ORIGINAL ARTICLE

# Health determinant factors associated with smoking behaviour of older adults in Thailand

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**Received:** 5 May 2022 **Revised:** 7 August 2022 **Accepted:** 8 August 2022 **Available online:** January 2023
**DOI:** 10.55131/jphd/2023/210103

## ABSTRACT

The health burden caused by smoking behaviour among older adults is an uncontrollable problem worldwide. In particular, the trend of smoking among the aging population is rapidly growing. It affects individuals, families, economies, and societies. Changes in health determinants influence the smoking behaviour of older adults who require health promotion so that they can take care of themselves. This cross-sectional study was performed using secondary data from the National Statistical Office of Thailand: Report of a survey of older adults in Thailand in 2017. The present study aimed to examine the health determinant factors associated with smoking behaviour of older adults in Thailand. Data were collected from 32,030 older adults using a structured questionnaire. Multi-level analysis was performed to identify the health determinants of smoking behaviour of older adults in Thailand by controlling the effect of other covariates. The results were presented as adjusted odds ratio (AOR) and 95 % confidence intervals (CI). Among the 32,030 older adults, 15.11% of the respondents were smokers. Factors associated with smoking behaviour of older adults in Thailand were male sex (AOR: 6.36, 95% CI: 5.80–6.94, *P*-value < 0.001), younger age (AOR: 4.35, 95% CI: 3.59–5.25, *P*-value < 0.001), currently working status (AOR: 1.40, 95% CI: 1.23–1.59, *P*-value < 0.001), very good physical health (AOR: 2.64, 95% CI:2.05-3.40, -value < 0.001), alcohol consumption (AOR: 7.06, 95% CI: 6.44–7.43, *P*-value < 0.001), and participation in group/club activities in the community (AOR: 1.17, 95% CI: 1.08–1.28, *P*-value < 0.001). There were significant differences in the risk of smoking among the older adults according to their health conditions and socialisation levels. This outcome reinforces the need to be alert for and respond to sex-related differences in the risk pattern and protective factors for smoking in older adults. Thus, it is critical to establish and implement an active and effective tobacco control program to protect the health of older adults, particularly considering Thailand's measures towards chronic disease prevention and increased life expectancy.

**Key words:**
smoking behaviour; socioeconomic status; health determinants; older adults

**Citation:**
Supachai Yanarueng, Wongsa Laohasiriwong, Surachai Phimha, Nuttapol Yotha, Saranya Phanyotha, Chanaporn Pinsuwan, Nopparat Senahad, Nathakon Nilnate, Amphawan Nonthamat, Nakarin Prasit. Health Determinant Factors Associated with Smoking Behaviour of Older Adults in Thailand. J Public Hlth Dev. 2023;21(1):32-44 (https://doi.org/10.55131/jphd/2023/210103)

# INTRODUCTION

Advancements in healthcare systems have increased the lifespan of the Thai population, especially older adults, with a fully aged society expected in the near future[1]. As a result, the older adult population in the country is expected to increase[2]. A proactive approach has been adopted by the Thai government in light of the changing demographics, with the formulation of an older adults policy aimed at promoting dignified and successful aging among the older adult population in Thailand and ensuring that they can live a normal life in their old age[3]. The policy's objectives were consistent with Rowe and Kahn's concept of "successful aging"[4] and the World Health Organisation's[5] definitions of normal aging as having a low risk of disabilities, diseases, and disabilities caused by diseases, as well as having increased physical and mental functions. However, older adults have poor health-promoting behaviours in terms of annual physical checkups. In particular, the proportion of early older adults who smoke regularly is higher than that of middle and late older adults, which, when compared to other groups, tends to be higher. In addition, the impact of smoking on older adults is more severe than that on other age groups in terms of the cost of treatment and rehabilitation[6].

Smoking-related illness and death have been highlighted as factors undermining the idea of "successful aging." Numerous studies have shown that older smokers have a 10-year reduced life expectancy and worse health than non-smokers[7]. Additionally, men and women who quit smoking at the age of 65 years gained 1.4–2.0 and 2.7–3.4 years of life, respectively, while those who quit smoking at the age of 70 years had almost 20% more survival[8]. To achieve the objective of effective aging among older adults in Thailand, it is necessary to identify the elements that contribute to smoking to develop targeted interventional policies.

In Thailand, research on smoking began in the previous 3 decades, although it mostly focused on teenagers and adults, with little attention paid to older adults. To the best of our knowledge, only a few studies on smoking in older adults have been published in the last decade. Those studies examined the smoking prevalence and knowledge and attitudes regarding smoking among older adults; however, they did not adequately address the causes linked with smoking. Given that the smoking habits of older adults are distinct from those of the general population in terms of smoking duration, health status, reluctance to quit smoking, knowledge of the possible damage, and overestimation of the benefits[9,10], it is imperative to address the current information gaps regarding the smoking behaviour of older adults in Thailand, as well as the inadequate understanding in this regard in other parts of the world. It is critical to determine the current smoking prevalence and risk factors among a representative sample of older adults in Thailand to prepare evidence-based recommendations to policymakers regarding the planning, improvement, and implementation of policies aimed at preventing smoking among the older adult populations to promote better well-being and successful aging. Reduced smoking-related morbidity among older adults will undoubtedly alleviate the government's fiscal burden in the healthcare sector and help achieve our national goal of being a developed country by 2022.

