

Investigation of the tobacco consumption situation and smoking cessation services over 5-year periods among the population living in health region 10, Thailand

Anun Chaikoolvatana¹, Mereerat Manwong¹, and Cholada Chaikoolvatana^{2*}

¹ College of Medicine and Public Health, Ubon Ratchathani University, Ubon Ratchathani 34190, Thailand

² Faculty of Nursing, Ubon Ratchathani Rajabhat University, Ubon Ratchathani 34190, Thailand

ABSTRACT

***Corresponding author:**
Cholada Chaikoolvatana
cholada.c@ubru.ac.th

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Despite smoking cessation programs, the average smoking rate in health region 10 was around 22%, exceeding the Thai National Standard Goal of 18–20%. It was a secondary data survey from 2017 to 2021, collecting information on Thais aged 15 and older registered in the 43-folder Thai Healthcare System. Topics included demographics, smoking history, tobacco control policies, and factors involved in tobacco control. The majority of clients were current smokers (21.86%), and only 6.25 percent of clients were quitters. Overall findings indicated brief counseling (2A) has been widely used, compared to the other models including 5A counseling, and 5A counseling and medications (65.55%, 23.39%, and 11.06% consecutively). The quit rates were mainly notified after 1- and 3-month cessation periods (46.01% and 41.96%, respectively). There were statistically significant relations between types of cessation services and quit success at 6-month periods ($p < 0.05$). The smoking rate among 15-year-old smokers in region 10 had exceeded the Thai National Standard Goal. Most current smokers received brief counseling (2A), which was statistically more effective than other cessation methods. These findings could help health policymakers in identifying target groups and enhancing access to cessation services nationwide.

Keywords: epidemiology; tobacco consumption; smoking cessation; smoking behaviors

1. INTRODUCTION

Generally, smoking has negative health effects and is the single largest preventable cause of morbidity and mortality worldwide. The World Health Organization (WHO) estimates that over 8 million people die from tobacco use each year. More than 7 million of these deaths are the result of direct tobacco use, while around 1.3 million are due to non-smokers being exposed to second-hand smoke (WHO, 2025). In Thailand, despite a declining

trend in smoking prevalence among adults aged 15 and older, from 23% in 2004 to 17.4% in 2021, tobacco use still caused an estimated loss of 125.9 thousand disability-adjusted life years (DALYs), accounting for about 9.4% of the total DALYs. Additionally, half of the 1.3 billion tobacco users around the world, including the Thai population, will die from tobacco-related non-communicable diseases (NCDs) such as diabetes (DM), cardiovascular (CVS), and respiratory diseases (RDs). Deaths from NCDs accounted for 74% of the total 539,000 deaths in Thailand in 2016

and are predicted to continue to increase rapidly (WHO, 2018). It accounts for 42.5 thousand DALYs for ischemic heart diseases (IHD), 17.1 thousand DALYs for stroke, 7.2 thousand DALYs for lung cancer, and 9.9 thousand DALYs for chronic obstructive pulmonary diseases (COPD) (Global Action to End Smoking, 2024). Additionally, tobacco is among the leading contributors to the substantial economic burden on Thailand. In 2017, the direct morbidity costs attributable to smoking and secondhand smoke (SHS) exposure at home in Thailand were estimated at US\$265.97 million and US\$23.66 million, respectively. The total economic cost from both types of tobacco exposure amounted to US\$2.98 billion, equivalent to 17.41% of Thailand's current health expenditure or 0.65% of its gross domestic product (Komonpaisarn, 2022).

Focusing on smoking incidence in health region 10, including the Ubon Ratchathani, Sisaket, Yasothon, Amnat Charoen, the Mukdahan provinces, it has been reported that the highest smoking incidence rates were among those aged between 20 and 24 years, and the majority are males (68.9%). Also, the second smoking rate among people living in health region 10 has been equal to 53.9%, and roll-your-own cigarettes were more popular than factory cigarettes (0.68% and 0.20% respectively) (Tobacco Control Research and Knowledge Management Center, 2019). Noticeably, the NCDs situation in health region 10 from the Health Data Center (HDC), Ministry of Public Health (MOPH), found a cumulative total of 195,629 patients in 2017 and increased gradually from the year 2013 to 2017 (Health Region 10th Ubon Ratchathani, 2018). In the aspect of health risk behavior, the survey in the year 2014 found out that high cholesterol (24.78%), no physical activity (35.58%), a body mass index (BMI) higher than standard score (31.07%), drinking alcohol (31.07%), and smoking (23.86%) were health risk behaviors (Burden of Disease Thailand, 2018).

