# Health Status and Bio-indicators Among Elderly People in Rural Areas, Thailand

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***Objective:*** *This community based cross-sectional study design aimed to assess health status among people aged ≥ 60 years living in rural areas of northern Thailand.*
***Material and Method:*** *The questionnaires, physical examination, and 5 milliliters of blood specimen had been obtained. The face-to-face interview was conducted by trained interviewers and physical examination made by physician. A Chi-square test and multiple logistic regression were used to determine significant association at alpha = 0.05.*
***Results:*** *Three hundred twenty eight subjects were recruited into the study: 60.7% had chronic diseases, 73.2% received health care at health promoting hospitals, 32.1% received regular medication, 85.4% had abnormality of mobility, 30.5% had cataract, and 11.6% had hearing loss. Females had smoked longer than males (p-value < 0.05), but males had drank alcohol longer than females (p-value < 0.05). In this group, 12.2% had Cholesterol ≥ 251 mg/dl, 27.5% had Triglyceride ≥ 171 mg/dl, 10.5% had FBS ≥ 121 mg/dl, 15.4% had SGPT ≥ 31I U/L, and 21.5% had Uric acid ≥ 7.1 mg/dl.*
***Conclusion:*** *Effective health promoting program is still necessary for improving elderly health in rural Thailand.*

***Keywords:*** *Health status, Bio-markers, Elderly population, Rural area, Health promoting hospital*

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Thailand has achieved to emerge as a middle-income country over the last few decades. The number of people living below the poverty line was reduced by almost two-thirds between 1990 and 2002. Thailand[1]. Consequently, the aging population has dramatically increasing in Thai society. It is predicted that by the year 2025, the global proportion of those aged 60 years and older will more than double from 542 million in 1995 to about 1.2 billion[2]. The total number of older people living in developing countries will also be more than double by 2025, reaching 850 million[2]. Twelve percent of the global population is over age 60 in Thailand[2].

These demographic changes in Thailand are taking place in increasing mobility and changing family structures. The older generation have been weakened, and often destroyed, by rapid social and economic change, especially in the rural areas. In the economies of both developed and developing countries, structural inequalities have often been the cause among the general population of low wages, high unemployment, poor health services, lack of educational opportunities, and discrimination against women – all of which tended to make the elderly poorer and more vulnerable. The economic marginalization of older people has multiple health effects and spiraling consequences. Poor diet, living environment, and personality health behaviors have been linked to a wide range of later-life illnesses including heart disease, hypertension, diabetes, and different forms of cancer.

WHO reported that in developing countries including Thailand has shown that older people consistently experience disproportionately high levels of poverty. It is estimated that 80% of older people in these countries have no regular income and 100 million live on less than US$1 a day, and more than 10% of people living on less than US$1 per day are over 60 years old[3]. Older people in developing countries are facing a significant risk from both communicable and non-communicable diseases. As life expectancy increases in these countries, the elderly will be subject to the same long-term, largely incurable and often disabling diseases associated with old age that are currently most prevalent in developed countries. They would also face environmental dangers and the likelihood of violence in their societies.

In Thailand, 7.4% of the population was elderly in 1990. This number increased to 11.7% in 2010[4]. The Thai Ministry of Public Health estimated

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the proportion of elderly people in Thailand would be 20% by the year 2025, and 25% by the year 2030. Most elderly people are dependent. The main cost for health care in elderly population is for treatment of chronic diseases. More than 150,000 people are dependent in Thailand and this number is expected to increase to 240,000 by the year 2019. According to the Thai-MOPH, more than 70% of current dependents receive inadequate support from their family or communities[5].

The Ministry of Social Development and Human Security of Thailand reported in 2007 there were 7 million elderly people in Thailand, but only 43.0% of those had a good health[6].

In 2009, the MOPH of Thailand has established health promoting hospitals at the community level to increase the capacity of health care delivery. This was done in the rural area with almost 9,762 settings. In 2010, Thai government had allocated 14,973 million baht to develop the health promoting hospitals[7]. Advancing in medical science and in social welfare will ensure that many older people will enjoy longer periods of disability free. Diseases will be avoided or their impact lessened through better health care strategies. The resulting large number of older people will be a boon for society, constituting a great reservoir of experience and knowledge. Therefore, we needed to ensure that all of the public health activities in the community level particularly from the health promoting hospitals are supporting the needs of community particularly elderly people.