# MATERIALS/ METHODS

***Study design and population***

This cross-sectional study used two datasets for analysis: 1) a dataset from the report on the 2017 survey of older adults in

Thailand including 83,880 individuals who participated in the survey by the National Statistical Office[11]. The survey used multistage random sampling to select participants from 77 provinces which represented the total population of Thailand. The inclusion criteria were as follows: 1) participants who answered the exam completely in the 2017 survey of the older adult population in Thailand, and the exclusion criteria include 1) older adults who could communicate, read, and write by themselves; and 2) the questionnaire that contained incomplete information on smoking among the elderly. The inclusion and exclusion criteria of this study is illustrated in Figure 1.

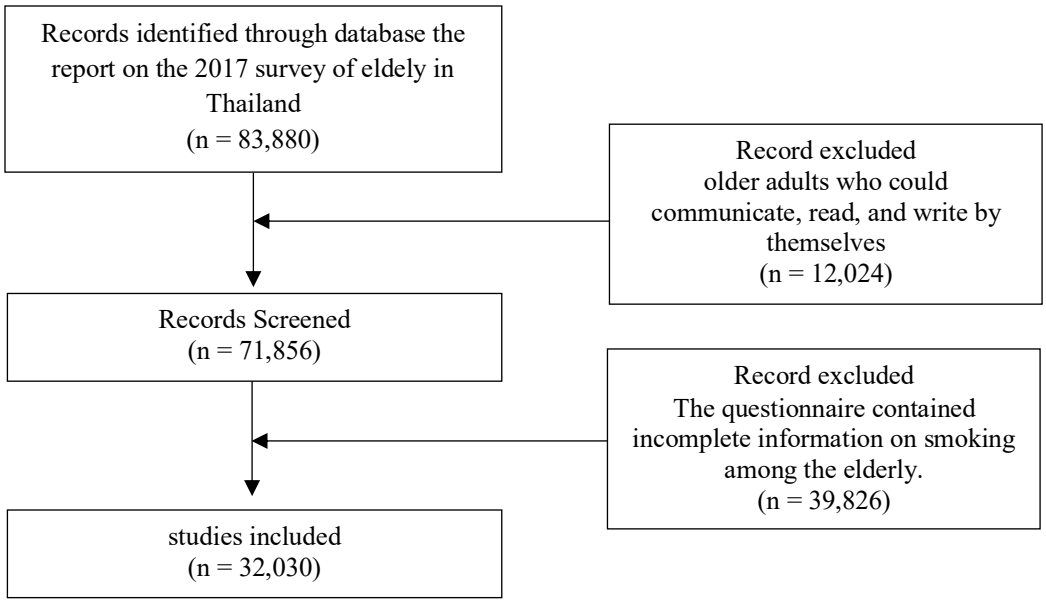


**Figure 1** The inclusion and exclusion criteria of smoking behaviour of older adults in Thailand

***Dependent and independent factors***

The dependent variable in this study was the smoking behaviour of older adults (smoker/non-smoker). The independent variables were sex, age, reading and writing ability, marital status, work requirements, income adequacy, hearing ability, physical health, regular exercise behaviour, alcohol consumption behaviour, happiness level, receiving health-related information, and participation in group/club activities in the community. The conceptual framework of this study is illustrated in Figure 2.

***Statistical analysis***

All analyses were performed using Stata version 10.0 (Stata Corp, College Station, TX, USA). Descriptive statistics such as frequency and percentage were used; however, for continuous data, mean, standard deviation, median, and maximum-minimum were used. Simple logistic regression was performed to identify individual associations between each independent variable and weight loss product use. Independent factors with a *P*-value < 0.25 were processed for multivariable analysis[12] using multi-level analysis to identify the association between factors and smoking behaviour of older adults when controlling for the effects of other covariates. The country was divided into 77 provinces, and regions were selected as random effects. The magnitude of association was presented as adjusted odds ratios (AORs) and 95% confidence

intervals (CIs). The significance level was set at $P < 0.05$ [13,14].

***Ethical approval***

Ethical approval for the study was obtained from the ethics committee in Human Research of Khon Kaen University, Khon Kaen, Thailand (HE642216).

