Health Risk Behavior And Associated Factors Among Myanmar Migrant Workers In Samut Sakhon Province, Thailand

Chirawat Paratthakonkun

Mahidol University College of Sports Science and Technology

Ngamphol Soonthornworasiri (✉ ngamphol.soo@mahidol.ac.th)

Mahidol University Faculty of Tropical Medicine <https://orcid.org/0000-0003-1031-7979>

Pannamas Maneekan

Mahidol University Faculty of Tropical Medicine

Kanittha Toraksa

Samut Sakhon Hospital

Aung Phone Zaw

Mahidol University Faculty of Tropical Medicine

Sai Wai Yan Myint Thu

Mahidol University Faculty of Tropical Medicine

Dumrongkiet Arthan

Mahidol University Faculty of Tropical Medicine

Research article

Keywords: Exercise, Smoking, Alcohol drinking, Betel quid chewing, Myanmar migrant workers

Posted Date: February 3rd, 2020

DOI: <https://doi.org/10.21203/rs.2.22500/v1>

License: This work is licensed under a Creative Commons Attribution 4.0 International License. [Read Full License](#)

Abstract

Background: Thailand has recently experienced large cross-border migration from nearby countries, in particular from Myanmar that have different lifestyle and health behaviors compared with the local community. The aim of this study was to explore the prevalence of health-risk behaviors and related factors amongst Myanmar migrant workers in Thailand.

Methods: The cross-sectional secondary data analysis was performed by using the primary data from questionnaire survey obtained from Samut Sakhon Hospital. This study explored the health-risk behaviors amongst 1,205 Myanmar migrant workers in Thailand by using a structured questionnaire, and analyzing the related factors by using logistic regression.

Results: Lack of exercise was considered to be the most common unhealthy behavior (81.5%) followed by smoking (22.5%), betel quid chewing (18.9%) and alcohol drinking (10.2%). Advancing age (AOR = 1.03, 95%CI 1.02-1.05) and being male (AOR = 8.29, 95%CI 5.54-12.40) were significant risk factors for workers having a smoking habit. Additionally, being Mon ethnic led to a lower chance of having a smoking habit compared with the Burmese ethnic group (AOR= 0.518, 95% CI: 0.315-0.851). The odds of having a smoking habit was four times greater in workers who drank alcohol (AOR = 4.08, 95%CI 2.58-6.47). Additionally, odds of drinking alcohol increased with advancing age, 1.03 (95%CI 1.00-1.05), male gender, 9.30 (95%CI 4.39-19.73), having a smoking habit, 4.23 (95%CI 2.67-6.70) and being a fisherman, 3.08 (95%CI 1.51-6.29).

Conclusions: The findings can be used for developing appropriate policies, special health promotion programs and mass communication to prevent treated diseases in migrant workers.

Keywords : Exercise, Smoking, Alcohol drinking, Betel quid chewing, Myanmar migrant workers

Background

Thailand has become one of the most developed countries in the Mekong sub-region, providing higher job opportunities compared with neighboring countries [1, 2]. Consequently, Thailand has become a popular destination for migrant workers, particularly from Myanmar, Cambodia and Laos PDR [3]. The Samut Sakhon Province is currently estimated to have 400,000 Myanmar migrant workers [4]. The majority of workers are employed in low-skilled jobs such as fishing, construction and factory work, but are attracted by the higher salaries compared with the other provinces in Thailand [5]. The higher stress encountered with migrant work may directly predispose workers to cardiovascular diseases. Alternatively, development of diseases may be related to unhealthy behaviors, such as drug abuse, smoking, alcohol intake, lack of income for prevention and treatment of diseases, and/or an inability to follow health education advice [6]. Therefore, a greater emphasis has been placed on increasing education and health knowledge to positively impact migrant worker health status.

Smoking, lack of exercise, alcohol abuse and consuming an unhealthy diet are all important modifiable risk factors for the occurrence of non-communicable diseases, such as cardiovascular diseases, cancers and diabetes [7]. Furthermore, betel quid chewing can cause oral premalignant lesions and cancers in both Myanmar males and females [8, 9]. The health status of migrant workers can also be influenced by physical activity and food preferences, food ingredients and taste. For instance, lack of exercise is regarded as a risk factor for many chronic diseases and is currently a major cause of death in modern society [10]. In line with these known health risks, the aim of this study was to determine the prevalence of unhealthy behaviors and their associated factors amongst Myanmar migrant workers residing in the Samut Sakhon Province in Thailand.

Methods

We performed the cross-sectional secondary data analysis based on questionnaire survey obtained from Samut Sakhon Hospital. The survey was collected from the fiscal years 2017/07 to 2018/02. The study was approved by the Ethics Committee Institutional Review Board, Faculty of Tropical Medicine, Mahidol University (MUTM 2017-040-02). The Myanmar migrant workers were recruited as participants to complete questionnaire survey. The recruitment criteria for participants were (1) a Myanmar citizen, (2) residing in Sumut Sakhon province, Thailand, for more than one year, (3) aged 18 years and older. The sample size was calculated via single proportion formula by using the prevalence result of a previous study in which 39.3% of Myanmar migrant workers in the Mae Sot District (Tak Province) had a smoking habit [11]. The minimum sample size was considered to be 1,018 with a precision of 3%.