## Material and Method

### *Study design*

This study was a community based cross-sectional analytic study design. The study sites were 18 villages from three districts in the rural areas in the Chiang Rai Province, northern of Thailand. The target populations were the people who were greater than 60 years old who lived in the study areas for at least five years. The completed questionnaire and physical examination forms were used for health assessment. Five milliliters of blood specimen were obtained for laboratory analysis.

### *Study sites*

The study sites were 18 villages from three districts: Mae Chan, Mae Lao, and Mae Fah Luang Districts, Chiang Rai Province, Thailand. There were two villages from Mae Fah Luang District, nine villages from Mae Chan District, and seven villages from Mae Fah Luang District.

### *Study population*

The study populations were the people aged ≥ 60 years old who had lived in the study areas for at least five years.

### *Target population*

The target population was the people born during or before January 1949.

### *Eligible population*

The eligible population was people aged ≥ 60 years old and lived in the study areas between June 2010 and January 2011. People refusing to sign or fingerprint on the consent form after having been given an oral explanation as well as reading out a written statement were excluded from the study.

### *Study sample and sampling technique*

The sample size was calculated to arrive at a minimum of 290 cases. Increasing the sample size by 10% for any errors in the study, resulted in 29 cases, for a total 309 cases.

The simple random sampling technique was used to select the subjects into the study from the lists of elderly population from the health promoting hospitals, Pa Kau Dam Health Promoting Hospital, Pong Morn Health promoting Hospital, and Pa Tung Health Promoting Hospital. Voluntary, written informed consent (in Thai) was obtained from all study participants, after the researcher read it to the subjects.

### *Research instruments*

The physical examination form and completed questionnaire were used in the study. The physical examination form was developed by the physician for specific using to assess elderly health with 67 items such as deformity, mobility, skin, and eye, etc.

The questionnaire had been developed from the literature review and related to the research conceptual framework. The study questionnaire was divided into four parts, a socio-demographic and economic profile, health behavioral profile, access to health care, and living environmental situation.

The questionnaire was tested for validity and reliability in a similar group of subjects before the commencement of the study. The questions had also been tested for the validity by the Item Objective Congruence Index (IOC ) technique from three external experts. Five milliliters of blood were obtained by

vein puncture by technicians and transported in cold-chain conditions. Sera were separated and testing at Mae Chan Hospital.

***Data collection procedures***

Permission was obtained from the directors of hospital and the community leaders for access to the information and subjects. Research objectives had been explained to the hospital directors, community leaders, and head of elderly groups in the community. The study samples were randomized from the lists of elderly people in the community. The simple random sampling technique was performed. The recruitment process had been done based on the inclusion and exclusion criteria.

There were two interviewers and one physician in the process of data collection. All interviewers were trained for two days prior to the study. The physical examination was completed by the physician in a private room. The questionnaire was completed by the interviewers using face-to-face interview. In case of the subjects who could not speak Thai, the local translator was invited to help. Each interview lasted approximately 45 minutes.

Five milliliters of blood specimens was obtained by vein puncture by technicians and transported in cold-chain conditions after the night of nothing by mouth (NPO). Sera were separated and tested at Mae Chan Hospital. Blood specimen was tested for biomarkers such as Cholesterol, Fasting Blood Glucose (FBG), Triglyceride, Uric acid, Serum Glutamic Pyruvate Transferase (SGPT), and Complete Blood Count at Mae Chan Hospital, Chiang Rai Province. The laboratory staffs had been trained according to the standard protocol, and used the blinding technique.

***Data management and data analysis***

Data were double-entered and validated using Microsoft Excel. Data analyses were performed using SPSS (version 11.5; 2006 SPSS, Chicago, Illinois), Stata (version 8.2; Stata Corp, College Station, TX), and Epi-Info (version 6.04d; US Centers for Disease Control and Prevention, Atlanta, GA). The data had been kept secured with a specific password accessible only by the researcher.

***Descriptive statistics***

Frequency, percentage, means, and standard deviation were used to explain the general characteristics of the samples.

***Inferential statistics***

The Chi-square test was analyzed for identify the association between independent variable and dependent variable. Linear regression analysis was used for explain the relationships of variables. The unconditional logistics regression was analyzed as the univariate analysis at p-value $\leq 0.10$. The multiple logistic regression was confirmed the association between a group of independent variables and dependent variable by controlling the possible confounding factors in the last model at p-value $\leq 0.05$.

