

Household Smoking Situations and Factors Associated with Smoking Cessation among Adult Men in Coastal Fishing Communities

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Objective: To investigate household smoking situations and factors associated with cessation, focusing on adult male smokers in low socioeconomic coastal fishing communities in southern Thailand.

Materials and Methods: An epidemiological community cross-sectional approach was conducted in 371 adult male smokers aged between 20 and 60 years. A self-administered questionnaire was applied to gather the data. Demographic characteristics, household smoking, smoking history, smoking behaviors, and pulmonary symptom data were collected by the community research assistants. Statistical computing was performed with R studio, and a p-value of less than 0.05 was considered significant.

Results: The household smoking prevalence was 23.5%. Most smokers were categorized as having high pack-years, and the lowest age at first smoking was ten years old. Imitation and impetuous behaviors were the major leading causes of becoming a new smoker. The number of cigarettes smoked daily was the highest among individuals with more than 20 pack-years. Eighty-four-point-one percent of smokers desired to quit smoking for personal health reasons. Smokers in the 51 to 60 years age group were 49.62 times as likely as adolescents to cease smoking. Participants who first started smoking when they were older than 17 years of age had a 3.56-times higher chance of quitting smoking than those who started smoking when they were younger than 15 years of age (95% CI 1.51 to 8.37).

Conclusion: The smoking situation in the coastal fishing communities of the southernmost provinces of Thailand is a worrisome problem. Smoking prevalence remains high, with prevalence increasing with age, and newer smokers starting at younger ages. A high proportion of smokers intended to cease smoking. Therefore, smoking cessation programs would be essential in the present study area.

Keywords: Smoking situation, Cessation, Coastal fishing community, Southernmost Thailand

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Smoking is responsible for a large burden of the preventable diseases and is the leading cause of global death in approximately five million individuals every year⁽¹⁾. According to the World Health Organization (WHO) report, the prevalence of smoking has

decreased among developed countries. However, over the past decade, the incidence of new smoking has escalated in developing countries, especially in low-income countries in South Asia and Africa⁽²⁾. Additionally, non-smoking people, such as children and elderly people, are subjected to passive smoking, which is second-hand smoke, that causes diseases, disability, and death. Cigarette smoking and passive smoking are global public health challenges⁽³⁾.

More than a decade ago, several countries strengthened up tobacco control policies as instruments for addressing the tobacco epidemic⁽⁴⁾. Increases in tobacco product taxes and bans on smoking in public places were likely to be the most successful strategies^(5,6). A previous study in 195 countries and territories revealed that the global smoking situation, burden of disease, injuries, and

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risk factors have gradually decreased⁽⁷⁾. However, there are some populations in critical settings that have been neglected in their smoking risk assessments. According to the recent smoking report by the Tobacco Control Research and Knowledge Management Center (TRC), Mahidol University⁽⁸⁾, the household tobacco consumption in Thailand among people living in rural settings in the southern region is unknown.

The present study aimed to investigate the smoking situations and factors associated with smoking cessation, focusing on fishery populations with low socioeconomic status. The study focused on an attempt to inform on early prevention measures and encourage smoking cessation. The results could be used as medical evidence that could lead to general public health policy planning. In short, it would be useful to promote smoking cessation programs in other remote areas, which could lead to management measures towards medical practices on smoking cessation around the world.

Materials and Methods

Study design

The present study was conducted with an epidemiological community cross-sectional approach between October 2016 and July 2017. It was a primary part of the MED PNU 03-2558 project approved by the Ethics Committee of the Faculty of Medicine, Princess of Naradhiwas University.

Study setting

The probability selection method was used to obtain the study setting. Muang district, Narathiwat province, was selected from nine coastal districts of Pattani and Narathiwat provinces in southernmost Thailand. Ten coastal fishing communities were selected by cluster sampling, namely Bangmanao, Khaotanyang, Pulakapa, Oamano, Chiltalae, Torkodor, Kampongtagor, Langtalard, Pitaklikerd, and Tarreua. These communities are composed of most vulnerable populations, characterized by poverty, low literacy, and low income. In addition, these areas have similar culture, language, lifestyle, and health beliefs. The local residency is unique from those in other regions of the country.

