CIGARETTE SMOKING AMONG THAI BUDDHIST MONKS, CENTRAL AND EASTERN THAILAND

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Abstract. A cross-sectional study was conducted from June to December, 2003 among Thai Buddhist monks in 4 provinces of the central region (Nonthaburi, Pathum Thani, Saraburi and Chai Nat) and in 4 provinces of the eastern region (Chachoengsao, Rayong, Trat, and Sa Kaeo) of Thailand. Data were collected using face to face interviews, questionnaires, and physical examination reports (weight, height, heart rate, blood pressure, etc) as the research tools. This study focused on socio-demographics, history of illness, and smoking behavior. The proportion of the cigarette smoking was 47.6% of the total of 920 Buddhist monks. The age group 20-34 years, Maha Nikaya section and Public temple were the majority of the study subjects. Multivariate analysis revealed that only four factors were related to smoking consumption: dharma education, Naktharm To (grade 2) (OR=0.6, 95%CI: 0.4-0.9), Naktharm Aek (grade 3) or above (OR=0.4, 95%CI: 0.2-0.6); Lay education, secondary school (OR=0.7, 95%CI: 0.5-0.9), bachelor degree or above (OR=0.4, 95%CI: 0.2-0.8); systolic blood pressure $\geq$140 mmHg (OR=1.8, 95%CI: 1.1-2.8) and history of respiratory illness (OR=3.2, 95%CI: 1.5-6.9). As a result, dharma education and well educated persons were the crucial factors which led to success in decreasing cigarette smoking. Smoking cessation campaigns and education of the consequences of smoking are strongly recommended among risk groups.

INTRODUCTION

Smoking is a major preventable cause of death and disability. It is maintained by a dependence on nicotine (Hall, 2002). A large number of epidemiological studies have linked smoking to cancer, coronary heart disease, emphysema, chronic bronchitis, reproductive-related problems, and other conditions (The Surgeon General, 1982, 1983, 1984, 1989; WHO, 1983). The consumption of cigarettes and other tobacco products and exposure to tobacco smoke are the world's leading preventable causes of death, responsible for about 5 million deaths a year, mostly in poor countries and poor populations (WHO, 2003). In the 1990s, the number of smokers in the world was estimated at 1.3 billion, it is expected to rise to 1.7 billion by 2023 if the global prevalence of tobacco use remains unchanged (Guindon and Boisclair, 2003). The epidemic of tobacco addiction, disease and

death is continuing to shift rapidly to developing and transitional market countries (Murray and Lopez, 1996). An alarming 23.4% of Thais over 11 years of age continue to smoke (National Statistical Office, 2001). Among Thai adults, males smoke more than females (38% of males, 2% of females) (Beyer and Brigden, 2003). However, the male smoking prevalence has fallen significantly from 49% in 1996 to 38% in 1999 (Vateesatokit *et al*, 2000).

Buddhism is the national religion of Thailand, where nearly 95% of the population is Buddhist. Monks have a powerful influence through the modeling of non-smoking as a desirable and meaningful action. However, Thais offer manufactured cigarettes to monks as alms with other common food and personal items, even though some believe that offering cigarettes to monks is a sin. Half the country's 300,000 monks are smokers, but earlier initiatives to get them to change their habits have largely been unsuccessful (Ingram, 2002). Smoking is a major cause of morbidity and mortality among Thai monks. Smoking-related diseases, especially in the circulatory and respiratory system among Thai monks, have been rapidly increasing over the

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past decade (Priest Hospital, 2003a,b). The outpatient proportions of diseases of the circulatory system and the respiratory system were about 16% and 13%, respectively in 2001-2003, and were among the ten leading causes of illness at the Priest Hospital (Priest Hospital, 2001, 2003a,b). This hospital is the only one in the country that just treats clerics. A better understanding of the smoking patterns in monks could lead to proper solutions for smoking control. The aim of this study was to determine the possible factors for cigarette smoking among Thai monks in 8 provinces (central and eastern regions). The study focused on socio-demographics, health status, history of illnesses and smoking behaviors of Thai monks.

