

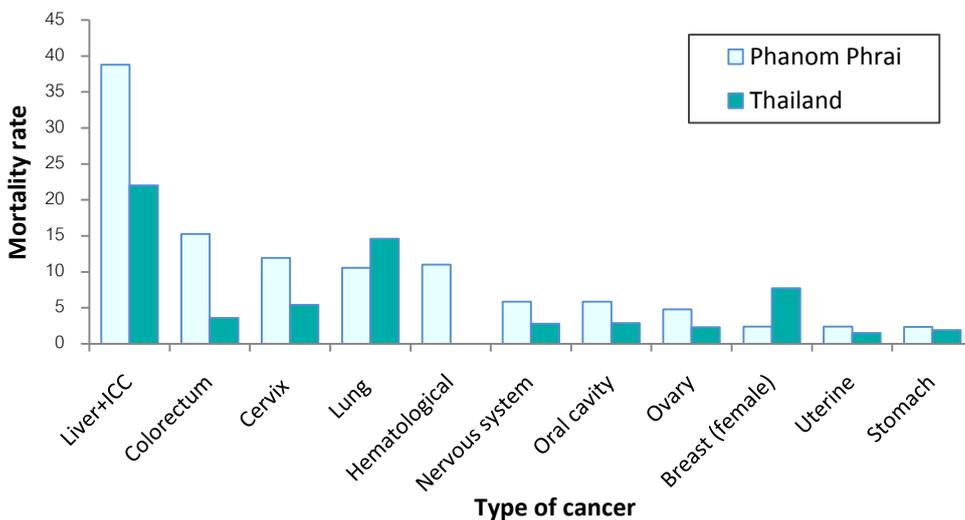


Figure 2. Mortality rates per 100,000 population by types of cancer in Phanom Phrai District, Roi Et Province, Thailand, January - December 2010

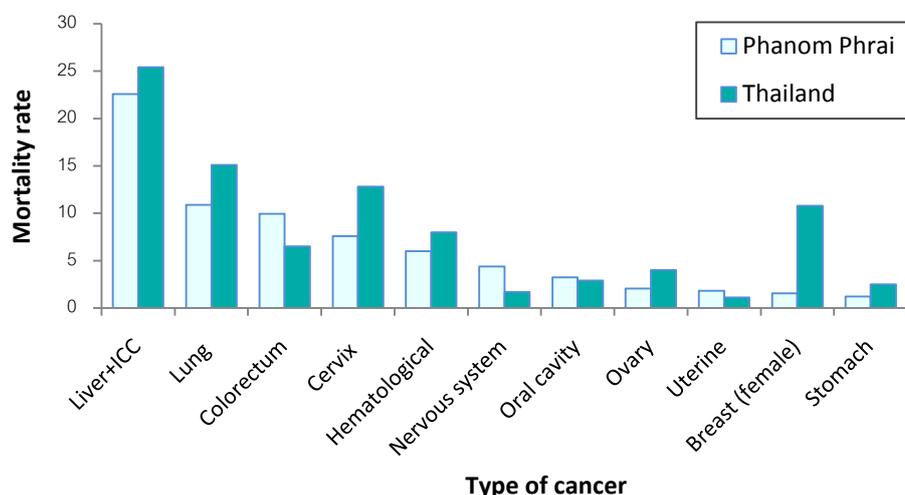


Figure 3. Age-standardized mortality rates per 100,000 population by types of cancer in Phanom Phrai District, Roi Et Province, Thailand in 2010 compared with the national rates in 2008

Five types of cancer with the highest ASR in Phanom Phrai during 2010 were selected to compare with the national and global ASR in 2008. The results showed that ASR in Phanom Phrai during 2010 were lower than those of the national and global ASR in 2008 for all types of cancer, lung, breast and cervical cancer. ASR of liver and ICC in Phanom Phrai during 2010 was lower than that of the national ASR in 2008 and higher than that of the global in 2008. For colorectal cancer, ASR in Phanom Phrai during 2010 was higher than those of both the national and global in 2008 (Table 1).

Discussion

In both genders, 80% of cancer mortality rate in Phanom Phrai was similar to those of the national, namely liver and ICC, colorectal, cervical, lung, and hematological cancers. Before age-standardization, mortality rate of Phanom Phrai in 2010 were higher

than those of the national in 2008, except lung cancer. However, after adjusting, ASR of all cancers were lowered, except colorectal cancer in males which was still higher than the national ASR even after adjusting because the population structure in Phanom Phrai was different from the general Thai population. In Phanom Phrai, majority of the population were adults aged between 30-60 years with less children and elderly while majority of the general population in Thailand were children and adults¹⁰.