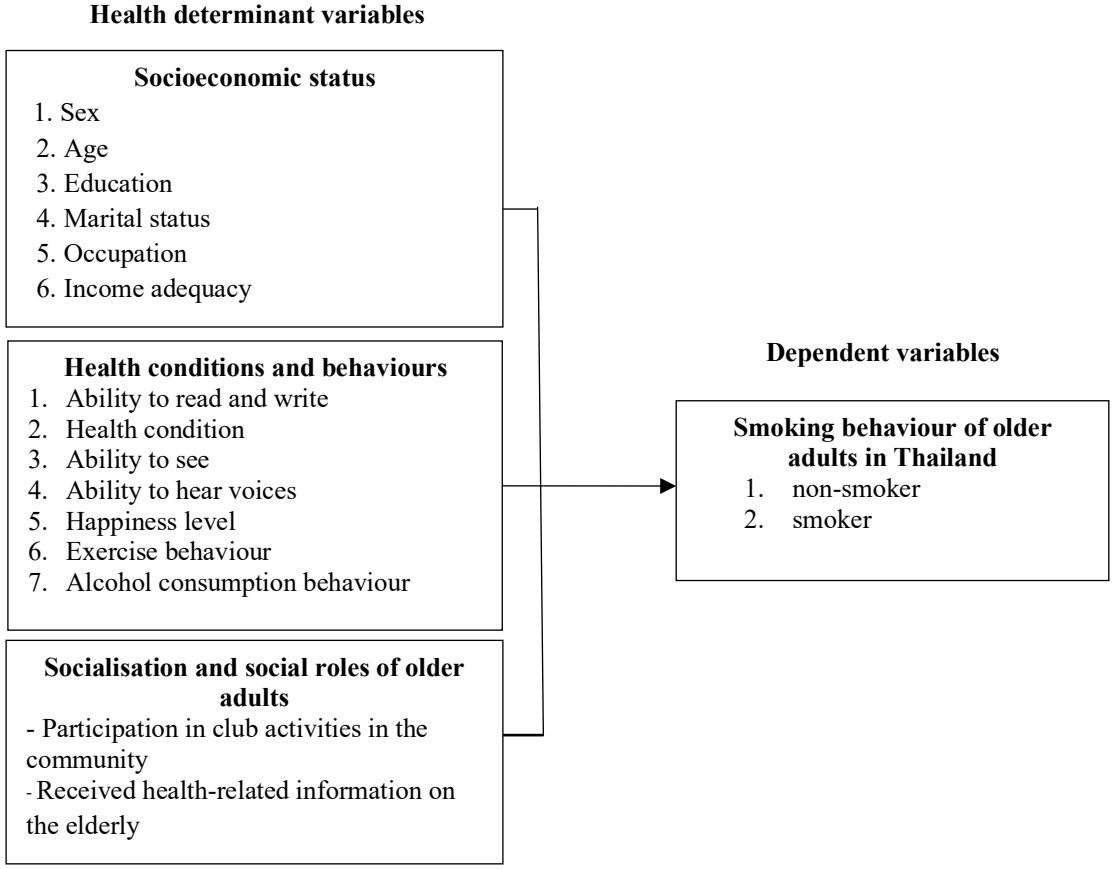


**Figure 2** Conceptual framework of the proposed correlation between density-related health determinant factors and smoking behaviour of older adults in Thailand

## RESULTS

***Demographic and socioeconomic distribution among older adults in Thailand***

Among 32,030 older adults, the majority of the respondents were female (57.39%), 55.07% aged between 60–69 years, 62.77% were married, 70.66% had pre-elementary school education, 63.63% were unwilling to work, 51.59% had adequate income, 85.22% could read and write, 53.76% could see clearly, 87.18% could hear clearly, 55.25% were very happy, 43.63% had moderate physical health, 55.25% exercised sometimes, 84.89% were not alcohol consumers, 88.36% received health information, and 60.59% participated in groups/clubs activities in the community (Table 1).

**Table 1.** Demographic and health determinant factors among older adults in Thailand (n = 32,030)

| Demographic and health determinant factors | Number | % |
|---|---|---|
| Socioeconomic status | | |
| 1. Sex | | |
| Male | 18,382 | 57.39 |
| Female | 13,648 | 42.61 |
| 2. Age group of older adults | | |
| Oldest-Old | 17,640 | 55.07 |
| Middle-Old | 10,644 | 33.23 |
| Youngest-Old | 3,746 | 11.70 |
| 3. Marital status | | |
| Single | 1,500 | 4.68 |
| Married | 20,106 | 62.77 |
| Widowed/divorced/separated | 10,424 | 32.55 |
| 4. Reading and writing ability | | |
| Can | 27,297 | 85.22 |
| Cannot | 4,733 | 14.78 |
| 5. Occupation | | |
| Not working | 20,380 | 63.63 |
| Currently working | 11,650 | 36.37 |
| 6. Income adequacy | | |
| Left for savings | 1,937 | 6.05 |
| Adequate | 16,525 | 51.59 |
| Sometimes adequate | 8,044 | 25.11 |
| Inadequate | 5,524 | 17.25 |
| Health conditions and behaviours | | |
| 7. Seeing ability | | |
| Could not see/blurred vision | 4,415 | 13.78 |
| Wearing eyeglasses | 10,395 | 32.45 |
| Clear vision | 17,220 | 53.76 |
| 8. Hearing ability | | |
| Could not hear/unclear hearing/ | 3,394 | 10.60 |
| Using hearing aid | 712 | 2.22 |
| Clear hearing | 27,924 | 87.18 |
| 9. Happiness level | | |
| Unhappy | 90 | 0.28 |
| Low happiness | 823 | 2057 |
| Moderate happiness | 9,820 | 30.66 |
| Happy | 17,697 | 55.2 |
| Happiest | 3,600 | 11.24 |
| 10. Physical health | | |
| Very bad | 280 | 0.87 |
| Not good | 3,869 | 12.08 |
| Moderate | 13,974 | 43.63 |
| Good | 13,114 | 40.94 |
| Very good | 793 | 2.48 |