***Ethical consideration***

This study was approved by the Committee for the Protection of Human Subjects of Mae Fah Luang University, Thailand, No.REH-51001-01/2551.

**Results**

Three hundred twenty eight subjects were recruited into the study, and completed collection of all questionnaires and specimens. Table 1 shows that 52.1% of subjects were female, and the majority of age group 70 to 74 years old (25.3%) followed by 65 to 69 years old (23.5%), and 75 to 79 years old (20.4%). In this group, 99.1% were Buddhism and 0.9% Christian. For their income, 91.8% had income of less than 500 baht/month, followed by 5.8% who did not have an income. In this group, 80.8% had debt, and 7.0% living alone. Furthermore, 48.5% were illiterate, 49.1% had only primary school, and 47.6% were unemployed. Most subjects (97.6%) had rights for access to health care delivery, 60.7% had chronic diseases, and 68.0% had history of medical surgery. Most of the subjects received medical care from the health promoting hospital. To do so, 81.4% had to travel 5 km and 21.9% had to travel more than 11 km.

Table 2 shows the results of physical examination. Twenty-one point seven had > 150 mmHg of systolic blood pressure, and 17.7% had > 95 mmHg of diastolic blood pressure. Thirty-two point one percent had regular medication, 1.5% edema, 11.6% deformity, 85.4% abnormal of mobility, 30.5%cataract, and 11.6% loss hearing.

Table 3 shows risk behaviors among the subjects. Overall, 63.7% ever smoked and 12.8% of those were still smoker. In the group of "smoker", 57.1% had 41 to 50 years of length of smoking, followed by 31 to 40 years (26.2%), less than 30 years (11.1%), and the average years of smoking was 42.4 years (SD = 11.9). In the group of "ever", 71.9% had less than 30 years of length of smoking, followed

**Table 1.** General characteristic of subjects

| Characteristics | n | % |
|---|---|---|
| Total | 328 | 100.0 |
| Sex | | |
| Male | 157 | 47.9 |
| Female | 171 | 52.1 |
| Age (year) | | |
| 60-64 | 45 | 13.7 |
| 65-69 | 77 | 23.5 |
| 70-74 | 83 | 25.3 |
| 75-79 | 67 | 20.4 |
| ≥ 80 | 56 | 17.1 |
| Religion | | |
| Buddhism | 325 | 99.1 |
| Christian | 3 | 0.9 |
| Education | | |
| No schooling | 159 | 48.5 |
| Primary school | 161 | 49.1 |
| Secondary school | 8 | 2.4 |
| Occupation | | |
| Unemployed | 156 | 47.6 |
| Agriculture | 172 | 52.4 |
| Income (baht) | | |
| None | 19 | 5.8 |
| ≤ 500 | 301 | 91.8 |
| > 501 | 8 | 2.4 |
| Debt | | |
| No | 63 | 19.2 |
| Yes | 265 | 80.8 |
| Living with | | |
| Alone | 23 | 7.0 |
| Spouse | 70 | 21.3 |
| Son or relative | 235 | 71.7 |
| Having rights for access to health care delivery | | |
| Yes | 320 | 97.6 |
| No | 8 | 2.4 |
| Chronic disease | | |
| No | 129 | 39.3 |
| Yes | 199 | 60.7 |
| History of medical surgery | | |
| No | 105 | 32.0 |
| Yes | 223 | 68.0 |
| Receiving health care service | | |
| Health promoting hospital | 240 | 73.2 |
| General hospital | 88 | 26.8 |
| Distance to health promoting hospital (km) | | |
| ≤ 5 | 267 | 81.4 |
| 6-10 | 31 | 9.5 |
| ≥ 11 | 30 | 9.1 |
| Distance to general hospital (km) | | |
| ≤ 5 | 219 | 66.7 |
| 6-10 | 37 | 11.3 |
| ≥ 11 | 72 | 21.9 |

