

RESEARCH ARTICLE

Evaluation of Health Status of a Population Underwent Routine Medical Check Up at the High Risk Screening Clinic in National Cancer Institute

Suleeporn Sangrajrang^{1*}, Vanida Chokvanitphong², Wutti Sumetchotimaytha², Thiravud Khuhaprema³

Abstract

The objective of the study was to evaluate the efficacy of a health check-up program among Thai people at the National Cancer Institute in the years 2008-2009. The program included history taking, physical examination, chest X-ray, EKG, and laboratory tests. A total of 28,240 women and 9,665 men were included in the study, with mean ages of 44.5 and 46.9 years, respectively. The study showed that obesity, as assessed by a BMI over 25.0 kg/m², in men and women was present in 41.4% and 30%, respectively. Biochemical study revealed that anemia was prevalent in 21.6% of men and 20.1% of women. High plasma glucose level (>115 mg/dL), cholesterol level (>200 mg/dL), triglyceride level (>190 mg/dL) in men was 13.8%, 63.8%, 22.6% and 7.7%, 61.1%, 8.9% in women. Hepatitis B virus infection was found 7.5% in men and 4.1% in women. In this study, 177 new cancer cases were detected, of which 35 were breast, 19 were cervical and 26 were colorectal, most of these cancers being detected at early stage. In addition, precancerous states was also found including 718 cases of benign and 99 cases of adenoma in situ. In conclusion, an annual check up may detect abnormalities that have no obvious clinical symptoms of disease. Early detection of asymptomatic neoplasms and precursor lesions should contribute to a prompt provision of treatment and further decline of death from cancer.

Keywords: Health check-up program - Thailand - cancers - BMI - HBV

Asian Pacific J Cancer Prev, 13 (11), 5759-5762

Introduction

Cancer is the leading cause of death in Thailand in the past decade. Smoking, unhealthy diet, obesity, sedentary lifestyles, and failure to get screened all contribute to the excess burden of cancer (Jean et al., 1998). In fact, age is one of the most important risk factors for cancer of most sites (Yanick, 1983). Approximately 70% of all cancers occur in Thai population over age 50 years (Khuhaprema et al., 2002). Because of the increased risk for cancer in the older population, it is essential that these persons follow cancer control guidelines and report potential cancer symptoms promptly. Consistent a regular check ups will help a doctor identify some abnormalities, this allowing for prompt provision of early diagnosis and treatment. National Cancer Institute (NCI) has been providing this service for many years, we set up a screening clinic and encourage people particularly in the high risk group to have a regular check ups. The program included history taking, physical examination, chest X-ray, EKG, and laboratory tests. In this study, we evaluated the health status of a population underwent routine medical check up at National Cancer Institute in the year 2008-2009.

Materials and Methods

The authors reviewed the health check up results of people who attended the annual check up program at the high risk screening clinic in NCI during 2008-2009. General questionnaire were completed by the subjects to gather information regarding their demographics, education, family history of cancer, cigarette and alcohol consumption, presence of congenital disease. Laboratory tests were performed including complete blood count, serum alanine transferase (ALT), serum aspartate transaminase (AST), serum cholesterol, serum triglyceride, urinalysis, surface antigen hepatitis B virus, stool examination. EKG and chest X-rays were performed using standard methods. Clinical breast examination and pap smear test were performed for women and prostate specific antigen were also tested in men aged ≥ 40 years.

For laboratory test, the abnormalities were defined as the following; impaired fasting sugar, serum cholesterol and triglyceride if level more than level 115, 200 and 190 mg/dL, respectively. Elevated low density lipoprotein cholesterol (LDL) level was defined as LDL > 130 mg/dL. Low level of HDL was defined as < 35 mg/dL in men and

¹Research Division, ²Out Patient Division, ³Surgical Oncology Division, National Cancer Institute, Bangkok, Thailand *For correspondence: sulee@health.moph.go.th

<45 mg/dL in women. An elevated of serum ALT and AST if the value above 40 mg/dL. Hyperuricemia was defined as >7 mg/dL.

Serum samples were tested for HBsAg, AFP and PSA with the electrochemiluminescence assay according to the manufacturer's instructions (Roche Diagnostic, Germany). Chest X-rays and EKG were performed using the standard method. BMI (body mass index); body weight in kg/ (height in meter)² were defined as overweight for BMI of 23.00-24.99 kg/m² and obesity if BMI \geq 25 kg/m².

Results

A total of 37,905 subjects were enrolled in the study, 28,240 (74.5%) were women and 9,665 (25.5%) were men (Table 1). The mean age was 44.6 \pm 11.8 among women and 46.9 \pm 11.1 among men. More than 60% of the subjects were aged over 40 years and had higher education. Obesity were detected in 41.4% in men and 30.0% in women. Only 33.4% among men and 51.6% among women had normal body weight. 38.2% of men subjects were current or ex-smoker while only 2.6% of women subjects were smoking. For alcohol consumption, 54.3% of men and 18.4% of women were drinking.