| Demographic and health determinant factors | Number | % |
|---|---|---|
| 11. Exercise behaviour | | |
| Never | 7,648 | 23.88 |
| Sometimes | 15,162 | 47.34 |
| Regularly | 9,220 | 28.79 |
| 12. Alcohol consumption behaviour | | |
| Never | 27,189 | 84.89 |
| Sometimes | 4,131 | 12.90 |
| Regularly | 710 | 2.22 |
| Socialisation and social roles of older adults | | |
| 13. Participated in groups/clubs activities in the community | | |
| No | 12,624 | 39.41 |
| Yes | 19,406 | 60.59 |
| 14. Received health information | | |
| No | 3,728 | 11.64 |
| Yes | 28,302 | 88.36 |

***Prevalence of smoking behaviour of older adults in Thailand***

The data analysis of the 32,030 older adults in Thailand revealed that 15.11% of older adults were smokers.

**Table 2.** Prevalence of smoking behaviour among older adults in Thailand **(**n = 33,343**)**

| Smoking behaviour of older adults | Number | % |
|---|---|---|
| Non-smoker | 27,189 | 84.89 |
| Smoker | 4,841 | 15.11 |

***Bivariate analysis: Health determinant factors associated with smoking behaviour of older adults in Thailand using multi-level analysis***

Our study observed that factors associated with smoking behaviour among the participants using bivariate analysis were male sex (crude OR [COR]: 9.59; 95% CI: 8.84–10.39, *P*-value < 0.001), younger age (COR: 6.48, 95% CI: 5.47–7.67, *P*-value < 0.001), married status (COR 2.62, 95% CI: 2.43–2.82, *P*-value < 0.001), currently working status (COR: 3.65, 95% CI: 3.42–3.89, *P*-value < 0.001), reading and writing ability (COR: 1.84, 95% CI: 1.66–2.04, *P*-value < 0.001), occassional adequate income (COR 1.18, 95% CI: 1.08–1.30, *P*-value < 0.001), very good health (COR: 7.94, 95% CI: 4.2–13.36, *P*-value < 0.001), clear vision (COR: 2.16, 95% CI: 1.91–2.42, *P*-value < 0.001), clear hearing (COR: 2.23, 95% CI: 1.96–2.54, *P*-value < 0.001), happy and happiest status (COR: 2.70, 95% CI: 2.08–3.51, *P*-value < 0.001), regular exercise behaviour (COR: 2.28, 95% CI: 2.08–2.49, *P*-value < 0.001), receiving health information (COR: 1.10, 95% CI: 1.00–1.21, *P*-value < 0.001), and participation in group/club activities in the community (COR: 1.60, 95% CI: 1.50–1.71, *P*-value < 0.001) (Table 3).

**Table 3.** Bivariate analysis: Health determinant factors associated with smoking behaviour of older adults in Thailand using multi-level analysis (n = 32,030)