MATERIALS AND METHODS

Study design and population

A cross-sectional study was conducted from June to December, 2003 in order to determine the risk factors that contribute to smoke among some Buddhist monks in 8 provinces (central region: Nonthaburi, Pathum Thani, Saraburi, and Chai Nat; eastern region: Chachoengsao, Rayong, Trat, and Sa Kaeo). The target population was the Buddhist monks who lived in temples at least one year, age ≥20 years. The total study subjects numbered 920. They were all willing to participate in the present study. All currently smoking monks were classified as "current smokers" and non-smoking monks were classified as "non-smokers". A total of 438 current smokers and 482 non-smokers were recruited. Face to face interviews, and weight, height, blood pressure and heart rate measurements were performed by well trained provincial health staff in eight provinces. The questionnaires consisted of 4 parts: socio-demographic, history of illness, history of smoking and measurement variables. The details of the study were explained and informed consent was obtained by signature or thumb print from all the participants. Socio-demographics, history of illness, and smoking behaviors are displayed by percentage, mean, standard deviation, median, and quartile deviation.

The Mann-Whitney U test was performed to compare the means for weight, height, body mass index, heart rate, and systolic and diastolic blood pressure. Chi-square tests were utilized to differentiate proportional exposures between the current smokers and the non-smokers for categorical variables which were employed in order to find out the suitable variables. Multiple logistic regression was used to estimate the cumulative odds ratios (OR) and their 95%CI as measures of associations including identification and adjustment for confounding variables. Assessment of the statistical significance of each independent variable was done using the Likelihood Ratio Test (LRT) at the p-value of 0.05 by two-tail tests.

Sample size

The sample size was calculated using the following formula (Lwanga and Lemeshow, 1991)

$$n= \frac{Z^2_{1-\alpha/2} \, P(1-P)}{d^2}$$

Where n=minimum number of subjects that were included, P=proportion of current smokers in the Thai-male population=0.43 (National Statistical Office, 2001), $Z_{1-\alpha/2}$ =1.96 at α=0.05, d=absolute precision=0.04. The calculated sample size was at least 589.

RESULTS

The proportion of cigarette smokers was 47.6% of the total of 920 Buddhist Thai monks. The majority of the study subjects were aged 20-34 years (49.3% of current smokers, 51.4% of non-smokers). The average age of the current smokers was 37.9 years, slightly lower than the non-smokers, which was 38.7 years. The proportion of smokers declined with increasing age for the current smokers. For Dharma education, most of the current smokers (36.5%) had no schooling; 38.4% of the non-smokers had Naktharm Aek (grade 3) or above. For lay education, the current smokers had a higher proportion of primary school education (46.1%), while the non-smokers had a higher proportion of secondary school education (41.2%). The province with the most current smokers was Saraburi Province (34.7%) (19.9% of the non-smokers). The second rank was Rayong Prov-

Table 1
Comparison of selected socio-demographic characteristics between current smokers and the non-smokers.