Biochemical analysis revealed that high glucose level (>115 mg/dL) in men was 13.8% and 7.7% in women (Table 2). The prevalence of hyperlipidemia; cholesterol >200 mg/dL, LDL>130 mg/dL and triglyceride >190 mg/dL was 63.8%, 60.7%, 22.6% in men and 61.1%, 50.5%, 8.9% in women, respectively. The level of HDL <35 mg/dL among men was 8.1% and <45 mg/dL among women was 12.6%. All subjects were checked for complete blood count the results revealed that 21.6% of men and 20.1% of women had low hemoglobin level. The prevalence of high AST, ALT and AFP (which suggests liver abnormalities) was 8.4%, 22.8% and 3.1% in men and 3.7%, 6.7% and 2.3% in women, respectively. The prevalence of elevated PSA level in men aged \geq 40 years was 3.7%. The detection of human antibodies to hepatitis B surface antigen were found 7.5% in men and 4.1% in women. The prevalence of faecal occult blood test positive was 7.5% in men and 6.3% in women.

Table 3 show the number of cancer and benign found in the study population. Overall, 177 of different cancers

Table 1. Characteristic of the Study Population

| | | Male (n=9,665) | | Female (n=28,240) | |
|------------------|---------------|-----------------|------|-------------------|------|
| | | No. of case | % | No. of case | % |
| Age | <25 | 158 | 1.6 | 506 | 1.8 |
| | 25-40 | 2,849 | 29.5 | 10,348 | 36.6 |
| | >40 | 6,656 | 68.9 | 17,382 | 61.6 |
| | Mean \pm SD | 46.9 \pm 11.8 | | 44.6 \pm 11.1 | |
| | | | | | |
| BMI | <23 | 3,185 | 33.4 | 14,415 | 51.6 |
| | 23-24.99 | 2,402 | 25.2 | 5,145 | 18.4 |
| | \geq 25 | 3,947 | 41.4 | 8,363 | 30.0 |
| Education | 6-12 years | 3,365 | 35.8 | 10,734 | 39.5 |
| | >12 years | 6,023 | 64.2 | 16,432 | 60.5 |
| Smoking | Yes | 3,687 | 38.2 | 721 | 2.6 |
| | No | 5,968 | 61.8 | 27,488 | 97.4 |
| Alcohol drinking | Yes | 5,244 | 54.3 | 5,177 | 18.4 |
| | No | 4,410 | 45.7 | 23,027 | 81.6 |

Table 2. Abnormalities Found on Blood and Urine Chemistry Analysis

| Chemistry analysis | Male (n=9,665) | | Female (n=28,240) | |
|---------------------------|----------------|------|-------------------|------|
| | No. of case | % | No. of case | % |
| Glucose (>115 mg/dL) | 1,333 | 13.8 | 2,187 | 7.7 |
| Cholesterol (>200 mg/dL) | 6,168 | 63.8 | 17,241 | 61.1 |
| HDL <35 mg/dL | 779 | 8.1 | - | - |
| <45 mg/dL | - | - | 3,564 | 12.6 |
| LDL (>130 mg/dL) | 5,867 | 60.7 | 14,261 | 50.5 |
| Hb <14 g/dL | 2090 | 21.6 | - | - |
| <12 g/dL | - | - | 5,681 | 20.1 |
| Triglyceride (>190 mg/dL) | 2,187 | 22.6 | 2,505 | 8.9 |
| BUN (>20 mg/dL) | 444 | 4.6 | 474 | 1.7 |
| Creatinine (>1.2 mg/dL) | 874 | 9 | 126 | 0.4 |
| Uric acid (>7.0 mg/dL) | 3,044 | 31.5 | 891 | 3.2 |
| AST (>40 mg/dL) | 810 | 8.4 | 1,038 | 3.7 |
| ALT (>40 mg/dL) | 2,208 | 22.8 | 1,905 | 6.7 |
| AFP (>7.0 ng/ml) | 295 | 3.1 | 658 | 2.3 |
| PSA (>4.0 ng/ml) | 273 | 3.7 | - | - |
| Not done (age <40 years) | 2,272 | | | |
| Hepatitis B Infection | | | | |
| Positive | 725 | 7.5 | 1,146 | 4.1 |
| Negative | 8,912 | 92.5 | 27,054 | 95.9 |
| Not done | 28 | | 40 | |
| Fecal Occult Blood | | | | |
| Positive | 682 | 7.5 | 1,533 | 6.3 |
| Negative | 8,391 | 92.5 | 22,856 | 93.7 |
| Not done | 592 | | 3,851 | |