| Health determinant factors | Number | Smoking behaviour among older adults (%) | Crude OR | 95% CI | *P*-value |
|---|---|---|---|---|---|
| Socioeconomic status | | | | | |
| 1. Sex | | | | | < 0.001 |
| Female | 18,382 | 4.23 | 1 | 1 | |
| Male | 13,648 | 29.77 | 9.59 | 8.84–10.39 | |
| 2. Age group | | | | | < 0.001 |
| Oldest-Old | 3,746 | 3.92 | 1 | 1 | |
| Middle-Old | 10,644 | 9.40 | 2.54 | 2.12–3.03 | |
| Youngest-Old | 17,640 | 20.94 | 6.48 | 5.47–7.67 | |
| 3. Marital status | | | | | < 0.001 |
| Single/Widowed/Divorced/ Separated | 11,924 | 8.29 | 1 | 1 | |
| Married | 20,106 | 19.16 | 2.62 | 2.43–2.82 | |
| 4. Occupation status | | | | | < 0.001 |
| Not working | 20,380 | 8.82 | 1 | 1 | |
| Currently working | 11,650 | 26.13 | 3.65 | 3.42–3.89 | |
| 5. Reading and writing ability | | | | | < 0.001 |
| Cannot | 4,733 | 9.40 | 1 | 1 | |
| Can | 27,297 | 16.10 | 1.84 | 1.66–2.04 | |
| 6. Income adequacy | | | | | < 0.001 |
| Inadequate | 5,524 | 15.13 | 1 | 1 | |
| Sometimes adequate | 8,044 | 17.50 | 1.18 | 1.08–1.30 | |
| Adequate | 16,525 | 13.85 | 0.90 | 0.82–0.98 | |
| Left for savings | 1,937 | 15.95 | 1.06 | 0.92–1.22 | |
| Health conditions and behaviours | | | | | |
| 7. Physical health | | | | | < 0.001 |
| Very bad | 280 | 4.64 | 1 | 1 | |
| Not good | 3,869 | 6.38 | 1.40 | 0.79–2.48 | |
| Moderate | 13,974 | 12.92 | 3.04 | 1.74–5.32 | |
| Good | 13,114 | 19.5 | 4.99 | 2.85–8.72 | |
| Very good | 793 | 26.73 | 7.49 | 4.20–13.36 | |
| 8. Seeing ability | | | | | < 0.001 |
| Could not see/blurred vision | 4,415 | 8.65 | 1 | 1 | |
| Wearing eyeglasses | 10,395 | 14.67 | 1.81 | 1.16–2.04 | |
| Clear vision | 17,220 | 17.04 | 2.16 | 1.91–2.42 | |
| 9. Hearing ability | | | | | < 0.001 |
| Could not hear/ unclear hearing/ | 3,394 | 7.87 | 1 | 1 | |
| Using hearing aid | 712 | 14.04 | 1.19 | 1.49–2.44 | |
| Clear hearing | 27,924 | 16.02 | 2.23 | 1.96–2.54 | |

| Health determinant factors | Number | Smoking behaviour among older adults (%) | Crude OR | 95% CI | *P*-value |
|---|---|---|---|---|---|
| 10. Happiness level | | | | | < 0.001 |
| Unhappy and low happiness | 913 | 6.79 | 1 | 1 | |
| Moderate happiness | 9,820 | 12.93 | 2.03 | 1.56–2.65 | |
| Happy and happiest | 21,297 | 16.48 | 2.70 | 2.08–3.51 | |
| 11. Exercise behaviour | | | | | < 0.001 |
| Never | 7,648 | 10.19 | 1 | 1 | |
| Sometimes | 15,162 | 14.29 | 1.46 | 1.34–1.60 | |
| Regularly | 9,220 | 20.56 | 2.28 | 2.08–2.49 | |
| 12. Alcohol consumption | | | | | < 0.001 |
| Never | 28,467 | 9.65 | 1 | 1 | |
| Sometimes | 1,276 | 59.48 | 13.74 | 12.20–15.48 | |
| Regularly | 2,287 | 58.33 | 13.10 | 11.9–14.36 | |
| 13. Receiving health information | | | | | 0.020 |
| No | 3,724 | 14.03 | 1 | 1 | |
| Yes | 28,240 | 15.26 | 1.10 | 1.00–1.21 | |
| 14. Participation in group/club activities in the community | | | | | < 0.001 |
| No | 12,624 | 11.61 | 1 | 1 | |
| Yes | 19,406 | 17.39 | 1.60 | 1.50–1.71 | |

***Health determinant factors associated with smoking behaviour of older adults in Thailand using multi-level analysis***

Our study observed that factors associated with smoking behaviour among the participants were male sex (AOR: 6.36, 95% CI: 5.80–6.94, *P*-value < 0.001), younger age (AOR: 4.35, 95% CI: 3.59–5.25, *P*-value < 0.001), currently working status (AOR: 1.40, 95% CI: 1.23–1.59, *P*-value < 0.001), very good health (AOR: 2.64, 95% CI: 2.05–3.40, *P*-value < 0.001), alcohol consumption behaviours (AOR: 7.06, 95% CI: 6.44–7.43, *P*-value < 0.001), and participation in group/club activities in the community (AOR: 1.17, 95% CI: 1.08–1.28, *P*-value < 0.001) (Table 4).