All basic health information of the Region 10 population was recorded into a 43-folder system, which was established to classify health data into 43 items for both local and national government utilizations. All health items involved health services, demographic population data, health insurances, and health policies were recorded via local hospitals, including health-promoting and district hospitals. The 43-folder system would help the policy makers to manipulate and improve the quality of the national health system. Similarly, social history data, including smoking and drinking behaviors were also recorded in a 43-folder system as well (Information and Communication Technology Center, Office of the Permanent Secretary, Ministry of Public Health, 2017).

Regarding the strategies of smoking cessation available in Thailand, we have both pharmacological and non-pharmacological strategies. Nicotine replacement therapy (NRT) products are prescribed via physicians for those who are affordably willing to undergo alongside with behavior modifications. Nevertheless, some alternative treatments are also interesting and becoming more popular among those who seek non-traditional ways to quit smoking, including meditation, acupuncture, exercise, and herbal medicine. The outcomes of individual treatment vary depending on the characteristics of each person. If the quitter came to the hospital, only available smoking cessation would be provided and recorded in the 43-folder system.

Unfortunately, the overall records of smoking behaviors and cessations of the quitters in region 10 have never been epidemiologically summarized. Each provincial data has been scattered, making it more difficult for both local government sectors and healthcare workers to investigate the current situation of tobacco consumption as well as the availability of smoking cessation services. Additionally, the National Health Security Office (NHSO) of region 10 lacks available data regarding the success of tobacco control at both provincial and regional levels. As a result, the study aimed to analyze the situation of tobacco consumption and smoking cessation services in health region 10 from 2017 to 2021 using data from the 43-folder system.

2. MATERIALS AND METHODS

2.1 Study design and participants

It was a secondary data-survey. The inclusion criteria of this study were Thai people aged above 15 years who have registered in the 43-folder National Healthcare System (NHS) of Thailand between 2017 and 2021. The study areas included five provinces of health region 10: Ubon Ratchathani, Sisaket, Yasothon, Amnat Charoen, and Mukdahan. Data sources came from local, district, and provincial hospitals in health region 10 areas. The authorized officers who work for NHSO could only access database system and handed it in to the researchers.

2.2 Variables and outcomes

All variables collected from the 43-folder-NHSO database system include demographic data (e.g., gender, age, medical history, alcohol consumption, height, weight, etc.), smoking behaviors including smoking history (e.g., numbers of current smokers, quitters, and cigarettes), and type of smoking cessation services including 2A counseling (clients were asked for smoking history and advised to quit smoking), 5A counseling (clients were asked for smoking history, advised to quit smoking, assessed for readiness, assisted with the solution to quit smoking, and arranged for follow-up), and 5A counseling with medications (Information and Communication Technology Center, Office of the Permanent Secretary, Ministry of Public Health, 2017). The outcomes included the current situation of tobacco consumption in health region 10 (5 provinces), the availability of smoking cessation services, quit success, and relations between key factors related to tobacco control.

2.3 Data collection

The research team along with NHSO teams, underwent the project at NHSO headquarter in Ubon Ratchathani province, Thailand. The data collecting forms were developed for five provinces in health region 10, which included Ubon Ratchathani, Amnat Charoen, Sisaket, Yasothon, and Mukdahan. All data gathered from the 43-folder system within 5 years (from 2017 to 2021) included 1) tobacco control policy, 2) tobacco control strategies of individual provinces, 3) overall results of tobacco control, and 4) relations between key factors related to tobacco control.