**Table 2.** Results of physical examination

| Physical examination | n | % |
|---|---|---|
| Total | 328 | 100.0 |
| Systolic blood pressure | | |
| Normal (≤ 149 mmHg) | 257 | 78.3 |
| Abnormal (> 150 mmHg) | 71 | 21.7 |
| Diastolic blood pressure | | |
| Normal (≤ 94 mmHg) | 270 | 82.3 |
| Abnormal (> 95 mmHg) | 58 | 17.7 |
| Regular medication | | |
| Yes | 105 | 32.1 |
| No | 223 | 67.9 |
| Edema | | |
| Yes | 5 | 1.5 |
| No | 323 | 98.5 |
| Deformity | | |
| Abnormal | 38 | 11.6 |
| Normal | 290 | 88.4 |
| Mobility | | |
| Normal | 48 | 14.6 |
| Abnormal | 280 | 85.4 |
| Lymph node | | |
| Normal | 318 | 96.9 |
| Abnormal | 10 | 3.1 |
| Eye | | |
| Normal | 228 | 69.5 |
| Abnormal | 100 | 30.5 |
| Ear | | |
| Normal | 290 | 88.4 |
| Abnormal | 38 | 11.6 |
| Throat | | |
| Normal | 205 | 62.5 |
| Abnormal | 123 | 37.5 |
| Neck | | |
| Normal | 321 | 97.7 |
| Abnormal | 7 | 2.3 |
| Abdomen | | |
| Normal | 283 | 86.3 |
| Abnormal | 45 | 13.7 |
| Sensory | | |
| Normal | 323 | 98.5 |
| Abnormal | 5 | 1.5 |

31 to 44 years (16.8%), and 41 to 50 years (9.6%), the average years of smoking was 24.2 years (SD = 15.3).

Forty-nine point one percent drank alcohol, and divided into “drinking” group 16.8%, and “ever”

**Table 3.** Health risk behaviors of the subjects

| Behaviors | n | % |
|---|---|---|
| Smoking (n = 328) | | |
| Smoking | 42 | 12.8 |
| Ever | 167 | 63.7 |
| No | 119 | 36.3 |
| Length of smoking (year) among who still smoke (n = 42) | | |
| ≤ 30 | 5 | 11.9 |
| 31-40 | 11 | 26.2 |
| 41-50 | 24 | 57.1 |
| ≥ 51 | 2 | 4.8 |
| Means = 42.4 years, SD = 11.9 | | |
| Length of smoking (year) among who ever smoked (n = 167) | | |
| ≤ 30 | 120 | 71.9 |
| 31-40 | 28 | 16.8 |
| 41-50 | 16 | 9.6 |
| ≥ 51 | 3 | 1.7 |
| Means = 24.2 years, SD = 15.3 | | |
| Alcohol consumption (n = 327) | | |
| Drinking | 55 | 16.8 |
| Ever | 106 | 32.3 |
| Never | 166 | 50.6 |
| Length of drinking (year) among who still drink (n = 55) | | |
| ≤ 30 | 20 | 36.4 |
| 31-40 | 12 | 21.8 |
| 41-50 | 21 | 38.2 |
| ≥ 51 | 2 | 3.6 |
| Mean 36.9 years, SD = 15.1 | | |
| Length of drinking (year) among who ever drank (n = 106) | | |
| ≤ 30 | 89 | 83.9 |
| 31-40 | 14 | 13.2 |
| ≥ 41 | 3 | 2.8 |
| Mean = 21.6 years, SD = 12.2 | | |
| Eating uncooked food | | |
| Yes | 140 | 42.7 |
| No | 188 | 57.3 |

32.3%. In the "drinking" group, 38.2% had drunk for 41 to 50 years, followed by less than 30 years (36.4%), and 31 to 40 years (21.8%). Whereas the "ever" group found that 83.9% had less than 30 years, followed by 31 to 40 years (13.2%). The average year of drinking was 21.6 year, and SD 12.2. There was 42.7% of eating uncooked food.

Table 4 shows the difference of length of smoking and drinking between sex and found that there were statistically significant differences between male and female in the length of smoking and drinking times. In the "smoking" group, it was found that female had longer than male (p-value < 0.01). On the other hand, in the "ever" group, it was found that male had longer than female (p-value < 0.01). In both the "drinking" and "ever" groups, it was found that male had a longer of drinking time than female.

Multiple logistic regression model was performed to control the possible confounder factors and for evaluating the risk factors on smoking and alcohol drinking behaviors among the elderly population. Table 5 shows that sex ($OR_{adj}$ = 3.81, 95% CI = 2.02-7.21) and education ($OR_{adj}$ = 2.55, 95% CI = 1.36-2.55) were associated with smoking behavior in elderly people. Being female were a greater risk to smoke than male 3.81 times, and "no schooling" group were greater risk of smoking than "yes" group with 2.55 times after controlling the possible confounder factors.