**Table 4.** Health determinant factors associated with smoking behaviour of older adults in Thailand using multi-level analysis (n = 32,030)

| Health determinant factors | Number | Smoking behaviour among older adults (%) | Crude OR | Multi-level AOR | 95% CI | *P*-value |
|---|---|---|---|---|---|---|
| 1. Sex | | | | | | < 0.001 |
| Female | 18,382 | 4.23 | 1 | 1 | 1 | |
| Male | 13,648 | 29.77 | 9.59 | 6.36 | 5.80–6.94 | |

| Health determinant factors | Number | Smoking behaviour among older adults (%) | Crude OR | Multi-level AOR | 95% CI | *P*-value |
|---|---|---|---|---|---|---|
| 2. Age group | | | | | | < 0.001 |
| Oldest-Old | 3,746 | 3.92 | 1 | 1 | 1 | |
| Middle-Old | 10,644 | 9.40 | 2.54 | 1.84 | 1.51–2.23 | |
| Youngest-Old | 17,640 | 20.94 | 6.48 | 4.35 | 3.59–5.25 | |
| 3. Occupational status | | | | | | < 0.001 |
| Not working | 20,380 | 8.82 | 1 | 1 | 1 | |
| Currently working | 11,650 | 26.13 | 3.65 | 1.40 | 1.23–1.59 | |
| 4. Physical health | | | | | | < 0.001 |
| Very bad and not good | 4,149 | 6.27 | 1 | 1 | 1 | |
| Moderate | 13,974 | 12.92 | 2.21 | 1.85 | 1.58–2.17 | |
| Good | 13,114 | 19.55 | 3.63 | 2.19 | 1.86–2.58 | |
| Very good | 793 | 26.73 | 5.45 | 2.64 | 2.05–3.40 | |
| 5. Alcohol consumption | | | | | | < 0.001 |
| Never | 28,467 | 9.65 | 1 | 1 | 1 | |
| Regularly | 3,563 | 58.74 | 13.32 | 7.06 | 6.44–7.43 | |
| 6. Participation in group/club activities in the community | | | | | | < 0.001 |
| No | 12,624 | 11.61 | 1 | 1 | 1 | |
| Yes | 19,406 | 17.39 | 1.60 | 1.17 | 1.08–1.28 | |

## DISCUSSION

This is the first study to demonstrate the smoking prevalence and the associated variables among a nationally representative sample of older adults in Thailand. Recent data indicated that the prevalence of current smokers was 15.11%, with current smokers being substantially more prevalent among older adults than that in the past. In addition, a 5.51% increase in smokers was noted between the findings of the current research and those published by the National Statistical Office in 2014[15]. The decline in smoking prevalence might be attributed to several government measures, including the development of health campaigns to educate older adults about the dangers of smoking and the introduction of legal provisions prohibiting smoking in some public spaces[16-18].

The smoking prevalence was also lower than the 28.1% reported in Lebanon[19] and Europe[20]. According to the present study's findings on smoking prevalence by sex, the proportions of smokers by sex were comparable to those observed by Kim et al. in 2013[21] among older adults in Korea (23.3% men and 3.9% women). There are only a few reasons that contribute to the smoking prevalence being greater in men than in women. First, smoking has long been considered a social norm among Thai men, and men were shown to be more driven to smoke than women[22,23]. Second, according to a prior national survey, males begin smoking at a younger age and use more tobacco products, which might lead to nicotine addiction[24,25]. Third, when comparing old male and female smokers, a high nicotine level addiction may enhance the incidence of smoking in men. Further research should be conducted to clarify these important elements.

On the other hand, the current results were supported by earlier research,

which stated that old age was always associated with more impairments, a greater feeling of vulnerability, and a higher risk of experiencing unfavourable health events as a result of smoking.[26] Therefore, older adults were more receptive to public health messages and medical advice. Accordingly, older adults are more likely to not smoke as they are aware of the adverse effects. However, there remains a lack of awareness regarding healthcare to avoid disease and illness. During the early stages of older adulthood, there is a high chance of smoking behaviour[27-28]. Smoking behaviour is one of the main factors that cause chronic non-communicable disease after alcohol consumption[29] because the nicotine in cigarettes has both direct and indirect effects on the autonomic nervous system. In addition, it stimulates the secretion of many substances that affect the control of blood sugar levels, including increased heart rate and blood pressure, resulting in many chronic diseases such as diabetes, hypertension, heart disease, stroke, and cancer[30]. Furthermore, tobacco consumption impairs physical performance and increases vulnerability to various diseases[31]. Secondhand smoke also increases the risk of lung cancer in those who are regularly exposed to it. Those who do not receive it are twice as likely to have three times the risk of heart disease and can die up to 4 years earlier than usual, particularly affecting the Thai population, which is entering an aging society in the near future.

Another factor affecting smoking in older adults is their socialisation level and social role. This is because aging societies are particularly vulnerable to being persuaded to smoke. Social interactions involving smoking behaviours may contribute to the spread of tobacco and cigarette usage. This decreases the likelihood of quitting smoking and avoiding nicotine exposure and increases older adults' desire for social smoking[32-34]. In addition, socialisation increases the likelihood of obtaining alcohol in a working and aging society. A review of the literature unequivocally demonstrated that drinking alcoholic beverages is associated with smoking, and was indicated by the simultaneous sale of alcoholic beverages and cigarettes in the same establishment. This demonstrates that the socialisation of older adults with access to alcohol or tobacco will motivate them to consume more. Older adults who continue to consume alcohol are more unlikely to quit smoking than those who do not. There is a potential conflict in Thailand's aging society as a result of the relationship of smoking with some form of community culture[35-37].