2.4 Data analysis

All results were analyzed via both descriptive and analytical statistics, including tobacco control policy and tobacco control strategies in region 10 via content analysis,

with assessed the understanding and appropriateness of each survey item. The overall results were favorable, and some minor changes were corrected prior to a further investigation. The overall results of tobacco control of each province in region 10 via descriptive statistics (e.g., frequency, percentage, mean, and standard deviation (SD)). The relations between types of cessation services and quit success at 6-month periods of five provinces were analyzed via chi-square test or Fisher's exact test, which was set as a $p < 0.05$. Statistical analysis was performed with SPSS Statistic 28 for Windows.

2.5 Ethical considerations

The methodology of the study was approved by the Ethic Committee (EC) of the Provincial Public Health Office, Ubon Ratchathani province. The reference number is SSJ.UB2565-25. Personal data confidentiality was performed according to the Declaration of Helsinki.

3. RESULTS

3.1 The overall situation of tobacco consumption of the local population in health region 10 during 2017 to 2021 (five-year periods)

The overall results showed there were a total of 4,538,440 people living in 5 different provinces of health region 10. They were covered by NHSO insurance under the

governmental hospitals in their areas. From health screening data in the 43-folder system, it revealed the majority of clients during 2017 and 2021 were current smokers (21.86%), and only 6.25 percent of clients were quitters. When focusing on tobacco consumption within 5 provinces, the findings stated there were 992,129 current smokers. Mukdahan had the highest number of smokers (30.65%), followed by Sisaket (24.46%). In contrast, Yasothon had the lowest number of smokers (16.40%) (Figure 1). Noticeably, Mukdahan was the province that had the highest number of quit smokers (7.84%), whereas Amnat Charoen had the lowest number of quit smokers during five-year periods.

3.2 Demographic information of the health region 10 population related to smoking behaviors

The overall findings of the situation of smoking behavior of the region 10 population across five different provinces from years 2017 to 2021 revealed that the total population recorded in the 43-folder system was 6,427,945 persons. The majority of smokers were males compared to females (593,489 vs. 22,172), aged between 50 and 59.9 years. They were regular smokers who usually smoke at least once per day and sometimes took alcohol (1 to 2 times per week). Noticeably, they have some medical conditions, including diabetes (11.09%), lung cancer (9.16%), cardiovascular diseases (7.50%), and hypertension (4.76%), respectively (Table 1).

