

ORIGINAL ARTICLE**FACTORS AFFECTING SMOKING MENTHOL BRAND CIGARETTE AMONG THE ADULT POPULATION IN SARAWAK, MALAYSIA**

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ABSTRACT

Menthol brand cigarette has been found to be linked with early initiation of smoking and addiction of nicotine. This study was designed to find out the factors associated with smoking menthol brand cigarettes among adult population in Sarawak. This was a cross-sectional study conducted among the adult population in Sarawak. Data were collected from ten villages in Kota Samarahan and Kuching Division by face to face interview using modified Global Adult Tobacco Survey questionnaire. Non-probability purposive sampling method was adopted to select the villages. All the households of the villages were visited, and an adult member was selected randomly from each household irrespective of sex. After missing value imputation, 1000 data sets were analysed using statistical software SPSS 19.0 version. Analysis showed that 28.8% of the respondents were current smokers, and 7.8% were past smokers. Among the smokers, 56.3% were habituated with menthol brand cigarette. Logistic regression analysis revealed that age at initiation of smoking before 15 years of age (OR=11.68, 95% CI: 4.25, 32.10), smoking within five minutes of wake up from sleep (OR=3.20, 95% CI: 1.35, 7.54), nature of job as business (OR=4.81, 95% CI: 2.13, 10.86) and service holders (OR= 3.85, 95% CI: 2.07, 7.16) and family size 5 and above (OR=2.22, 95% CI: 1.25, 3.94) appeared to be important determinants of smoking any menthol brand cigarette ($p<0.05$). Menthol is a prominent design feature to attract and retain younger smokers. It does not necessarily make the transition from experimenting with cigarettes, but to encourage early smokers to become a confirmed smoker. So, anti-tobacco public health programme should focus on age-specific community approach.

Keywords: Cigarettes, Menthol, Smoking, Sarawak

INTRODUCTION

Tobacco consumption and product have increased globally since its introduction, especially in developing countries. In Malaysia, the disease burden of respiratory diseases is apparent with 11.02% of the total cases of admission, the second highest principal cause of hospitalization.¹ The National Health and Morbidity Survey 1996 (Second NHMS, 1996) showed that the prevalence of smoking in Sarawak was 22.3%, where 16.5% were in urban, and 26.4% were in rural region. Menthol cigarettes have been found to be more addictive and has led to a higher difficulty of smoking cessation among smokers.² Among different ethnicity, menthol cigarettes were equally preferred as compared to non-menthol cigarettes in young people.³ The impact of menthol cigarette smoking, including nicotine dependence is worrying the public⁴⁻⁶ and the younger generation⁷ globally. Brown & Williamson reported that smokers have the highest rates of lung cancer of any racial/ethnic group,⁸ but other study demonstrated that African American smokers are also more likely to die from lung cancer than white smokers.⁹ Murray et al.¹⁰ found that male (but not female) menthol smokers had a modestly increased risk of lung cancer with a relative risk of 1.45 (95% CI:1.03-2.02). Kabat and Hebert (1994)¹¹ in a case control study suggested a small positive association between pharyngeal cancer in menthol smoking males, but not females (OR=1.7; 95% CI: 0.8-3.4). However, the

difference was not statistically significant. Previous studies showed that menthol cigarettes appear to produce a greater boost in nicotine and carbon monoxide levels than nonmenthol cigarettes.¹²⁻¹⁴ This possibly explains that menthol could potentiate the uptake of carcinogenic constituents of cigarette smoke.

Young people, are the targets for marketing as they are adventurous and willing to try new things. The menthol cigarette is unique, in which it is the only allowed additive in cigarettes. Marketing schemes to attract young people to smoke menthol cigarettes are high^{2,15,16} not only in the United States but also in the Asian countries, such as Singapore (22%), Hong Kong (26%) the Philippines (60%)¹⁷ and even in Malaysia.¹⁸ Menthol cigarettes are associated with increasing trend of smoking initiation among young non-smoking women¹⁵ and young male adults¹⁶ as well. Several factors have been found to be associated with the initiation of menthol cigarette smoking, including those trying to start smoking¹⁹, female^{19,20}, those who smoked less frequently¹⁹ and being of younger age.⁴ The significance of this study towards the current knowledge of tobacco was in identifying the local factors associated with choosing the smoking of menthol cigarette and to understand the initiation factors and its patterns. In this context, the main objective of this study was to determine the factors associated with smoking menthol brand cigarettes and smoking initiation among adult population in Sarawak.