Characteristics	Current smokers				p-value
	Yes		No		
	No.	%	No.	%	
Age (yr) (N=920)					NS
< 25	109	24.9	108	22.4	
25-34	107	24.4	140	29.0	
35-44	80	18.3	77	16.0	
> 44	142	32.4	157	32.6	
Mean ± SD	37.9 ± 14.7		38.7 ± 15.7		
Median ± QD	35.0 ± 12.5		34.0 ± 12.5		
Dharma education (N=899)					c
No schooling	158	36.5	104	22.3	
Naktharm Tri (grade 1)	122	28.2	103	22.1	
Naktharm To (grade 2)	68	15.7	80	17.2	
Naktharm Aek (grade 3) or above	85	19.6	179	38.4	
Education (N=920)					a
Primary school	202	46.1	183	38.0	
Secondary school	165	37.7	199	41.2	
Vocational school	47	10.7	50	10.4	
Bachelor degree or above	24	5.5	50	10.4	
Province (N=920)					c
Nonthaburi	28	6.4	94	19.5	
Pathum Thani	55	12.6	66	13.7	
Saraburi	152	34.7	96	19.9	
Chai Nat	11	2.5	26	5.4	
Chachoengsao	28	6.4	40	8.3	
Rayong	92	21.0	80	16.6	
Trat	28	6.4	30	6.2	
Sa Kaeo	44	10.0	50	10.4	
Former occupation (N=920)					b
Agriculture	160	36.5	207	42.9	
Employee	213	48.6	182	37.8	
Student	21	4.9	43	8.9	
Governmental officer/ state enterprise officer	22	5.0	22	4.6	
Others	22	5.0	28	5.8	
Type of temple (N=920)					NS
Aram Luang (Royal)	29	6.6	37	7.7	
Rasadorn (Public)	409	93.4	445	92.3	
Type of ordination (N=920)					NS
Dhammayut Nikaya	20	4.6	32	6.6	
Maha Nikaya	418	95.4	450	93.4	
Position (N=920)					NS
Abbot	28	6.4	46	9.5	
Others	410	93.6	436	90.5	
Duration of monkhood (yr) (N=920)					c
<5	263	60.0	231	47.9	
5-9	88	20.1	90	18.7	
10-14	34	7.8	66	13.7	
>14	53	12.1	95	19.7	
Mean ± SD	6.0 ± 7.3		9.2 ± 10.8		
Median ± QD	3.0 ± 3.0		5.0 ± 5.0		
History of illness within 1 year					
Respiratory tract (N=920)					a
Yes	362	82.6	346	71.8	
No	76	17.4	136	28.2	
Gastrointestinal tract (N=920)					NS
Yes	96	21.9	155	32.2	
No	342	80.1	327	67.8	

NS = not significant at α = 0.05; [a]0.01 < p < 0.05; [b]0.001 < p < 0.01; [c]p < 0.001 by Pearson chi-square

Table 2
History of smoking among current smoking Buddhist monks.

Characters	No.	%
Start of smoking (N=437)		
Before monkhood	416	95.2
During monkhood	21	4.8
Age at start of smoking (yr) (N=429)		
<10	8	1.9
10-14	83	19.4
15-19	234	54.5
>19	104	24.2
Mean ± SD	17.2 ± 4.3	
Median ± QD	17.0 ± 2.0	
Current age of smoker (yr) (N=429)		
<15	46	10.7
15-19	188	43.8
20-24	138	32.2
25-29	21	4.9
30-34	16	3.7
>34	20	4.7
Mean ± SD	19.7 ± 6.7	
Median ± QD	19.0 ± 2.5	
Duration of smoking (yr) (N=429)		
1- 4	69	16.1
5- 9	88	20.5
10-14	62	14.5
15-19	46	10.7
20-24	44	10.3
25-29	22	5.1
30-34	21	4.9
>34	77	17.9
Mean ± SD	17.8 ± 14.1	
Median ± QD	14.0 ± 10.3	
Number of cigarettes per week (N=417)		
<40	81	19.4
40-79	136	32.7
80-119	56	13.4
>119	144	34.5
Mean ± SD	94.8 ± 66.9	
Median ± QD	70.0 ± 45.5	
Number of cigarettes per day (N=427)		
<10	107	25.1
10-19	174	40.7
>19	146	34.2
Mean ± SD	13.9 ± 9.4	
Median ± QD	10.0 ± 5.5	
Smoking habits (N=436)		
Every day	379	86.9
Often (sometimes in a week)	29	6.7
Occasional (once in a week)	28	6.4

ince (21.0% current smokers, 16.6% non-smokers). The highest two former occupations among the current smokers were agricultural workers (36.5%) and employees (48.6%) which were similar to the non-smokers, agricultural workers (42.9%) and employees (37.8%). Both groups had a high proportion of public temple monks (93.4% for current smokers, 92.3% for non-smokers), and a high proportion in the Maha Nikaya section (95.4% for current smokers, 93.4% for non-smokers). The duration of monkhood in both groups declined with increasing number of years (<5, 5-9, and 10-14 years), but it increased again after 14 years. The average duration of monkhood in the current smokers was 6 years shorter than the non-smokers, which was 9.2 years. A history of respiratory illness within one year in the current smokers and the non-smokers were 82.6% and 71.8%, respectively.