According to these findings, socialisation levels and social roles of older adults, as well as health determinants, may be important factors in increasing the likelihood of becoming a smoker. Smoking is already associated with an increased likelihood of consuming alcoholic beverages. In addition, it is extremely difficult for older adults to give up smoking for health reasons. Therefore, more attention should be paid to the health of older adults, particularly through physical activity and mental training. In addition to raising the awareness of older adults about their health, this will help prepare older adults as potential health leaders who will serve as role models for future generations.

## CONCLUSION

The high smoking prevalence among older adults in Thailand, combined with rising medical costs and an aging population, could have a serious impact on the economy and exacerbate the country's health care burden. Although Thailand has signed and ratified the framework convention on tobacco control and has

tobacco control programs and policies in place, smoking prevalence remains high. Thus, it is critical to develop and implement an aggressive and robust tobacco control strategy that targets older age groups to promote healthy aging, particularly in light of Thailand's epidemiological transition toward more chronic diseases and an increase in life expectancy. Older adults are at an age where they need to take care of their health to be strong and live independently as much as possible. Smoking is a factor that leads to the deterioration of health and causes many diseases. Therefore, it is important to practice healthy behaviours. This will help to reduce the disease incidence in older adults or maintain their health in the absence of disease. The most important aspect is the development of the way of thinking. The decision to quit and avoid smoking from the formulation of behavioural adjustments will raise awareness among older adults to nurture the correct attitude. Creating a body of knowledge for older adults to be knowledgeable about health will help build self-acquaintances and pass on information to others for mutual benefits and can serve as a healthy example for society in the future. It also promotes appropriate social roles regarding health among older adults, shaping them as role models for future generations to create sustainable good health.

## CONFLICT OF INTEREST

The authors declare no conflicts of interest.

## LIMITATIONS

Secondary data were obtained from the National Statistical Office of Thailand; therefore, there were limitations in terms of variables and data integrity.

## ACKNOWLEDGEMENTS

The authors would like to express their sincere gratitude to the National Statistical Office of Thailand for the dataset and to the Faculty of Public Health, Khon Kaen University, Khon Kaen, Thailand, for their academic support.

## REFERENCES

1. Sasiwongsaroj K, Burasit Y. Managing Thailand's ageing Population. ISEAS – Yusof Ishak Institute 2019(32). p. 1-15.
2. Prasartkul P, Thaweesit S, Chuanwan S. Prospects and contexts of demographic transitions in Thailand. J Popul Soc Stud. 2019;27(1):1-22.
3. Phayungphong S. An investigation of eldercare in Thailand through the institutional logics lens [Internet]. 2019 [cited 2021 Aug 31]. Available from: https://repository.nida.ac.th/handle/662723737/5185
4. Rowe JW, Kahn RL. Successful aging. Gerontologist. 1997;37(4):433–40.
5. World Health Organization. Active Ageing: A Policy Framework. 2002. Geneva: World Health Organization; 2002.
6. Strategy and Planning Division Ministry of Public Health. Public Health Statistics Book. Nonthaburi: Ministry of Public Health. 2017.
7. Pekalee A, Ingersoll-Dayton B, Gray RS, Rittirong J, Völker M. Applying the Concept of Successful Aging to Thailand. J Popul Soc Stud. 2020; 28(2):175-90.
8. Nicita-Mauro V, Balbo CL, Mento A, Nicita-Mauro C, Maltese G, Basile G. Smoking, aging and the centenarians. Exp Gerontol. 2008;43(2):95-101.
9. Marinho V, Laks J, Freire Coutinho ES, Blay SL. Tobacco use among the elderly: a systematic review and meta-analysis. Cad Saude Publica. 2010; 26(12):2213–33.