METHODOLOGY

Study design and sampling procedure

This was a cross-sectional study conducted in ten different villages, in two of the eleven divisions in Sarawak. Five villages from Kota Samarahan and five villages from Kuching division were selected. A non-probability purposive sampling technique was adopted to select the villages. All the households within the villages were visited. One respondent aged 18 years and above was selected randomly irrespective of sex from each household after listing the household members aged 18 years and above. The respondent who did not consent or unwilling to participate; age below 18 years, a person incapable of answering the questionnaires and visitors who were visiting the state were excluded from the study. A total of 1000 data sets were collected from ten villages.

Instrument development and data collection procedure

A modified data collection instrument was developed based on Global Adult Tobacco Survey (GATS)²¹ and other relevant additional instruments.²² Data collection was done by Doctor of Public Health (DrPH) first-year students using an interviewer administered semi-structured questionnaire. The questionnaire consists of several parts, which include socio-demographic characteristics, tobacco use behaviour and its patterns, cessation attempts, second-hand smoking and dependence on nicotine. A pre-test of the questionnaire was done in a non-sample area, utilizing the translated Malay language in questionnaire. A minor change of the questionnaire was made after pre-test. Respondents who reported smoking at least one cigarette in the last month, at the time of the survey, smoked either every day or some days were defined as a current smoker. Respondents who reported giving up smoking for the last six months were defined as a

former smoker. Respondents who did not smoke in his/her life were defined as a never smoker. Respondents who smoked cigarettes within five minutes of waking up from sleep were defined as nicotine dependent.⁶ The study proposal was approved by the Research Review Committee of the Faculty of Medicine and Health Sciences (FMHS) and Research and Innovation Management Centre (RIMC), Universiti Malaysia Sarawak (UNIMAS). Ethical clearance was also taken from the Ethical Review Board (IRB) of the Faculty of Medicine and Health Sciences, UNIMAS.

Data processing and analysis

Data was entered manually and cross-checking was done using SPSS Software 19.0 version. After validation, descriptive statistics were presented to summarize participants' socio-demographic characteristics, pattern of smoking, frequency and its dependency. The main hypothesis was whether initiation of smoking has a link with menthol brand cigarette. Missing data were carefully examined and imputed. However, failure to collect adequate data of an important variable such as smoking history, were not used in the final data analysis. In the present analysis, only current smokers' data were analysed, former and non-smokers were excluded from the final analysis. A binary logistic regression analysis was done to test the hypothesis. A *p*-value less than 0.05 was considered as statistically significant.

RESULTS

Smoking status

Table 1 shows the smoking status of the respondents. Out of 1000 interviewed respondents, 28.8% were current smokers (95% CI: 26.1, 31.8), 8.7% were past or former smokers (95% CI: 7.0, 10.5) and 62.5% were never smokers (95% CI: 59.4, 65.4). Among the smokers, 56.3% were habituated with any menthol brand cigarette.

Table 1 Percentage distribution of the respondents by smoking (n=1000)

Smoking status	Frequency	%	95% CI	
			Lower bound	Upper bound
Current smokers	288	28.8	26.1	31.8
Past smokers	87	8.7	7.0	10.5
Never smokers	625	62.5	59.4	65.4

Socio-demographic characteristics of the smokers

Details of socio-demographics of the smokers are presented in Table 2. The mean age of the smokers was 36.64 years with standard deviation of 14.6 years. The study sample was predominately male with 94.1%. About half of the respondents had higher secondary education and above (47.9%). The majority of the respondents were Malays (90.6%) and Muslims (91.3%). The mean family size was 5.22 with a standard deviation of 2.1. Three-fifths (61.8%) of

the respondents were married. The mean monthly income was MYR 1156.65. One-third of the respondents were engaged in any gainful job, and 17% were businessmen. However, 47.6% were engaged in different types of job such as housewives, students, self-employed and others. To assess the socioeconomic status, number of living rooms was used as a proxy variable.²³ The mean number of living rooms was 3 with one-third of the respondents having 1-2 living rooms (33.7%), and another one-third had 4 and above living rooms.