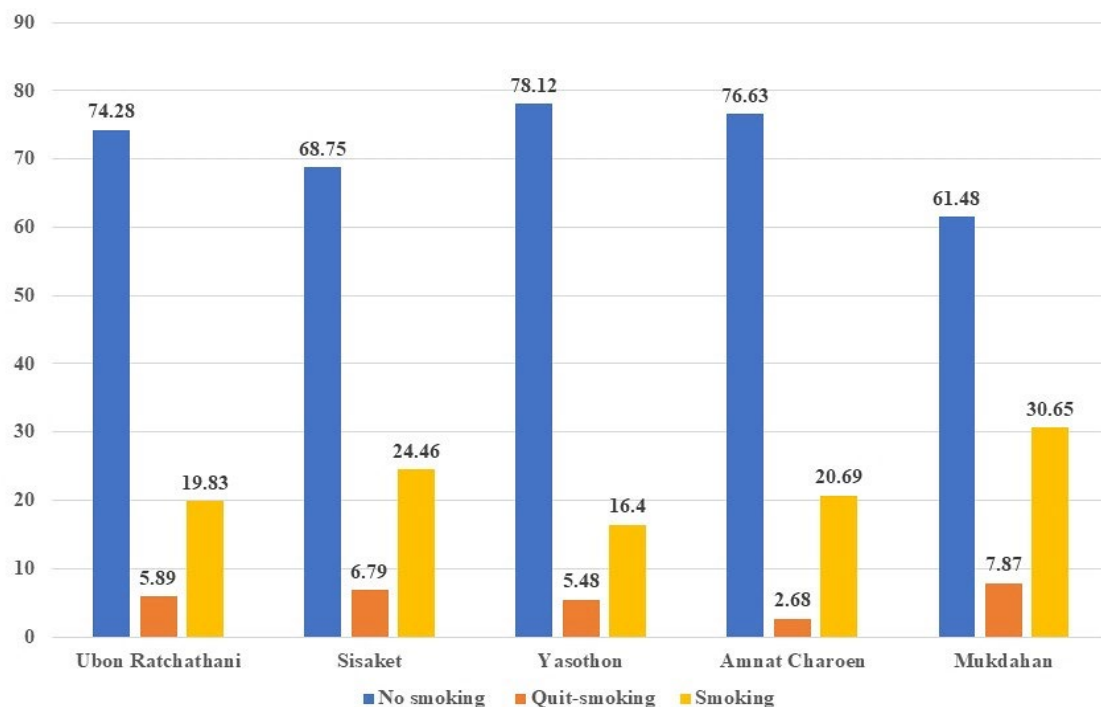


Figure 1. Percentage of smoking behavior in the 10th health region population between 2017 and 2021 by province

Table 1. Demographic data of the health region 10 population related to smoking behaviors from the years 2017 to 2021

Items	2017		2018		2019		2020		2021		Total	
	smokers	non smokers	smokers	non smokers	smokers	non smokers	smokers	non smokers	smokers	non smokers	smokers	non smokers
Gender (s)												
Male	120,678	454,371	122,818	498,247	121,620	525,747	123,143	514,542	105,230	498,906	593,489	2,491,813
Female	5,503	621,690	4,589	668,693	4,554	692,962	4,127	690,925	3,399	646,201	22,172	3,320,471
Age (years)												
Average	51.66	52.35	51.66	52.42	52.18	52.61	52.54	53.84	53.04	54.00		
S.D.	12.66	14.57	12.84	14.67	12.76	14.81	12.66	14.26	12.58	14.48		
MAX	100	100	100	100	100	100	100	100	100	100		
MIN	15	15	15	15	15	15	15	15	15	15		
15 – 24	2,697	39,909	3,090	44,727	2,517	48,884	2,351	31,853	1,705	33,060	12,360	198,433
25 – 29	1,610	14,681	1,913	19,029	1,775	19,572	1,763	13,675	1,305	14,996	8,366	81,953
30 – 39	15,275	129,477	15,245	138,969	14,740	143,920	14,149	129,218	11,619	121,136	71,028	662,720
40 – 49	38,839	307,389	37,938	321,761	35,938	320,987	35,122	312,308	29,233	283,476	177,070	1,545,921
50 – 59	35,298	263,249	35,905	288,119	36,836	308,639	38,290	319,529	32,830	301,901	179,159	1,481,437
60 – 69	21,331	182,013	21,914	201,987	22,392	213,287	23,277	223,824	20,728	218,468	109,642	1,039,579
above 70	11,131	139,343	11,402	152,348	11,976	163,420	12,318	175,060	11,209	172,070	58,036	802,241
Smoking history												
None		506,001		1,076,061		1,166,940		1,218,709		1,205,467		1,145,107
Sometime (1–2 times per week)	15,045		39,125		39,689		37,732		41,873		37,431	
Often (3–4 times per week)	6,603		17,242		15,783		17,053		16,268		14,755	
Regularly (once per day)	48,242		69,814		71,935		71,389		69,129		56,443	
Not applicable (N/A)		11,912		19,151		15,163		16,194		25,374		21,529
Alcohol consumption												
None (within the past 12 months)	28,378	965,633	28,310	1,050,484	28,435	1,115,739	27,591	1,097,555	23,364	1,044,009	136,078	
Sometime (1–2 times per week)	48,045	76,087	51,809	78,489	48,743	75,246	52,264	72,557	46,443	68,227	247,304	
Often (2–4 times per week)	28,602	24,995	26,269	24,648	27,177	25,246	26,505	24,382	20,752	21,298	129,305	

Table 1. Demographic data of the health region 10 population related to smoking behaviors from the years 2017 to 2021 (continued)