Table 3. Number of Cancers and Benign Lesions in the Study Population

| Disease | (n=37,905) |
|---|------------|
| Breast: | |
| Stage I-II | 29 |
| Stage III- IV | 3 |
| Unknown | 3 |
| Cervix uteri: | |
| Stage I-II | 15 |
| Stage III- IV | 3 |
| Unknown | 1 |
| Colon: | |
| Stage I-II | 14 |
| Stage III- IV | 10 |
| Unknown | 2 |
| Prostate: | |
| Stage I-II | 15 |
| Stage III- IV | - |
| Unknown | 4 |
| Rectum | 13 |
| Liver and intrahepatic bile duct | 10 |
| Bronchus, Lung | 13 |
| Other cancers | 42 |
| In situ and benign: | |
| Carcinoma in situ of breast | 6 |
| Carcinoma in situ of cervix uteri | 93 |
| Benign neoplasm of colon, rectum, anus and anal canal | 239 |
| Benign neoplasm of breast | 173 |
| Leiomyoma of uterus | 71 |
| Other benigns | 235 |

were detected. There were 35 cases of breast cancer, 19 cases of cervical cancer, 26 cases of colon cancer, 13 cases of rectum cancer, 13 cases of lung cancer, 10 cases of liver and intrahepatic bile duct cancer and 42 cases of other cancers. Among carcinoma in situ, 6 cases of breast and 93 cases of cervix uteri were found. In addition, 718 benigns were also found including 239 benign of colon, rectum, anus and anal canal, 173 benign neoplasm of breast, 71 leiomyoma of uterus and 235 other benign.

Using the PSA as the screening marker, the result showed that all prostate cancer were the cases that had elevated level of PSA (15/15) from 295 positive cases, while in AFP analysis only 5 of 10 liver cancer had elevated level of AFP from 953 positive cases. The result of stool examination showed a total of 2,215 positive cases, among these 21 of 24 cases (87.5%) were colon cancer, 7 of 11 cases (63.7%) were rectum cancer and 181 of 237 cases (76.3%) were benign neoplasm of colon, rectum, anus and anal canal.

Discussion

According to our result, the metabolic abnormalities were markedly detected. This may be related to changing lifestyle of Thai people. In this study, the BMI over 25 kg/m² were detected in 41.1% in men and 30.0% in women. The prevalence of high cholesterol, triglyceride, LDL were observed both in men and women. The result is in according to the increasing rates of obesity observed from the national health examination survey (Aekplakorn et al., 2009)

Evidence suggests that the cancer deaths each year that occur in the United States are related to dietary factors, excess weight and lack of sufficient physical activity (Eheman et al., 2012). A high-fat diet has been associated with an increased risk for cancer of the prostate, endometrium, and colon and rectum. It is believed that a high-fat diet is a cancer promoter, with numerous theories to explain the effects of excess fat (Kerley-Hamilton et al., 2012).

The top five leading cancer in Thailand are liver, lung, breast, cervix and colorectal cancer, taken together, these five sites are responsible for 56.31% of all cancer (Khuhaprema et al., 2002). It is know that effective screening leads to early detection and treatment, thereby reducing disease-associated morbidity and mortality. WHO recommends population-based screening for colon and rectum cancer, female breast cancer, and uterine cervix cancer. The U.S. Preventive Services Task Force (USPSTF) also recommends screening tests for each of these cancers to reduce morbidity and mortality (Guzick, 1978; Tabar and Dean, 1987; US Preventive Services Task Force, 2010). USPSTF recommends that women aged 50-74 years be screened for breast cancer by mammography every 2 years, women aged 21-65 years be screened for cervical cancer and precancerous lesions by Pap smear testing every 3 years and regular screening of both men and women for colorectal cancer, starting at age 50 years and continuing until age 75 years. Our check up program include a pap test and clinical breast examination for women. In this study, 35 breast cancer, 19 cervical cancer, 6 carcinoma in situ of breast and 93 carcinoma in situ of cervix uteri were detected from the total of 28,240 screened women. Faecal occult blood test is the most widely used for colorectal cancer screening. Early detection and removal of polyps in the colon and rectum may prevent the development of invasive cancer (Levin et al., 2008). The result of faecal occult blood test revealed that 33,462 subjects were screened in the study and there were 2,215 positive cases (6.6%), among these 21 of 24 cases (87.5%) were colon cancer, 7 of 11 cases (63.7%)

were rectum cancer and 181 of 237 cases (76.3%) were benign neoplasm of colon, rectum, anus and anal canal. For prostate cancer the recommendation for screening is controversial issue because of cost and uncertain long-term benefits to patients (Collins and Barry, 1996). Recently, the US PSTF released the recommendation which is based on a review of evidence and concludes that prostate-specific antigen-based screening results in small or no reduction in prostate cancer-specific mortality and is associated with harms related to subsequent evaluation and treatments, some of which may be unnecessary (Roger et al., 2011). In our study, 7,393 men aged ≥40 were screened for PSA and 273 cases had elevated level of PSA, all 15 prostate cancer cases were the cases that had high PSA.