Study sample and sampling methods

The study participants were adult men living in coastal fishing communities. The sample size was calculated based on a recent report of the percentage of smoking among adult men in the southern

provinces of Thailand⁽⁸⁾. The smoking proportion among adult men was 27%, given a type I error $z_{\alpha/2}$ of 1%, a design effect of 2, a precision of 9%, a power of 0.8, and an estimated 15% incomplete information, the sample size was 359 men.

A proportional to size method study was used for participant recruitment. Each of the chosen communities was divided into four localities by the optional criteria of 15 to 18 house density and 80 to 120 population size. Five to ten men in each locality of a community were selected and invited to be study participants by local assistant researchers.

Inclusion and exclusion criteria: The eligible participants were adult male smokers aged between 20 and 60 years who had lived in coastal fishing communities for more than 10 years. Participants who were not willing to provide personal and smoking data were excluded.

Data collection procedure

Acknowledgement of the project information and permission to collect data were obtained from the head of the community and the community administration committee in the study areas. Between three and five community health volunteers who responded to the tasks during the research operation in each study area in the locality were invited to be research facilitators. The community research assistants underwent training for two days by the project head, which aimed to provide information on the purposes, methods, and procedures of the study as well as their tasks and compensation.

Data collection were permitted by the community administration committee. Adult male smokers in each locality were screened and invited to be study participants by the community health volunteers. The objectives of the study were explained, and all eligible participants signed consent forms. The study participants were assigned to complete a self-administered questionnaire related to personal characteristics and smoking behaviors.

Measures and instrument

Self-administered questionnaire: Study data were gathered and applied using a uniform self-administered questionnaire, which was designed by the research team. There were two parts across three pages of the study questionnaire record form. The preface included the project title and general guidance. The second page included the first part of the personal information questionnaire, which the participants filled by making tick marks and writing

text as appropriated for the different questions. The second part included questions on smoking history and smoking behaviors.

Demographic characteristics and household smoking data: The personal characteristics section of the questionnaire contained ten items eliciting basic information about living area, gender, age (years), occupation, education level, family income (Baht), household size (persons), number of smokers in the house (persons), and body mass index (BMI). The participant's body weight was measured in kilograms and body height in centimeters, and the BMI was calculated as body weight (kg) divided by body height (m²).

Smoking history and smoking behavior data: Important and specific data related to respiratory health were collected through the smoking history and smoking behavior section of the questionnaire. Smoking history and smoking behavior data were obtained with four question items covering aspects such as age at first smoking (years), reason for initiating cigarette smoking, current smoking per day (rolls), smoking type, intention to quit smoking, and the reason for intending to quit smoking.

Pulmonary symptoms: The respiratory symptoms of the study participants were assessed with five ordered-answer lists, which aimed to screen for respiratory symptoms of pathological manifestations of COPD and obstruction ventilator dysfunction during the last six months. The following respiratory symptoms were identified based either on an official diagnosis or on the patients showing related signs of the symptoms, breathlessness, on-going cough, coughs with sputum, cough with blood, wheezing, sore throat, bronchial irritation, chest tightness, and asthma. These respiratory symptoms and abnormal signs were used to determine the order in the prioritized scoring.

Statistical analysis

Epidata version 3.1 was used for data processing, analysis, data input, data correction, and data completion. R program version 3.2.3 (2015-12-10, "Wooden Christmas-Tree") (The R Foundation for Statistical Computing 2008, Austria) and R studio version 1.0.153 (2009 to 2017 RStudio, Inc.) were used to analyze the study data. Among the demographic characteristics of the participants, continuous variables were presented as mean, standard deviation (SD), and range, and the categorical variables were presented as frequencies and percentages. The smoking history and smoking behaviors between

pack-years were compared and tested by using the chi-square test for categorical variables, whereas the independent t-test and Fisher's exact test were used for continuous variables. The factors associated with smoking cessation were presented as odds ratios, and a p-value of less than 0.05 was considered statistically significant.

Results

Participant characteristics and household smoking prevalence

Four hundred fifty-six men in the study areas were invited, and 70 men refused. Three hundred eighty-six men met the eligibility criteria, and 15 of these were excluded as two returned incomplete questionnaires and 13 were not willing to fill them out. Three hundred seventy-one men were finally included as the study population. The recruited participants are presented in Figure 1. Approximately half of the participants were recruited from the East Beach zone, and 98.4% were Muslim. Approximately one-third were younger than 30 years and earned less than 8,000 Bahts per month in family income. Half of the respondents were employed, and half had a household size between four and six persons. Two-thirds of participants graduated from secondary school. Most participants were slender based on BMI (18.5 to 22.9 kg/m²). Half of the participants had been smokers for more than 20 years (24.3±12.7). The household smoking prevalence was 23.5%. The demographic characteristics of the participants and the household smoking prevalence are shown in Table 1.