Some of the variables associated with current smoking, were Dharma education, residential province, duration of monkhood, former occupation, lay education, and history of respiratory illness within 1 year (Table 1).

Most of the current smokers began smoking before becoming monks (95.2%). The most common ages to start smoking were 15-19 years (54.5%) and above 19 years (24.2%). The main age group of current smokers was 15-19 years (43.8%), followed by 20-24 years (32.2%). The duration of current smokers was mainly 1-9 years (36.6%), and >34 years (17.9%). Most smoked less than 80 cigarettes per week (52.1%) or more than 119 cigarettes per week (34.5%). In addition, the main proportion of cigarettes smoked per day was 10-19 cigarettes (40.7%). Most smoked every day (86.9%) (Table 2).

The average heart rate (per minute) in the current smokers was 81.7, slightly higher than the non-smokers was 79.4. The current smokers had an average systolic blood pressure (128.0 mmHg) higher than the non-smokers (124.1 mmHg). The diastolic blood pressure in the current smokers (80.6 mmHg) was slightly higher than the non-smokers (78.8 mmHg). Some of the variables associated with current smoking were heart rate, systolic blood pressure, and diastolic blood pressure (Table 3).

Table 3
Weight, height and heart rate of current smokers and the non-smokers.

Characteristics	Current smokers		p-value
	Yes Mean ± SD	No Mean ± SD	
Weight (kg) (N=903)	61.4 ± 10.4	62.7 ± 10.9	NS[a]
Height (cm) (N=906)	166.6 ± 9.1	165.9 ± 9.4	NS[a]
Body mass index (kg/m^2) (N=902)	22.4 ± 7.3	22.9 ± 6.3	NS[a]
Heart rate (per minute) (N=820)	81.7 ± 8.3	79.4 ± 7.8	***a
Systolic blood pressure (mmHg) (N=808)			***b
≥140	140	34	
<140	276	358	
	128.0 ± 17.1	124.1 ± 15.2	***a
Diastolic blood pressure (mmHg) (N=871)			**b
≥90	130	97	
<90	286	358	
	80.6 ± 10.1	78.8 ± 9.7	**a

NS = not significant at α = 0.05
** 0.001 < p < 0.01; *** p < 0.001
[a]p-value by Mann-Whitney U test, [b] p-value by Pearson chi-square test

There were 8 different factors included in the model: education, history of respiratory illness, former occupation, Dharma education, province, duration of monkhood, heart rate, and systolic blood pressure (p<0.05). The variables which were not statistically significant are excluded. To evaluate the effect of risk or protective factors and adjust for confounding variables, all potential variables were included in the final model. The reason why we selected only systolic blood pressure was that the systolic blood pressure and diastolic blood pressure were found to have collinearity. Upon adjusting for potential confounders, only four variables were significantly associated with current smoking. Subjects who studied to Naktham To (grade 2) and Naktham Aek (grade 3) were 0.6 and 0.4 times, respectively, less at risk than those with no schooling (95%CI=0.4-0.9, 0.2-0.6). Subjects who finished secondary school, a bachelor degree or above had higher protective factors for smoking than those with a primary school education (OR=0.7, 95%CI=0.5-0.9; OR=0.4, 95%CI=0.2-0.8). Subjects who had a history of respiratory illness were 3.2 times more at risk for smoking than those who had none (95%CI=1.5-6.9). Subjects who had a systolic blood pressure ≥140 mmHg were 1.8 times more at risk for smoking than those with a systolic blood pressure <140 mmHg (95%CI=1.1-2.8), as shown in Table 4.