Liver cancer and ICC are highly fatal diseases. Five-year survival rate was 8.5% in males and 8.3% in females,¹¹ due to late presentation and difficulties in surgical intervention.¹² Known risk factors included hepatitis B and C viruses, and *Opisthorchis viverrini* infection, which are prevalent in Thailand.¹³⁻¹⁶ However, these risk factors and other underlying risk factors had never been explored in Roi Et.

Table 1. Main cancer mortalities in Phanom Phrai District, Roi Et Province, Thailand during 2010 compared with average figures in Thailand and worldwide during 2008

Type of cancer	Age-standardized mortality rate per 100,000 population		
	Phanom Phrai (95% CI)	Thailand	Worldwide
All cancers	68.9 (68.84, 68.95)	93.6	105.6
Male	83.0 (82.95, 83.12)	102.6	127.9
Female	54.4 (54.37, 54.49)	85.6	87.2
Liver cancer and ICC	22.6 (22.57, 22.63)	25.4	9.9
Male	28.7 (28.65, 28.74)	35.1	14.5
Female	16.5 (16.46, 16.53)	16.6	5.7
Lung cancer	10.9 (10.85, 10.91)	15.1	19.3
Male	13.6 (13.53, 13.63)	22.0	29.2
Female	8.1 (8.05, 8.10)	9.3	10.9
Colorectal cancer	10.0 (9.93, 9.97)	6.5	8.2
Male	14.7 (14.64, 14.69)	6.4	9.6
Female	5.1 (5.04, 5.08)	6.5	7.0
Breast cancer (female only)	1.6 (1.56, 1.56)	10.8	12.4
Cervical cancer	7.6 (7.55, 7.59)	12.8	7.8

For colorectal cancer, mortality rate in males was three times higher than that of females, which might be due to smoking and alcohol drinking among males.¹⁷ In Thailand, frequencies of smoking and alcohol drinking in males were 18 and five times higher than those of females respectively.¹⁸ High mortality rate in Phanom Phrai and nationwide might result from delayed diagnoses at advanced stage. As an example, among patients with known staging at diagnosis in Chiang Mai Province, almost 30% were diagnosed as advanced stages, including only 10.4% with localized disease and 29.2% with metastatic diseases.¹⁹

Cervical cancer is the third most common cancer affecting women around the world²⁰ as well as in Phanom Phrai. The high incidence might be due to high pre-cancerous lesions with 2.4% and 5.3% for conditions like infection and inflammation respectively.²¹ High mortality rate in Phanom Phrai might be resulted from high rate of loss to follow-up. About 41% of patients with abnormal Pap smear were lost to follow-up according to a study in Thailand.²²

Since structure of the population in Phanom Phrai is different from the general Thai population, it might not be appropriate to make direct comparison of the crude rates. However, age-standardization allowed comparison between two types of population by controlling the effects of different population structures. In Phanom Phrai, mortality rate decreased after adjusting because the population structure was different when compared to Segi population. Nevertheless, as the national population structure was similar to Segi population after adjusting, mortality rate increased. Although the ASR in Phanom Phrai decreased, top five cancers were still the same, which provided the strong evidence that these cancers were serious problems.

Limitations

The national and global cancer ASR, which derived from IARC, were available only until 2008. Despite that, the cancer ASR in Phanom Phrai was studied in 2010. The discrepancy in time periods might have different population structures as well. Hence, the age-standardization comparison was made for further analysis. Furthermore, as the study period for analysis was only one year, changes in trend over time could not be described or compared.

Intervention or screening programs were not reviewed or added to the analyses. Therefore, strategies on cancer prevention, early detection and treatment, could not be evaluated by this study. The data might be underestimated as well since all the

people with cancer might not registered in the cancer registry based in Roi Et Hospital and National Cancer Institute, and all cancer deaths might not be diagnosed by health care personnel. Finally, as certain information such as risk and protective factors was not available at the time of recruitment, we could not explain why some cancers were lower or higher than the national and global rates in 2008.

Conclusions

We concluded that cancer-specific mortality rate in Phanom Phrai were similar to the reported national mortality rate. Cancer was the second most common cause of death in Phanom Phrai, with ASR equal to 69/10⁵. Liver and ICC, colorectal, cervical, lung, and hematological cancers caused 80% of cancer deaths in Phanom Phrai. Actions were needed to identify risk factors and effective interventions in order to reduce the disease burden.

Public Health Recommendations

We recommended that temporal changes of overall and individual cancer mortalities in Roi Et should be analyzed for longer time period such as 10 years to help in decision making for health resource allocation, and better prevention and control measures. Cancer incidence rates and trends, along with mortality rates, should be calculated for all districts, allowing comparison between districts. Finally, risk or protective factors should be explored to identify why some types of cancer were lower or higher than the national and global rates in 2008.

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