Smoking history, smoking habits, and pulmonary symptoms by pack-year group

Fifty-five-point-five percent of the study participants began smoking at 15 years of age or younger. The lowest age at first smoking was 10 years old (15.8±2.8). Imitation was a major cause of smoking (46.7%), while impetuosity was the second leading cause (38.3%). In terms of daily smoking, two-thirds (62.8%) of the study participants smoked approximately two to three cigarettes a day (3.1±1.2). There was a significant difference in daily cigarette use among the different pack-year groups, with participants in the more than 20 pack-years group were the highest daily smoke (p<0.05). In terms of the different types of smoking, 66.0% and 24.8% of participants primarily smoked cigarettes and Nipa palm leaves, respectively. Twenty-one-point-six percent of smokers presented with at least one pulmonary symptom. The number of participants

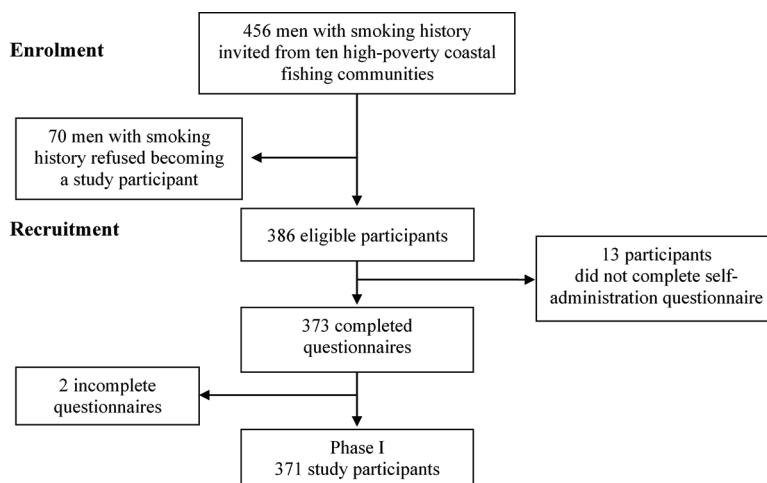


Figure 1. Flow diagrams of the screening process and recruited participants.

Table 1. Demographic characteristics of the participants and household smoking prevalence

Factors	Total (n=371); n (%)	Factors	Total (n=371); n (%)
Dwelling zone		Family income (Bath)	
East beach	158 (42.6)	<8,000	124 (33.4)
South site	43 (11.6)	8,001 to 12,000	38 (10.2)
North site	96 (25.9)	12,001 to 20,000	73 (19.7)
West beach	74 (19.9)	20,001 to 25,000	21 (5.7)
Sex		>25,000	115 (31.0)
Male	371 (100)	Mean±SD (min-max)	24,292.4±29,571.6 (2,000 to 350,000)
Religion		Household size (persons)	
Islam	365 (98.4)	≤3	38 (10.2)
Buddhism	6 (1.6)	4 to, 6	185 (49.9)
Age (years)		7 to 9	79 (21.3)
≤30	110 (29.6)	10 to 12	46 (12.4)
31-40	96 (25.9)	>12	23 (6.2)
41-50	79 (21.3)	Mean±SD (min-max)	6.7±3.3 (2 to 19)
51-60	66 (17.8)	Body mass index	
>60	20 (5.4)	Thin	40 (10.8)
Mean±SD (min-max)	40.2±12.4 (20 to 83)	Slender	251 (67.7)
Occupation		Obese	80 (21.6)
Agriculture	10 (2.7)	Pack-years	
Trader	98 (26.4)	≤10	46 (12.4)
Employee	191 (51.5)	11 to 20	126 (34.0)
Others	72 (19.4)	>20	199 (53.6)
Education		Mean±SD (min-max)	24.3±12.7 (2 to 67)
Primary school	108 (29.1)	Household smoking prevalence	
Secondary school	245 (66.0)	Total household members	2,497
Bachelor's degree or higher	18 (4.9)	Smokers [‡]	587
		Prevalence (%)	23.5