Meanwhile, factors related to alcohol drinking behaviors in elderly people were sex, education, and family debt. Being female were a greater risk to drinking alcohol than male 7.36 times ($OR_{adj}$ = 7.36, 95% CI = 3.86-14.09), the "no" group of education were greater risk of alcohol drinking than "yes" with 1.91 times ($OR_{adj}$ = 1.91, 95% CI = 1.01-3.64), and "yes" group of debt were a greater risk of alcohol drinking than "no" group with 2.55 times ($OR_{adj}$ = 2.55, 95% CI = 1.15-5.67).

Table 7 shows that only 75.3% had complete blood specimen collection. Of 44.5% were male, 12.2% had Cholesterol ≥ 251 mg/dl, 27.5% had Triglyceride ≥ 171 mg/dl, 10.5% had FBS ≥ 121 mg/dl, 15.8% had SGPT ≥ 31 IU/L, and 21.5% had Uric acid ≥ 7.1 mg/dl.

The Chi-square test of the difference of biomarkers levels and sex found that two factors had shown statistically different; SGPT (p-value = 0.001), and Uric acid (p-value = 0.003). Meanwhile only a Uric acid had shown the statistically significant when comparing between age categories (p-value = 0.049).

## Discussion

Most of the elderly people who are 60 years old as the definition of an elderly person[8] living in rural Thailand are facing both physical health problems and mental health problems. The elderly people in rural Thailand have little income and some live alone. A

**Table 4.** Mean difference of length in health risk behaviors

| Factors | n | % | Mean | SD | t-test | df | p-value |
|---|---|---|---|---|---|---|---|
| Smoking | | | | | | | |
| Male | 22 | 52.4 | 41.73 | 11.54 | | | |
| Female | 20 | 47.6 | 43.08 | 12.67 | 17.93 | 40 | <0.001* |
| Ever | | | | | | | |
| Male | 96 | 57.5 | 24.43 | 15.26 | | | |
| Female | 71 | 42.5 | 23.78 | 15.49 | 15.28 | 165 | <0.001* |
| Drinking | | | | | | | |
| Male | 41 | 75.6 | 38.52 | 14.79 | | | |
| Female | 14 | 24.4 | 32.22 | 1.64 | 14.16 | 53 | <0.001* |
| Ever | | | | | | | |
| Male | 68 | 64.2 | 22.52 | 12.81 | | | |
| Female | 38 | 35.8 | 20.00 | 11.04 | 13.75 | 104 | <0.001* |

* Significance at alpha = 0.05

**Table 5.** Adjusted odds ration of smoking behavior on multivariate analysis

| Factors | OR | 95% CI | p-value |
|---|---|---|---|
| Sex | | | |
| Male | 1.00 | | |
| Female | 3.81 | 2.02-7.21 | <0.001* |
| Education | | | |
| Yes | 1.00 | | |
| No | 2.55 | 1.36-4.75 | 0.030* |

* Significance at alpha = 0.05

**Table 6.** Adjusted odds ration of alcohol drinking behavior on multivariate analysis

| Factors | OR | 95% CI | p-value |
|---|---|---|---|
| Sex | | | |
| Male | 1.00 | | |
| Female | 7.36 | 3.86-14.09 | <0.001* |
| Education | | | |
| Yes | 1.00 | | |
| No | 1.91 | 1.01-3.64 | 0.050* |
| Debt | | | |
| No | 1.00 | | |
| Yes | 2.55 | 1.15-5.67 | 0.022* |

* Significance at alpha = 0.05

small proportion did not have rights of access to health care. The socioeconomics status of elderly people was related to their health status. This is in line with the study of Zimmer et al[9] and Savirasarid et al[10].

The proportion of elderly who are living alone is different according to the country (32.8% in Korea[11] and 24.8% in Spain[12]). This phenomenon is different in the Thai culture as most Thai people are living as an extended family. Meanwhile in this study, we found that 7.0% in Thailand are living alone. The elderly people in Thailand were also facing mental health problem especially among people living alone[13].