10. Bratzler DW, Oehlert WH, Austelle A. Smoking in the elderly: it's never too late to quit. J Okla State Med Asso. 2002;95:185–91.
11. National Statistical Office. Report of the survey of elderly in Thailand 2017. Bangkok. National Statistical Office. 2017.
12. Thinkhamrop B. Analysis of Data in Health Science Research Using Logistic Regression. Khon Kaen: Department of Biostatistics and Demography, Faculty of Public Health, Khon Kaen Universsity. 2000.
13. Snijders TA, Bosker RJ. Multilevel analysis: An introduction to basic and advanced multilevel modeling. SAGE; 2011.
14. Hox JJ, Moerbeek M, Van de Schoot R. Multilevel analysis: Techniques and applications. Routledge; 2017.
15. National Statistical Office. Report of the survey of elderly in Thailand 2014. Bangkok. National Statistical Office. 2014.
16. Chantornvong S, McCargo D. Political economy of tobacco control in Thailand. Tobacco control. 2001;10(1): 48-54.
17. Aungkulanon S, Pitayarangsarit S, Bundhamcharoen K, Akaleephan C, Chongsuvivatwong V, Phoncharoen R, Tangcharoensathien V. Smoking prevalence and attributable deaths in Thailand: predicting outcomes of different tobacco control interventions. BMC Public Health. 2019;19(1):1.
18. Levy DT, Benjakul S, Ross H, Ritthiphakdee B. The role of tobacco control policies in reducing smoking and deaths in a middle income nation: results from the Thailand SimSmoke simulation model. Tob Control. 2008; 17(1):53-9.
19. Chaaya M, Mehio-Sibai A, El-Chemaly S. Smoking patterns and predictors of smoking cessation in elderly populations in Lebanon. Int J Tuberc Lung. 2006;10(8):917–23.
20. Lugo A, Vecchia CL, Boccia S, Murisic B, Gallus S. Patterns of smoking prevalence among the elderly in Europe. Int J Environ Res Public Health. 2013;10(9):4418–31.
21. Heshmati H, Charkezi A, Asnaashari R, Khhhsar F. Prevalence of smoking and related factors among the elderly in Kashmar, Iran. Health Scope. 2014; 3(1):e13996.
22. Lim KH, Jasvindar K, Cheong SM, Ho BK, Lim HL, Teh CH, et al. Prevalence of smoking and its associated factors with smoking among elderly smokers in Malaysia: findings from a nationwide population-based study. Tob Induc Dis. 2016;14(1):1-8.
23. Pang S, Subramaniam M, Abdin E, Lee SP, Chua BY, Shafie SB, et al. Prevalence and predictors of tobacco use in the elderly. Int J Geriatr Psychiatry. 2016;31(7):716-22.
24. Veeranki SP, John RM, Ibrahim A, Pillendla D, Thrasher JF, Owusu D, et al. Age of smoking initiation among adolescents in Africa. Int J public health. 2017;62(1):63-72.
25. Nuyts PA, Kuipers MA, Willemsen MC, Kunst AE. Trends in age of smoking initiation in the Netherlands: a shift towards older ages?. Addiction. 2018;113(3):524-32.
26. Maryland Tobacco Control Resource Center. What specific problems do older adults face when they smoke? [Internet]. 2019 [cited 2021 Aug 31]. Available from: https://marylandtcrc.org/special-populations/older-adults
27. Phillips A. Supporting smoking cessation in older patients: a continuing challenge for community nurses. Br J Community Nurs. 2016;21(9):457-61.
28. Oh YS, Choi EY, Kim YS. Predictors of smartphone uses for health information seeking in the Korean

elderly. Soc Work Public Health. 2018; 33(1):43-54.
29. Bureau of Non-Communicable Diseases, Department of Disease Control, Ministry of Public Health. Handbook for prevention and control of chronic non-communicable diseases, 1st ed. Bangkok: Emotion Art; 2017.
30. Center for Research and Knowledge Management for Tobacco Control. Smoking and cardiovascular disease. [Internet]. 2018 [cited Mar 2018, 21]. Avialble from: http://www.trc.or.th/th/media/attachments/2018/02/05/world-no-tobacco-day-2018-tobacco-and -health-disease.pdf.
31. Bureau of Tobacco Control. Interesting facts: Thai tobacco consumption. Pathum Thani: Thammasat University. 2012.
32. Phetme P, Tanakanjanapong W, Duangjan R, Salah S, Donroman T, Sangthong R, et al. Factors associated with successful smoking cessation behaviors of patients visiting smoking cessation clinic. Mahachula Acad J. 2020;7(3):294-308.
33. Phattharasirisomboon P, Homsin P, Srisuriyawet R. Factors Associated with Smoking among Health Science Students in an Autonomous University in Eastern Region. Public Health J Burap. 2021;15(2):25-38.
34. Thammawongsa P, Laohasiriwong W, Prasit N, Phimha S. Spatial Association Patterns Of Smoking, Tobacco Outlet Density, And Secondhand Smoke In Thailand. J South Jiao. 2021;56(5).
35. Prasit N, Laohasiriwong W, Sornlorm K, Pimha S. Spatial Association Patterns Of Binge Drinking, Alcohol Outlet Density, and Early Started Drinking In Thailand. J South Jiao. 2021;56(4).
36. Muhammad T, Govindu M, Srivastava S. Relationship between chewing tobacco, smoking, consuming alcohol and cognitive impairment among older adults in India: a cross-sectional study. BMC geriatrics. 2021;21(1):1-4.
37. Jain M, Garg K, Jain R, Dudi M, Gupta PK. A study of tobacco and alcohol consumption among the elderly population residing in field practice areas of a tertiary care institute. Indian J Prev Soc Med. 2018;49(4):6.