Liver and lung cancer are two major cancer among Thai men. Unfortunately, there are no effective screening program for liver and lung cancer. Prevention offers the most cost-effective long-term strategy for the control of these cancer. The data from WHO revealed that every year there are over 4 million acute clinical cases of HBV, and about 25% of carriers, 1 million people a year, die from chronic active hepatitis, cirrhosis or primary liver cancer (World Health Organization, 2001). Hepatitis B infection were found in 7.5% in men and 4.1% in women in our study. Our check up program also include the test for AST, ALT and AFP to screen liver abnormalities. AFP is widely use in clinical practice, however, it's not yet clear if the test is accurate enough. In our study, 10 of liver and intrahepatic bile duct cancer were detected. Our result revealed that 953 people had elevated level of AFP, among these 5 of 10 (50%) were detected liver and intrahepatic bile duct cancer.

In conclusion, health check up is part of health promotion crucial in public health policy. It may detect some abnormalities that have no obvious clinical symptoms of disease. According to this study, obesity and diet-related diseases were markedly observed. Early detection of asymptomatic neoplasms and precursor lesions would contribute to a further decline of death from cancer. It should be noted that an annual check up can not detect all early cancer but can screen some high risk person and allow these people to have further investigation and may detect cancer in early stage. A periodic health examination may also induce unnecessary costs and patient harms by the use of nonrecommended services, further research is needed to clarify the long-term benefits, harms and costs. In addition to laboratory tests, health advice by physicians or nurses regarding behavior risk should be implemented to individual. Our study has its own limitations. This study was conducted in a single institution and may have been subject to selection bias. Further large-scale studies in the general population will be necessary to confirm our results.

References

- Aekplakorn W, Porapakkham Y, Taneepanichskul S, et al (2009). Fourth report on survey of health status in Thai populations by physical examination, 2008-2009. National health examination survey office. Bangkok.
- Collins MM, Barry MJ (1996). Controversies in prostate cancer

- screening. Analogies to the early lung cancer screening debate. *JAMA*, **276**, 1976-9.
- Eheman C, Henley SJ, Ballard BR, et al (2012). Annual Report to the Nation on the status of cancer, 1975-2008, featuring cancers associated with excess weight and lack of sufficient physical activity. *Cancer*, **118**, 2338-66.
- Guzick DS (1978). Efficacy of screening for cervical cancer: a review. *Am J Public Hlth*, **68**, 125-34.
- Jean D, Nadine M, Jean CF, et al (1998) Cigarette Smoking Is Associated with Unhealthy Patterns of Nutrient Intake: a Meta-analysis. *J Nutr*, **128**, 1450-7.
- Kerley-Hamilton JS, Trask HW, Ridley CJ, et al (2012). Obesity is mediated by differential aryl hydrocarbon receptor signaling in mice fed a Western diet. *Environ Hlth Perspect*, **120**, 1252-9.
- Khuhaprema, T, Srivatanakul, P, Attasara P, et al (2002). Cancer incidence in Thailand 2001-2003. National cancer institute. Bangkok, Thailand.
- Levin B, Lieberman DA, McFarland B, et al (2008). American cancer society colorectal cancer advisory group; us multi-society task force; American college of radiology colon cancer committee. screening and surveillance for the early detection of colorectal cancer and adenomatous polyps: a joint guideline from the American cancer society, the us multi-society task force on colorectal cancer, and the american college of radiology. *Gastroenterology*, **134**, 1570-95.
- Roger C, Jennifer MC, Tracy D, et al (2011). Screening for prostate cancer - a review of the evidence for the U.S. preventive services task force. *Annals of Int Med*, **155**, 662-771.
- Tabar L, Dean PB (1987). The control of breast cancer through mammography screening: what is the evidence? In: E. A. Sickles (ed.). *The Radiologic Clinics of North America (Breast Imaging)*, Philadelphia, W.B. Saunders Company, pp. 993-1005.
- US Preventive Services Task Force (2011). Recommendations for adults: cancer. Rockville, MD: Available online at: <http://www.uspreventiveservicestaskforce.org/adultrec.htm> Accessed January 17, 2012.
- World Health Organization (2001). Introduction of hepatitis B vaccine into childhood immunization services. unpublished document WHO/V&B/01.31 available on request from Department of Vaccines and Biologicals, World Health Organization, 1211 Geneva 27, Switzerland).
- Yancik R (1983). Frame of reference: old age as the context for the prevention and treatment of cancer. In: R. Yancik, P. P. Carbone, W. B. Patterson, et al. (eds.). *Perspectives on Prevention and Treatment of Cancer in the Elderly*. Raven Press, New York.