SD=standard deviation

[‡] Accumulated counts of smokers in the family include the study participants

Table 2. Description of the participants according to smoking history by pack-year

Factors	Total (n=371)	Pack-years			p-value
		≤10 (n=46)	11 to 20 (n=126)	>20 (n=199)	
Age at first smoking (years)					0.2417
≤15	191 (51.5)	21 (45.7)	61 (48.4)	109 (54.8)	
16 to 17	81 (21.8)	8 (17.4)	27 (21.4)	46 (23.1)	
>17	99 (26.7)	17 (37.0)	38 (30.2)	44 (22.1)	
Mean±SD (min to max)	15.8±2.8 (10 to 29)				
Cause/factor of initial smoking behaviour					0.1839
Imitation	173 (46.6)	14 (30.4)	64 (50.8)	95 (47.7)	
Impetuousness	142 (38.3)	24 (52.2)	43 (34.1)	75 (37.7)	
Relaxing	56 (15.1)	8 (17.4)	19 (15.1)	29 (14.6)	
Smoking daily use (cigarettes)					0.0102 ^{1***}
≤1	13 (3.5)	0 (0.0)	7 (5.6)	6 (3.0)	
2 to 3	233 (62.8)	36 (78.3)	85 (67.5)	112 (56.3)	
>3	125 (33.7)	10 (21.7)	34 (27.0)	81 (40.7)	
Mean±SD (min-max)	3.1±1.2 (1 to 7)				
Type of cigarette use					0.4731 ¹
Cigarette	245 (66.0)	29 (63.0)	85 (67.5)	131 (65.8)	
Nipa palm leaves	92 (24.8)	12 (26.1)	34 (27.0)	46 (23.1)	
Other	34 (9.2)	5 (10.9)	7 (5.6)	22 (11.1)	
Pulmonary symptoms [†]					<0.001 ^{1***}
Yes	80 (21.6)	3 (6.5)	18 (14.3)	59 (29.6)	
Intention to quit smoking					<0.001 ^{1***}
Yes	312 (84.1)	29 (63.0)	100 (79.4)	183 (92.0)	
Reason for intending to quit smoking (n=312)					<0.001 ^{1***}
Personal health concern	187 (59.9)	9 (31.0)	52 (52.0)	126 (68.9)	
Family health concern	81 (26.0)	10 (34.5)	33 (33.0)	38 (20.8)	
Others	44 (14.1)	10 (34.5)	15 (15.0)	19 (10.4)	

SD=standard deviation

¹ Fisher's exact test, * p<0.05, ** p<0.01, *** p<0.001[†] Breathlessness, ongoing cough, coughs with sputum, cough with blood, wheezing, sore throat, bronchial irritation, chest tightness, asthma

with pulmonary symptoms was significantly higher in more than 20 pack-year group (p<0.001). Eighty-four-point-one percent of the participants intended to quit smoking, and concern for the participant's health was the most important reason. See Table 2 for more details.

Factor associated with smoking cessation

Twelve factors composed of personal and smoking-behavior variables were initially assessed via multivariable analysis using multiple logistic regression. The results identified two factors significantly associated with smoking cessation among the participants, age and age at first smoking. Regarding participant age, the older age groups had

an increased chance of smoking cessation. The 51 to 60-year-old age group had a 49.62-times greater intention to quit smoking than the adolescent (20 years or younger) (95% CI 4.96 to 495.98, p<0.001). Likewise, 41 to 50 and 31 to 40-year-old age groups had a 13.45-times (95% CI 1.66 to 109.11, p=0.0149) and 13.45-times (95% CI 1.66 to 109.11, p=0.0418) greater chance of intending to quit smoking, respectively, than the adolescent age group. In terms of age at first smoking, those who began smoking older than 17 years of age had a 3.56-times greater chance of intending to quit smoking than those who started smoking younger than 15 years of age (95% CI 1.51 to 8.37, p=0.0037), as presented in Table 3.