Thailand has established the health promoting model in the community, which developed from the public health centers[7]. It is focusing on strengthening the capacity of the organization and their staff to give the health promoting programs and standard treatment to patients in the community. Since the study found that 60.7% had chronic disease, health promoting hospitals should be focusing on chronic disease management in the elderly people with simple methods. This is because nearly haft of elderly people needed to check up their health monthly, and its can decrease the medical cost in both direct and indirect costs. The referral system is needed to support the medical care system especially in a community of increasing elderly population where most live far from the hospital. This finding is similar with the results by Li et al[14] in China. Furthermore, Nemt et al[15] found that the distances of living place and health care utilization among the rural elderly people were associated with their health status.

**Table 7.** Univariate analysis of biomarkers levels by sex

| Biomarkers | Sex | | Total (%) | p-value |
|---|---|---|---|---|
| | Male (%) | Female (%) | | |
| Total | 110 (44.5) | 137 (55.5) | 247 (100.0) | |
| Cholesterol (mg/dl) | | | | |
| ≤ 149 | 12 (10.9) | 6 (4.4) | 18 (7.3) | 0.078 |
| 150-250 | 88 (80.0) | 111 (81.0) | 199 (80.6) | |
| ≥ 251 | 10 (9.1) | 20 (14.6) | 30 (12.2) | |
| Triglyceride (mg/dl) | | | | |
| ≤ 170 | 78 (70.9) | 101 (73.7) | 179 (72.5) | 0.560 |
| ≥ 171 | 32 (29.1) | 36 (26.3) | 68 (27.5) | |
| FBS (mg/dl) | | | | |
| ≤ 80 | 11 (10.0) | 26 (19.0) | 37 (15.0) | 0.144 |
| 81-120 | 87 (79.1) | 97 (70.8) | 184 (74.5) | |
| ≥ 121 | 12 (10.9) | 14 (10.2) | 26 (10.5) | |
| SGPT (IU/L) | | | | |
| ≤ 30 | 84 (76.4) | 124 (91.2) | 208 (84.2) | 0.001* |
| ≥ 31 | 26 (23.6) | 12 (8.8) | 38 (15.8) | |
| Uric acid (mg/dl) | | | | |
| ≤ 7.0 | 77 (70.0) | 117 (85.4) | 194 (78.5) | 0.003* |
| ≥ 7.1 | 33 (30.0) | 20 (14.6) | 53 (21.5) | |

* Significance at alpha = 0.050

**Table 8.** Univariate analysis of biomarkers levels by age group

| Items | Age (years) | | | | | p-value |
|---|---|---|---|---|---|---|
| | 60-64 | 65-69 | 70-74 | 75-79 | ≥ 80 | |
| Total | 49 | 66 | 64 | 45 | 23 | |
| Cholesterol (mg/dl) | | | | | | |
| ≤ 149 | 3 (6.1) | 5 (7.6) | 4 (6.3) | 2 (4.4) | 4 (17.4) | 0.379 |
| 150-250 | 37 (75.5) | 51 (77.3) | 54 (84.4) | 40 (88.9) | 17 (73.9) | |
| ≥ 251 | 9 (18.4) | 10 (15.2) | 6 (9.4) | 3 (6.7) | 2 (8.7) | |
| Triglyceride (mg/dl) | | | | | | |
| ≤ 170 | 34 (69.4) | 46 (69.7) | 49 (76.6) | 34 (75.6) | 16 (69.6) | 0.855 |
| ≥ 171 | 15 (30.6) | 20 (30.3) | 15 (23.4) | 11 (24.4) | 7 (30.4) | |
| FBS (mg/dl) | | | | | | |
| ≤ 80 | 8 (16.3) | 11 (16.7) | 10 (15.1) | 7 (15.6) | 1 (4.3) | 0.262 |
| 81-120 | 35 (71.4) | 46 (69.7) | 53 (82.8) | 31 (68.9) | 19 (82.6) | |
| ≥ 121 | 6 (12.2) | 9 (13.6) | 1 (1.6) | 7 (15.6) | 3 (13.0) | |
| SGPT (IU/L) | | | | | | |
| ≤ 41 | 39 (79.6) | 56 (84.8) | 53 (82.8) | 38 (86.4) | 22 (95.7) | 0.500 |
| ≥ 42 | 10 (20.4) | 10 (15.2) | 11 (17.2) | 6 (13.6) | 1 (4.3) | |
| Uric acid (mg/dl) | | | | | | |
| ≤ 7.0 | 41 (83.7) | 53 (80.3) | 54 (84.4) | 33 (73.3) | 13 (56.5) | 0.049* |
| ≥ 7.1 | 8 (16.3) | 13 (19.7) | 10 (15.6) | 12 (26.7) | 10 (43.5) | |