Items	2017		2018		2019		2020		2021		Total	
	smokers	non smokers	smokers	non smokers	smokers	non smokers	smokers	non smokers	smokers	non smokers	smokers	non smokers
Alcohol consumption												
Regularly (5-7 times per week)	20,791	16,511	20,507	17,106	21,474	17,530	20,497	17,759	17,820	15,092	101,089	83,998
Not applicable (N/A)	225	11,237	142	9,878	214	12,429	161	21,969	143	17,020	885	72,533
Current medical conditions												
Diabetes (DM)												
None	122,559	1,011,529	123,083	1,089,484	121,691	1,134,922	122,345	1,100,361	103,968	1,035,216	593,646	5,371,512
Yes	3,622	64,532	4,324	77,456	4,483	83,787	4,925	105,106	4,661	109,891	22,015	440,772
Type 1 DM	291	6,324	402	7,740	381	8,030	365	10,870	323	11,136	1,762	44,100
Type 2 DM	3,331	58,208	3,922	69,716	4,102	75,757	4,560	94,236	4,338	98,755	20,253	396,672
Hypertension (HT)												
None	115,931	921,491	115,723	992,437	113,918	1,026,261	113,962	984,992	96,429	925,108	555,963	4,850,289
Yes	10,250	154,570	11,684	174,503	12,256	192,448	13,308	220,475	12,200	219,999	59,698	961,995
Morbidity rates	8.84	16.77	10.10	17.58	10.76	18.75	11.68	22.38	12.65	23.78	10.74	19.83
Lung cancer												
None	126,080	1,075,125	127,273	1,165,775	126,043	1,217,310	127,102	1,203,996	108,500	1,143,504	614,998	5,805,710
Yes	101	936	134	1,165	131	1,399	168	1,471	129	1,603	663	6,574
Morbidity rates	0.08	0.09	0.11	0.10	0.10	0.11	0.13	0.12	0.12	0.14	0.11	0.11
Cardiovascular diseases												
None	124,942	1,061,625	126,003	1,151,023	124,691	1,200,624	125,751	1,186,133	107,394	1,127,997	608,781	5,727,402
Yes	1,239	14,436	1,404	15,917	1,483	18,085	1,519	19,334	1,235	17,110	6,880	84,882
Morbidity rates	0.99	1.36	1.11	1.38	1.19	1.51	1.21	1.63	1.15	1.52	1.13	1.48

In Table 2, the majority were light smokers who usually smoke 1 to 10 cigarettes per day. They started smoking their first cigarette at least one hour after waking up (35.2%). Whereas, those moderate and heavy smokers

were likely to smoke for between 30 min and one hour, and less than half an hour (43.3% and 35.4%, respectively). Evidently, there were numbers of missing smokers whose records have not been added into the 43-folder database.

Table 2. Frequency and percentage of smoking behavior of smokers in health region 10

Number of cigarettes per day	Initial time of smoking after waking up							
	< 30 min		30 Min – 1 h		> 1 h		N/A	
	n	%	n	%	n	%	n	%
1–10	91,496	31.5	82,223	28.3	102,415	35.2	14,589	5.0
11–19	15,930	24.2	28,548	43.3	17,749	26.9	3,655	5.5
≥ 20	7,187	35.4	5,935	29.2	5,656	27.9	1,527	7.5

There are approximately 1,062 healthcare centers, including central, provincial, district, and health-promoting hospitals, across the five provinces of Health Region 10. All available smoking cessation services can be divided into 3 different types, including 1) 2A counseling (short action); 2) 5A counseling (intermediate action); and 3) combination counseling (5A with medications). For 2A counseling, the findings revealed thirty-two percent (32%) of clients during 5-year periods accessed the counseling service. Noticeably, a number of clients have climbed up ever since. For those who received 5A counseling, only 15.77 percent of them have been accessed to the service, and the trend seemed to be declining, especially during the

years 2020 and 2021. Finally, the results indicated the overall percentage of clients who received both 5A counseling and medications for smoking cessation was equally to 1.37 percent. The percentage has been declining over 5-year periods since 2017. The most common form of cessation counseling was brief counseling among either light or heavy smokers. 5A counseling and 5A counseling with medications were suitable for those who were considered moderate to heavy smokers. Remarkably, some cases who smoked less than 10 cigarettes per day (light smokers) could still need more than just brief counseling (Table 3).