Table 2 Socio-demographic characteristics of the current smokers (n=288)

Characteristics	Frequency	%	95% CI	
			Lower bound	Upper bound
Age in years				
<20	34	11.8	8.3	15.6
20-29	79	27.4	22.2	32.6
30-39	64	22.2	17.4	27.1
40-49	46	16.0	11.8	20.1
50-59	43	14.9	10.8	19.1
≥60	22	7.6	4.9	10.8
Mean (SD)	36.64(14.6)		34.99	38.33
Gender				
Male	271	94.1	91.3	96.5
Female	17	5.9	3.5	8.7
Level of Education				
No formal education	29	10.1	6.6	13.9
Primary	78	27.1	21.9	32.3
Secondary	43	14.9	10.8	19.1
Higher secondary & above	138	47.9	42.0	53.8
Religion				
Muslim	263	91.3	87.8	94.4
Non-Muslim	25	8.7	5.6	12.2
Ethnicity				
Malay	261	90.6	87.2	94.1
Chinese	27	9.4	5.9	12.8
Family size				
<5	105	36.5	30.9	42.0
≥5	183	63.5	58.0	69.1
Mean (SD)	5.22(2.1)		4.99	5.47
Marital status				
Unmarried	94	32.6	27.4	38.2
Married	194	67.4	61.8	72.6
Monthly income (MYR)				
≤800	135	46.9	41.0	52.8
≥801	153	53.1	47.2	59.0
Mean (SD)	1156.75(1029.9)		1039.32	1283.49
Nature of work				
Service	102	35.4	30.2	41.0
Business	49	17.0	12.8	21.5
Others	137	47.6	41.7	53.5
No. of living rooms				
1-2	97	33.7	28.1	39.2
3	99	34.4	28.8	39.9
≥4	92	31.9	26.4	37.5
Mean (SD)	3.02(1.0)		2.91	3.14

Behavioural Characteristics of the smokers

Table 3 shows the behavioural characteristics of the current smokers. About two-fifths of the smokers started smoking within five minutes of waking up from sleep (38.2%, 95% CI: 32.3, 43.8), and about half of the smokers started smoking in between 6 to 60 minutes (48.6%, 95% CI: 42.7, 54.5), and only 13.2% smoked after 60 minutes waking up. The mean age of initiation of smoking was 17.17 years with standard deviation

of 3.6 years (95% CI: 16.78, 17.60). Three fifths (62.8%, 95% CI: 57.3, 68.4) of the respondents initiated smoking at the age of 15-19 years. However, more than one-tenth (14.6%, 95% CI: 10.4, 18.8) initiated smoking before the age of 15 years. The mean duration of smoking was 16.52 (95% CI: 15.15, 17.89) years, and average, 14.64 (95% CI: 13.68, 15.62) sticks of cigarette were smoked per day.

Table 3 Behavioral characteristics of the smokers (n=288)

Characteristics	Frequency	%	95% CI	
			Lower bound	Upper bound
First cigarette after waking up from sleep (min)				
After 60 minutes	38	13.2	9.7	17.4
Within 6-60 minutes	140	48.6	42.7	54.5
Within 5 minutes	110	38.2	32.3	43.8
Age at initiation of smoking (years)				
<15	42	14.6	10.4	18.8
15-19	181	62.8	57.3	68.4
≥20	65	22.6	17.7	27.4
Mean (SD)	17.17(3.6)		16.78	17.60
Duration of smoking (years)				
1-9	85	29.5	24.3	34.7
10-19	118	41.0	35.4	46.9
20-29	49	17.0	12.8	21.5
≥30	36	12.5	8.7	16.7
Mean (SD)	16.52(11.9)		15.15	17.89
Number of sticks smoked per day				
1-10	135	46.9	41.0	52.4
11-20	132	45.8	40.3	51.4
21-30	21	7.3	4.5	10.4
Mean (SD)	14.64(8.6)		13.68	15.62

Factors affecting smoking Menthol brand Cigarette: Binary Logistic Regression Analysis

A binary logistic regression analysis was done to examine whether smoking menthol brand cigarette has an impact on initiation of smoking and nicotine dependency and non-menthol brand cigarette was used as the reference category (Table 4). All the variables were entered into a logistic regression model one by one to determine the significant individual contribution. Some variables were statistically significant in bi-variate chi-square analysis, but had no potential impact in logistic regression analysis. Initial bi-variate analysis revealed that age, gender, level of education, family size, marital status, monthly family income, number of living rooms, first smoking after waking up from sleep, age at initiation of smoking, duration of smoking and number of sticks smoked per day appeared as significant influencing factors of smoking menthol brand cigarette ($p < 0.05$). However, four independent variables were identified as important predictors in the final full explainable model. The model containing the four independent variables explained 21.0% (Cox and Snell R square) and 28.0% (Nagelkerke R squared) of the variance in the choice of menthol brand cigarette. It was also able to classify 69.0% of the cases. The goodness of fit indices was not statistically significant ($p > 0.05$) which indicated that the assumption was not violated. Analysis revealed that age at initiation of smoking before 15 years of age (OR=11.68, 95% CI: 4.25, 32.10),