Table 3. Final model results for smoking cessation

	Smoking cessation		p-value ¹	p-value ²
	Crude OR (95% CI)	Adjusted OR (95% CI)		
Age (years)				<0.001**
≤20 (reference)	-	-	-	
21 to 30	3.42 (0.55 to 21.48)	4.07 (0.55 to 30.19)	0.1697	
31 to 40	9.58 (1.46 to 62.91)	8.36 (1.08 to 64.60)	0.0418*	
41 to 50	13.31 (1.93 to 91.97)	13.45 (1.66 to 109.11)	0.0149*	
51 to 60	31.5 (3.74 to 265.43)	49.62 (4.96 to 495.98)	<0.001***	
60+	63,817,218.54 (0 to infinity)	80,647,826.58 (0 to infinity)	0.9828	
Age at first smoking (years)				0.0052**
≤15 (reference)	-	-	-	
16 to 17	2.25 (1.04 to 4.88)	2.1 (0.89 to 4.76)	0.0898	
>17	3.21 (1.44 to 7.13)	3.56 (1.51 to 8.37)	0.0037**	
Cause of smoking				0.1251
Impetuously	-	-	-	
Imitate	1.76 (0.96 to 3.23)	2.01 (1.02 to 3.94)	0.0429	
Relaxing	1.54 (0.66 to 3.61)	1.46 (0.56 to 3.82)	0.4431	
Smoking type				
Cigarette (reference)	-	-	-	0.0678
Nipa leaves	1.55 (0.74 to 3.25)	1.54 (0.69 to 3.44)	0.2908	
Other	0.45 (0.20 to 1.02)	0.42 (0.17 to 1.06)	0.0681	
Log-likelihood	-133.5393			
AIC	291.0786			

OR=odds ratio; CI=confidence interval; AIC=Akaike information criterion

¹ Wald's test, ² LR-test, * p<0.05, ** p<0.01, *** p<0.001

Discussion

The results of the present study found that half of the participants had smoked since they were 15 years old or younger, and the lowest age at first smoking was 10 years old. The household smoking prevalence was 23.5%. Imitation and impetuous behavior were a major leading cause to becoming a new smoker. Generally, the participants smoked approximately two to three cigarette rolls a day, and most participants had more than 20 pack-years. Almost all smokers intended to quit smoking due to personal health reasons. Age and age at first smoking were factors associated with smoking cessation among participants.

The findings of the present study are in accordance with cross-sectional studies about the age of initiation among adolescents in Bangladesh, Hong Kong, Malaysia, and Jordan, showing ages of 10 to 11, 10 to 14, 12 to 14, and 11 to 14 years, respectively⁽⁹⁻¹²⁾, while a study in India revealed that the lowest age at first smoking was 8 years old⁽¹³⁾. However, two previous studies in Gaza and Palestine showed starting ages of

17.4 and 17.0 years^(14,15). A previous study conducted in the USA contrasted with this finding, revealing an age at first smoking of 18 years old⁽¹⁶⁾. The difference in ages at first smoking might be associated with the differences in social-economic level among the different areas, with people in developed counties having a higher education level and more access to a high-quality health promotion services programs, while people in remote areas or developing counties are usually less likely to have knowledge and more likely to have little access to health promotion services programs. Another reason may be differences in the cultural and traditional backgrounds of the regions.

The household smoking prevalence of the present study was 23.5%. The present finding is similar to the results of a study conducted in 195 countries, where the age-standardized prevalence of daily smoking was found to be 25.0%⁽⁷⁾. In addition, a cross-sectional study was conducted in the Gaza Strip revealed a prevalence rate of 26.3%⁽¹⁴⁾. However, the results of the present study contrast with the results

of a household survey in Greece, which showed a prevalence of current smoking among adults aged 15 years or older of 38.2% (95% CI 35.7% to 40.8%)⁽¹⁷⁾. Surprisingly, the present study findings seemed to indicate a higher prevalence rate among the adolescent group than those from other studies. A cross-sectional study conducted in the city of Zarandieh, Iran revealed a prevalence of current smoking among adolescents of 15.1%⁽¹⁸⁾, while a systematic review on the prevalence of smoking among youth in mainland China revealed 8.17% (95% CI 6.97 to 9.45)⁽¹⁹⁾. These results contrast with a study among medical students at the medical college at King Fahad Medical City in Riyadh, where the prevalence of smoking was 31%⁽²⁰⁾. The lower smoking prevalence in adolescents could be explained by their still being enrolled in an education system and thus were under institutional rule and parent control. This kind of regulation might keep these adolescents away from smoking.