Table 3. Frequency and percentage of smoking behaviors related to smoking cessation

Frequency of smoking	Types of cessations					
	Brief counseling (2A)		5A counseling		5A counseling + medications	
	n	%	n	%	n	%
1–10 roll/day (light smokers)	160,286	78.8	55,557	78.4	2,851	76.3
11–19 roll/day (moderate smokers)	32,668	16.1	12,051	17.0	570	15.3
≥ 20 roll/day (heavy smokers)	10,423	5.1	3,215	4.5	315	8.4

3.3 The relations between smoking behaviors and smoking cessation services of the Thai population in health region 10 (only year 2021)

Due to some limitations of the data completeness over 5-year periods including missing and inconsistent data, only data in the year 2021 were fully investigated. The overall findings revealed if the frequency of cigarette smoking is increased, the onset of smoking after waking up will be shorter. It means when people smoked more frequently during a day, they tended to start smoking shortly after waking up. Noticeably, numbers of cigarettes were related to types of smoking cessation. For those who regularly

smoked 1 to 10 rolls per day, they were treated with 2A counseling, while those who smoked up to 20 rolls and over were treated with 5A counseling and 5A with medications, respectively. When focusing on the coverage of cessation services within health region 10, especially in 2021, those clients who attended to the healthcare centers in five different provinces were approximately between 40 and 50 percent. Those numbers declined more than 30 percent after 6-month monitoring. Due to missing data of 'no change' of number of cigarettes at 6-month periods, therefore, there was no data available for analysis (N/A) (Table 4).

Table 4. Frequency and percentage of smoking cessation monitoring in the year 2021, divided by types of monitoring

Types of monitoring	Number of cigarettes 1-month period			Number of cigarettes 3-month periods			Number of cigarettes 6-month periods		
	1	2	3	1	2	3	1	2	3
Brief counseling (2A)	9,696 (62.4)	5,004 (32.2)	845 (5.4)	1,507 (44.8)	1,369 (40.7)	488 (14.5)	N/A	1,814 (66.8)	901 (33.2)
5A counseling	4,270 (44.3)	4,638 (48.1)	735 (7.6)	947 (24.6)	2,300 (59.9)	595 (15.5)	N/A	1,069 (62.8)	632 (37.2)
5A counseling with medications	165 (28.8)	380 (66.4)	27 (4.7)	46 (15.5)	207 (69.7)	44 (14.8)	N/A	357 (91.1)	35 (8.9)
Total	14,131 (54.9)	10,022 (38.9)	1,607 (6.2)	2,500 (33.3)	3,876 (51.7)	1,127 (15.0)	N/A	3,240 (67.4)	1,568 (32.6)

Note. 1 = No change, 2 = Declined, 3 = Successfully quit

Regarding the smoking cessation monitoring of healthcare centers in five provinces over 5-year periods, overall, the findings indicated 2A counseling has been widely used, compared to the other models (65.55%, 23.39%, and 11.06% consecutively). After 1-month monitoring, the total number of cigarettes was not changed (46.01%). However, the percentage of numbers of cigarette smokers declined after 3-month periods (41.96%). Eventually, when the cessations were completed at 6-month periods, the finding revealed the majority were able to quit smoking 42.70 percent.

When focusing on the relations between types of cessation services and quit success at 6-month periods

in five provinces. The results stated only half of the population who have accessed smoking cessation services have quit smoking at 6-month periods in the year 2021. Thus, there were statistically significant relations between those two factors in three different provinces, including Ubon Ratchathani, Amnat Charoen, and Sisaket ($p < 0.05$), except Yasothon and Mukdahan. Noticeably, most clients in each province preferred 2A counseling service rather than 5A counseling and 5A counseling with medications. When compared to the success of each province, the findings revealed the proportions of people who cut down on cigarettes were higher than those who quit smoking successfully in all five provinces (Table 5).