smoking within five minutes of waking up from sleep (OR=3.20, 95% CI: 1.35, 7.54), nature of a job as business (OR=4.81, 95% CI: 2.13, 10.86) and service holders (OR= 3.85, 95% CI: 2.07, 7.16) and family size 5 and above (OR=2.22, 95% CI: 1.25, 3.94) appeared to be important determinants of smoking any menthol brand cigarette ($p < 0.05$).

DISCUSSION

The prevalence of smoking 28.8% among respondents who were current smokers was similar to previous findings in a Malaysian setting, which were 29.7% in Johor²⁴ and 29% in Selangor.²⁵ Among the smokers, almost half, 56.3% were habituated with any menthol brand cigarettes. The mean age of the smokers was 36.64 years, which portrayed a younger age group, consistent with the global patterns of smoking²⁶ found in studies done by tobacco companies.^{4,6} We also found that males were predominant whereas other studies found that females were predominant in mentholated smokers.^{15,27} However, the finding of predominantly among males was similar to other studies done in both the Peninsula and East Malaysia.²⁵ The smokers had higher secondary education and above¹⁹ which was also found with similar prevalence in a university setting,¹⁸ and was highest among the Malays of Kota Samarahan and Kuching division in Sarawak.

Table 4 Factors affecting the type of cigarette smoked by socio-demographic characteristics: Binary Logistic Regression analysis (menthol vs. non-menthol cigarette)

Characteristics	β	Odds ratio	95% CI	
			Lower limit	Upper limit
First cigarette after waking up (minutes)				
After 60 minutes (Ref)	-	-	-	-
Within 6-60 minutes	0.786*	2.194	0.978	4.922
Within 5 minutes	1.164**	3.203	1.359	7.547
Nature of work				
Service	1.350***	3.857	2.076	7.164
Business	1.571***	4.812	2.132	10.863
Others (Ref)	-	-	-	-
Age at initiation of smoking (years)				
<15	2.458***	11.685	4.254	32.100
15-19	0.832**	2.299	1.183	4.466
≥ 20 (Ref)	-	-	-	-
Family size				
<5(Ref)	-	-	-	-
≥ 5	0.800**	2.226	1.256	3.945
Constant	-2.607	.074		
Model chi square (df)	67.669 (7)***			
n	287			
Goodness of fit	p>0.05			
Ref	Reference category			

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

The mean age of initiation of smoking was 17.17 years indicative of younger age group within the menthol cigarette smokers. Moreover, 14.6% were found to have initiated smoking before the age of 15 years. Menthol as an additive flavouring in cigarettes was found to entice the younger age group as found in other studies as well.^{27, 28-30} Mentholated cigarettes were also more acceptable to the smokers, and they tend to smoke longer, with a mean duration of smoking of 16.52 years.^{26,28,30} On an average, 14.64 sticks of cigarette were smoked per day, which was comparable to other studies in the United States with 16 cigarettes per day amongst all mentholated cigarette smokers.³¹

Smokers with the age at initiation of smoking before 15 years of age were found to be 11.68 times more likely to smoke a mentholated cigarette, which was also found in other studies with higher likelihood to be menthol smokers.^{27,32,33} Those smoking within five minutes of waking up from sleep were 3.20 times more likely;^{2,4,5,31,34} those who had business as nature of job were 4.81 times more likely; those working as service holders were 3.85 times more³⁵ and family size of five and above were 2.22 times more likely to smoke mentholated cigarettes as compared to non-menthol smokers. The cross-sectional design of this study limits the conclusion regarding relationships between mentholated smokers and the dependence on nicotine. The nature of the questionnaire also need to be treated with caution to reduce recall biases.

CONCLUSION

Male mentholated cigarette smokers were in the younger age group. The age of initiation before 15 years was a determinant for menthol preference, indicating an early age of trial and initiation among mentholated cigarette smokers. The longer duration of smoking among menthol smokers suggested that menthol was a method to attract and retain the younger smokers, even though the number of cigarettes per day was lower. This would thus reinforce the theory that tobacco marketing does take menthol flavouring as an appealing feature to entice young smokers. Public health practitioners and policy makers should target anti-tobacco public health programme for age-specific community approach.

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