Focusing on reasons for smoking initiation, the present study revealed that imitation and impetuous behaviors were the major leading causes of becoming a new smoker. This is similar to the studies from Hong Kong^(9,11), Indonesia⁽²¹⁾, and Iran⁽¹⁸⁾, which found that the main causes of smoking were having seen friends and family smoke, having seen best friends smoke, having seen father smoke, and having seen siblings smoke. However, studies from Bangladesh⁽¹⁰⁾, China⁽²²⁾, and Saudi Arabia⁽²⁰⁾ presented a different result, indicating the leading cause of smoking to be personal factors such as gender and age. The motivations for smoking included imitation of others, leisure, or relief of stress. Due to differences among the subjects of the studies, it is possible that physiological and psychosocial changes tend to increase risky behaviors that trigger smoking among students and adolescents. Social learning theory could explain imitative behavior toward parent and adult role models, for example, teachers and cousins can be encouraging and unintentionally cause young people to smoke.

Approximately two-thirds of the study participants smoked approximately two to three cigarettes per day, with the more than 20 pack-year group showing the highest prevalence. The present study finding contrasted with a study in a rural population from Greece that revealed the high daily smokers consumed an average of 20.6 cigarettes per day⁽¹⁷⁾. However, a study in Poland on tobacco smoking among medical school students showed that the majority indicated that they smoked no more than five cigarettes per day⁽²³⁾. The heterologous results

can be explained by the differences among the study participants, and sociocultural factors in each setting might be influential.

The present study demonstrated that almost all smokers (84.1%) intended to quit smoking due to personal health reasons. The result was in accordance with a study in the Gaza Strip, Palestine⁽¹⁵⁾ that indicated 81% of its participants also intended to quit for health reasons. However, the present study results are in contrast with the findings by Haug et al⁽²⁴⁾ that showed 72.1% of participants had an intention to quit. A previous study on smoking among college students⁽²⁵⁾ found that proportion of intention to quit smoking was 71% among high-intensity smokers, or the one that smoked more than 10 cigarettes per day. These studies were conducted in adolescents, while the participants of the present study were general smokers. Therefore, it is possible that the high pack-years smoking group was likely to have lung pathologies and thus a greater intention to quit smoking.

Regarding the investigation of smoking cessation factors, the present study found that smoking age and age at first smoking were associated with the intention to quit smoking among the participants. This was different from a previous study in Switzerland⁽²⁴⁾, which found that gender, lower alcohol consumption, and a lower number of cigarettes smoked per day at baseline were associated with higher smoking abstinence. A study in Crohn's disease (CD) patients⁽²⁶⁾ found that the main reason for quitting was the diagnosis of CD. In addition, smoking cessation at the time of CD diagnosis was associated with intestinal resection within three months from CD diagnosis, light smoking, and initiation of smoking before 18 years of age. Based on medical evidence, this phenomenon could explain why long-term smoking and older age are associated with current diseases, especially respiratory system diseases. Therefore, long-term smokers who have any pulmonary symptoms are more likely to decide to quit smoking.

Conclusion

The household smoking prevalence was quite high (23.5%) among the coastal fishing communities of the southernmost provinces of Thailand. Most smokers in the present study area were categorized as having high pack-years. Imitation and impetuous behavior were the major leading causes of becoming a new smoker. The highest daily cigarette use was shown among the highest pack-years smoking

group. The proportion of smokers who presented with pulmonary symptoms was low. Most smokers intended to quit smoking due to health reasons. Age and age at first smoking were factors associated with quitting smoking among the participants.

What is already known on this topic?

The global smoking situation trend has declined in recent decades. Tobacco control is a strong and effective policy worldwide. In contrast, the number of new smokers is increasing in developing countries, especially in low socioeconomic countries. The health sectors of all countries have implemented strategies to promote smoking cessation, and health professionals can support and encourage most smokers who are willing to quit.

What does this study add?

The smoking situation in coastal fishing communities of the southernmost provinces of Thailand is worrisome. Smoking prevalence remains high, and the emergence of new smoking begins at increasingly younger ages. The proportion of smokers who presented with pulmonary symptoms is low. There are a high proportion of smokers in this area who intend to quit smoking. The high pack-years smoking group most likely intends to quit smoking.

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Conflicts of interest

The authors declare that they have no competing interests.

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