Table 5. The relations between types of cessation services and quit success at 6-month periods of five provinces

Provinces / Types of cessation services	Quit Success at 6-month period				<i>p-value</i>
	Cut down cigarettes n (%)		Successfully quit n (%)		
Ubon Ratchathani (n = 3,249)					<0.001 ^a
Brief counseling (2A)	746	(23)	190	(5.8)	
5A counseling	445	(13.7)	51	(1.6)	
5A counseling + medications	58	(1.8)	6	(0.2)	
Sisaket (n = 3,976)					<0.001 ^a
Brief counseling (2A)	769	(19.3)	637	(16)	
5A counseling	606	(15.2)	538	(13.5)	
5A counseling + medications	295	(7.4)	29	(0.7)	
Yasothon (n = 149)					0.052 ^a
Brief counseling (2A)	17	(11.4)	26	(17.4)	
5A counseling	9	(6)	35	(23.5)	
5A counseling + medications	-	-	-	-	
Amnat Charoen (n = 292)					<0.001 ^b
Brief counseling (2A)	234	(79.1)	40	(13.7)	
5A counseling	1	(0.3)	7	(2.4)	
5A counseling + medications	1	(0.3)	-	-	
Mukdahan (n = 177)					0.999 ^b
Brief counseling (2A)	48	(27.1)	8	(4.5)	
5A counseling	8	(4.5)	1	(0.6)	
5A counseling + medications	3	(1.7)	-	-	

Abbreviations: ^a Chi-square test; ^b Fisher exact test

4. DISCUSSION

It revealed an increase in the number of current smokers over five provinces of health region 10 during 2017 and 2020, except in the year 2021 (Table 1). Some explanations of the decline of smokers in the year 2021 have been addressed. For instance, the widespread pandemic of COVID-19 in Thailand since 2019 has increases the risk of contracting COVID-19 from the gesture of smoking by holding the cigarette with the finger near the nose. It was also found that patients infected with COVID-19 with a history of smoking or vaping e-cigarettes have poor lung health, which could lead to severe symptoms and death (Haupala et al., 2022).

Also, some regular health checks or hospital visits were restricted as much as possible to minimize the spread of the disease. Therefore, smoking cessation services were canceled and led to a decrease of smokers who

visited the hospital. More explanation was provided by Kongrukgratiyos (2021), who found that the average income per capita in Thailand has decreased, while health insurance expenses and personal and family debts have steadily increased. As a result, some current smokers tended to reduce their cigarette consumption during the crisis. Some limitations during the covid-19 crisis, such as shortage of manpower and overload duties of health workers, could possibly tumble the hospital services, including smoking cessation into a small number of screening clients (40%) recorded in the 43-folder database system in 2021. When focusing on smokers (Table 1), most current smokers were males with inadequate educational backgrounds. Normally males consume more tobacco products than females as part of their daily lives (Higgins et al., 2015; Jamal et al., 2016). Noticeably, the findings indicated the older males (>30 and above 70 years old)

smoked more than the younger ones. The results also found several medical conditions among smokers, including hypertension, diabetes, cardiovascular diseases, and lung cancer. Medical evidence has shown that lung cancer is the most common cancer caused by tobacco use. Moreover, smoking also increases the chance of developing diabetes, coronary heart disease, stroke, and peripheral vascular diseases as well (Proctor, 2012; National Cancer Institute, 2017; Bucheli et al., 2017).

Notably, the report revealed most clients were mild-nicotine addicts due to a small number of cigarettes (1 to 10 rolls per day). They were mainly treated with brief counseling (2A), including both history-taking and brief advice. For brief counseling, it usually takes up to 3 minutes to talk about the disadvantages of the effects of cigarettes on the human body and 'ready-to-quit' steps. Therefore, brief counseling should be available at any hospital setting for the clients to be easily accessed (e.g., outpatient and in-patient settings, wards) (Puschel et al., 2008). Some previous papers showed the tendency to quit smoking is higher among those who received brief counseling than those who did not (10.2%, 7.9%, respectively) (Rollnick et al., 2008; Fiore et al., 2008). Meanwhile, the Ask-Advise-Refer (AAR) approach in which clinicians ask about tobacco use, advise tobacco users to quit, and then refer patients to an outside entity for assistance and follow-up, is available to engage patients in treatment and support quitting in some western countries (Schroeder, 2005; Gordon et al., 2010). The findings also showed the significant differences in quit success at 6-month periods between types of counseling. In general, medications serve to make smokers more comfortable while the quitters learn to live and cope with daily cues/triggers and life stressors without smoking cigarettes. It makes sense to use medications to support smoking cessation for as long as the individual feels at risk for relapse. However, the expenses of medications were not covered by NHSO Thailand. As a result, they are optional for those who can afford it.