DISCUSSION

The majority of study subjects were in the Maha Nikaya section (type of ordination), age 20-34 years, worked in agriculture or as employees before being monks, lived in a public temple, and had no Dharma education. The proportion of cigarette smoking was 47.6%. These findings are similar to a previous report (Ingram, 2002) which found that about 50% of monks were smokers. They started smoking before monkhood (95.2%), were youth aged 15-19 years (43.8%), had a duration of smoking 1-9 years (36.6%), smoked 10-19 cigarettes per day (40.7%), and smoked everyday (86.9%). A poor socio-economic situation was a critical factor which lead them to become a monk. Temples were their schools and temporary homes and they lived on alms donated by the public. The average length of being a monk was 6 years. A solution to the smoking problem is needed both before and after being a monk as well as while being a monk.

There is no religious edict banning monks from smoking. Even senior clerics can some-

Table 4
Risk factors for current smoking among Buddhist monks by multiple logistic regression.

Variable	OR	95 % CI	p-value
Age (yr)			
< 25	1		
25-34	0.9	0.6-1.5	NS
35-44	1.3	0.7-2.1	NS
≥ 45	1.1	0.6-1.7	NS
Dharma education			
No schooling	1		
Naktham Tri (grade 1)	0.7	0.5-1.1	NS
Naktharm To (grade 2)	0.6	0.4-0.9	[a]
Naktharm Aek (grade 3) or above	0.4	0.2-0.6	[c]
Education			
Primary school	1		
Secondary school	0.7	0.5-0.9	[a]
Vocational school	0.9	0.5-1.6	NS
Bachelor degree or above	0.4	0.2-0.8	[b]
Former occupation			
Agriculture	1		
Employee	1.3	0.9-1.8	NS
Student	0.6	0.3-1.3	NS
Government officer/state enterprise officer	1.4	0.7-2.9	NS
Others	0.9	0.5-1.8	NS
Duration of monkhood (yr)			
<5	1		
5-9	1	0.7-1.6	NS
10-14	0.6	0.4-1.1	NS
>15	0.7	0.4-1.2	NS
Systolic blood pressure (mmHg)			
<140	1		
≥140	1.8	1.1-2.8	[a]
History of illness within 1 year			
Respiratory tract			
No	1		
Yes	3.2	1.5-6.9	[b]

NS, not significant at α=0.05
[a]$0.01<p<0.05$; [b]$0.001<p<0.01$; [c]$p<0.001$ by Likelihood Ratio Test.

times be seen smoking. Smoking goes against the moral values of Buddhism, since monks are the spiritual leaders of the lay people, Thai monks can also be crucial agents for smoking reduction in the rural population (Swaddiwudhipong, 1993). Tobacco, whether smoked or chewed, is now widely considered an addictive and dangerous drug. However, as its impact on consciousness is slight, most Buddhists do not consider smoking to be breaking the fifth precept. In Myanmar and Japan, smoking by monks is as common as it is in Thailand amongst monks of the Maha Nikaya section. In Sri Lanka and amongst Tibetans and Chinese, smoking monks are looked down upon and they usually refrain from it. From the Buddhist perspective, smoking may well be unwise but it does not have a moral dimension. Smoking among monks is related to respiratory illness and high systolic blood pressures. Teams of health personnel should educate as to the impact and disadvantages of smoking, and should counsel to stop smoking.

However, government officials will have to be especially vigilant to see that this new legislation is respected. Enforcement officials from several government departments are responsible for ensuring that the new restrictions on tobacco advertising and marketing, and on smoking in public places, are respected. If they are successful, Thailand may soon begin to enjoy the public health benefits that flow from declining tobacco consumption (WHO, 1997). Our study found that the more education (Dharma and lay education), the less monks smoke. This finding is similar to previous studies (Hann *et al*, 1995; WHO, 1997). Educational promotion and intensive anti-smoking campaigns through the media are important measures for smoking cessation.

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