* Significance at alpha = 0.050

The result of this study found that the proportion of elderly who were smoking was higher than the report of Thai Ministry of Public Health[7]. Chokevivat et al[16] reported on both of alcohol drinking and smoking. It was found that they were the important risk factors for several chronic diseases. The average of age to start smoking was 18.2 years old in male and 20.2 years old in female. In 2011, MOPH[7] reported that 13% of DALY (Disable Adjusted Life Year) among Thai people came from alcohol drinking (7.6 x 100,000 year) and 9% from smoking (5 x 100,000 year). Lee et al[11] found that there was statistically significant difference in the mean score of health promotion behaviors with regard to gender. Lee and his colleagues found that the smoking rate in male was higher than female, which is different from this study. However, the rate of alcohol drinking is not difference between Thai's older people and Korea's older people.

The number of subjects who had the history of medication was different from the study of Belvis et al[17]. He found that 69.9% of the subjects in his study in Italy had been diagnosed with one or more chronic diseases, whereas only 39.3% in this study reported that had chronic diseases. This finding concurs in the previous study[9]. Belvis et al[17] found that increasing of the physical examination scores were related to the education level. This is coinciding with the study that found the higher education were related to lower smoking and drinking behaviors among Thai elderly people. Therefore, the health promoting models for reducing of smoking and drinking in Thai population should be included in the master national health plan.

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**Potential conflicts of interest**

None.

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## *ภาวะสุขภาพและตัวบ่งชี้ชีวภาพในผู้สูงอายุที่อาศัยอยู่ในพื้นที่ชนบทในประเทศไทย*

***ธวัชชัย อภิเดชกุล***

***วัตถุประสงค์:*** *การศึกษาแบบภาคตัดขวางเพื่อศึกษาภาวะสุขภาพของผู้สูงอายุที่มีอายุตั้งแต่ 60 ปีขึ้นไป ที่อาศัยอยู่ในชนบทภาคเหนือของประเทศไทย*

***วัสดุและวิธีการศึกษา:*** *เครื่องมือที่ใช้ในการศึกษาประกอบด้วยแบบสอบถาม แบบตรวจร่างกายและเก็บตัวอย่างเลือดจำนวน 5 มิลลิลิตร การเก็บข้อมูลเก็บโดยวิธีสัมภาษณ์และตรวจร่างกายโดยแพทย์ การวิเคราะห์ข้อมูลโดยใช้ไคท์สแคว์ และพหุสมการถดถอยที่ค่าความคลาดเคลื่อนเท่ากับ 0.05*

***ผลการศึกษา:*** *มีจำนวนกลุ่มตัวอย่างทั้งสิ้น 328 คน ร้อยละ 60.7 มีโรคเรื้อรัง ร้อยละ 73.2 ได้รับการดูสุขภาพจากโรงพยาบาลส่งเสริมสุขภาพระดับตำบล ร้อยละ 32.1 รับประทานยาทุกวันร้อยละ 85.4 พบความผิดปกติของการเคลื่อนไหว ร้อยละ 30.5 พบต้อกระจก และร้อยละ 11.6 พบการได้ยินลดลง ผู้หญิงสูบบุหรี่นานกว่าผู้ชาย ($p$-value $< 0.05$) แต่ผู้ชายดื่มสุรานานกว่าผู้หญิง ($p$-value $< 0.05$) ร้อยละ 12.2 มีระดับ Cholesterol $\geq 125$ mg/dl ร้อยละ 27.5 มีระดับ Triglyceride $\geq 171$ mg/dl ร้อยละ 10.5 มีระดับ FBS $\geq 121$ mg/dl ร้อยละ 15.4 มี SGPT $\geq 31$ IU/L และร้อยละ 21.5 มีระดับ Uric Acid $\geq 7.1$ mg/dl*

***สรุป:*** *การพัฒนาโครงการส่งเสริมสุขภาพที่มีประสิทธิภาพยังมีความจำเป็นอยู่เพื่อพัฒนาระดับสุขภาพของผู้สูงอายุในชนบทไทย*