Regarding cessation intervention periods, the study suggested that successful quitting could occur within short cessation periods (less than 6 months). Therefore, when evaluating a person's ability to quit smoking, 1- and 3-month periods were typically used as cut-off points for cessation. Thus, during 1- to 3-month periods, health workers should monitor and give support to the smokers closely to quit successfully (Kim et al., 2015). Nevertheless, in Western countries, quit success periods could be extended to 12 months (1 year) (Santi et al., 2022). Nonetheless, to further improve sustained abstinence rates, more intensive interventions need to be conducted. Randomized, controlled trials conducted in primary care practices demonstrate that a physician's advice to stop smoking increases the rates of smoking cessation among patients. Providing a brief period of counseling (three minutes) is more effective than simply advising the patient to quit. It doubles the cessation rate, as compared with no intervention (Bhattacharyya et al., 2008). Additionally, counseling by non-physician health providers, including nurses, oral health professional, and pharmacists, also increases quit rates (Rice et al., 2017; Carr & Ebbert, 2012; Augustine et al., 2016). Importantly, the healthcare team also needs to be good listeners and advisors to support the clients no matter what decisions the clients make. Finally, the counselors should not set any high expectations when

undergoing a brief counseling. Interestingly, the result showed drinking habits occurred among the current smokers. It could be that people who drink alcohol products tend to smoke cigarettes more than those who drink less. Also, people who regularly drink alcohol products (five times per week) seemed as much as smoke cigarettes 2.5 times of non-alcohol drinkers (Fritz et al., 2008; Rose et al., 2004; Jiang & Ling, 2011). From the study findings, the overall smoking behaviors of five provincial populations were still on and off over five years. It is questionable whether smoking cessation services are still effective. As we know, smoking behaviors are caused by socioeconomic status, including economics, incomes, and psychological issues. If these factors were minimized, smoking behaviors tended to be decreased (Hitchman et al., 2014).

Finally, the public policies from Thai governmental sectors are crucial. The key success of quit smoking policies depends upon some factors, including manpower (public health workers, village volunteers), adequate budget, policy restrictions (bans, fines, rules, and regulations), and continued monitoring. Having said that, the authors want to emphasize electronic cigarette (e-cig) products which are currently spread out and harm teenager health. Again, public policies need to intervene and take actions to control the situations. Recently, it has been reported that the Thai parliamentary committee has issued control measures related to e-cig products. Hopefully when the law enforcement is fully compelling, it will minimize e-cigarette exposure among Thai teenagers.

5. CONCLUSION

The overall smoking rate of current smokers above 15 in health region 10 (five provinces) was 21.86%, which was slightly higher than the Thai National Standard Goal (18–20%). The common risk factors involved with smoking rates included medical histories, and social histories (e.g., drinking and smoking). Most current smokers have been reported as 'mild smokers' who received brief counseling (2A), which tended to sustain the quit success over 6-month periods compared to the other types of counseling. Therefore, these findings would help the policy makers to implement both national policies and the investment of the comprehensive tobacco cessation services at both regional and local levels. Additionally, this study would help healthcare workers, who are responsible for smoking cessation services, improve their routine works efficiently.

Study limitations: As data collection has been gathered via the NHSO database system, some crucial information might be missed to evaluate the whole picture of tobacco consumption in Health Region 10. Thus, it is recommended to form a 'real-time data center' in each province that can connect to each other, so NHSO can be able to pull out all data and analyze them precisely and up-to-dated. Furthermore, other risk factors, including alcohol consumption, social issues, and medical history, should carefully be analyzed with smoking behaviors. Finally, the administrative work should be revised; for example, the person who undergoes the cessation process should be the same person to fill data into the 43-folder system. It helps to minimize incorrect data as well as improper decision-making regarding the cessation process.

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AUTHOR CONTRIBUTIONS

C.A. designed the study. M.M. and C.A. collected the data. C.C. and M.M. conducted the statistical analysis and interpretation of the findings. C.A. and M.M. wrote the initial draft. C.C. and C.A. reviewed and finalized the manuscript. All authors read and approved the final version of this manuscript.

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