One-thousand and two-hundred fifteen households were subsequently randomly selected by using a simple random sampling technique. Survey questionnaires were undertaken through face-to-face interviews. The questionnaires were pre-tested with the Myanmar migrant

workers before conducting the study. The well-trained interviewers who were translators, distributed the interview to the participants. The period of data collection took approximately 4 months starting from September 2017 to January 2018. The questionnaire contained structured questions consisting of demographic information, the prevalence of health-risk behaviors, such as, smoking, alcohol drinking, betel quid chewing, and preferred food ingredients and taste in order to predict future risks of non-communicable diseases. Data from the survey questionnaires were entered into an Excel program by trained research assistants at the Department of Tropical Nutrition and Food Science, Mahidol University. The data was analyzed using a statistical software package (SPSS version 18 software) with descriptive analysis, chi-square and logistic regression analyses performed. A p-value of < 0.05 was considered statistically significant.

Results

Demographic characteristics of participants

Among the 1,215 Myanmar migrant workers, 55.5% of the respondents were aged ≤ 30 , 52.2% of them were female and 61.8% of them were married. Most workers were Burmese (43.0%), followed by Dawei (31.1%), Mon (17.8%) and Karen, who only made up 4.7% of the study participants. The highest education level of > 60% of workers was primary education, with 16.4% of the respondents not having any formal education. Only 2.7% of workers studied at high school or University. The vast majority (76.3%) worked as construction or factory laborers and 14.6% of the participants did not have any occupation, with their income dependent on their family members. Additionally, nearly two-thirds of the respondents had children in their family (data not shown). A detailed description of the demographic information of the participants can be seen in Table 1.

Table 1
Socio-demographic characteristics of respondents (N = 1,215)

General characteristics		Number (%)
Age	≤30	671 (55.5)
	> 30	539 (44.5)
	31.19 ± 10.03 (mean ± SD)	
Gender	Male	581 (47.8)
	Female	634 (52.2)
Marital status	Single	462 (38.2)
	Married	749 (61.8)
Ethnic	Burmese	522 (43.0)
	Dawei	378 (31.1)
	Mon	216 (17.8)
	Karen	57 (4.7)
	Other	42 (3.5)
Religion	Buddhism	1,188 (98.4)
	Other	19 (1.6)
Occupation	Labour	926 (76.3)
	Fisherman	59 (4.9)
	Merchant	18 (1.5)
	No job	177 (14.6)
	Others	33 (2.7)
Income (THB)	≤12000	577 (48.1)
	> 12000	623 (51.9)
	15,321.45 ± 6814.64 (mean ± SD)	
Education	Uneducated	197 (16.4)
	Primary	749 (62.2)
	Secondary	226 (18.8)
	Other (High school and bachelor)	32 (2.7)
Studying	Yes	27 (2.2)
	No	1175 (96.7)

Prevalence of health risk behaviors

More than three-quarters (81.5%) of the total participants did not exercise regularly, accounting for the most prevalent health-risk behavior amongst the four types of unhealthy behaviors (smoking, alcohol drinking, betel quid chewing, and lack of exercise). Smoking ranked second (22.5%) in these four unhealthy behaviors, followed by betel quid chewing (18.9%) and alcohol drinking (10.2%). Only 7% of the respondents lacked any of the abovementioned behaviors. The combination of smoking and alcohol drinking habits were found to be the most common concurrent habit, comprising about 6.7% of the total respondents. Furthermore, smoking, alcohol intake and lack of exercise were observed coincidentally in the same person amongst the 4.5% of the survey respondents. Table 2 provides information about the frequency and percentage of the four different health risk behaviors.

Table 2
Percentage of health risk behaviors

Health behavior		Number (%)
No risk behavior	Yes	83 (7.0)
	No	1102 (93.0)
One risk		
Smoking	Yes	273 (22.5)
	No	938 (77.5)
Alcohol drinking	Yes	123 (10.2)
	No	1078 (89.8)
Betel quid chewing	Yes	227 (18.9)
	No	974 (81.1)
Lack of exercise	Yes	983 (81.5)
	No	223 (18.5)
Two or three risks		
Smoking and alcohol drinking	Yes	81 (6.7)
	No	1120 (93.3)
Smoking and betel quid chewing	Yes	67 (5.6)
	No	1133 (94.4)
Alcohol drinking and betel quid chewing	Yes	38 (3.2)
	No	1152 (96.8)
Smoking + Alcohol drinking + lack of exercise	Yes	54 (4.5)
	No	1141 (95.5)
Note: Smoking: "Yes" means at least one cigarette a day, "No" means never Alcohol drinking: "Yes" means at least once a week, "No" means never. Betel quid chewing: "Yes" means at least one betel quid a day, "No" means never. Lacking of exercise: "Yes" means never, "No" means at least once a week.		

Unhealthy eating behaviors

Of the 1,215 research participants, more than one-fifth (22.2% and 22.1%) preferred to eat sour and salty food, respectively, whereas only 3.8% preferred to have food with normal taste. In relation to food ingredients, monosodium glutamate was the most commonly used food ingredient, comprising approximately 26.7% of the total participants, followed by vegetable oil. However, coconut and animal oil were regarded as the least preferred food ingredients amongst the eight ingredients that were mainly used as food additives or flavouring agents in Thailand. The percentage and frequency of preferred taste and food ingredients are shown in Tables 3 and 4, respectively.

Table 3
Percentage of preferred taste

Preferred taste	Number (%)
Sweet	487 (17.3)
Salty	
Sour	623 (22.1)
Bitter	
Spicy	625 (22.2)
Normal taste	
	412 (14.6)
	558 (19.8)
	108 (3.8)
Total	2,813 (100.0)

Table 4
Percentage of preferred food ingredients
consumed by Myanmar migrant workers

Preferred food ingredients	Number (%)
Sweet	235 (7.6)
Vegetable oil	
Animal oil	737 (24.0)
Coconut	
Salt	29 (0.9)
Fish sauce	
Fermented shrimp	50 (1.6)
Monosodium glutamate	
	699 (22.7)
	213 (6.9)
	291 (9.5)
	822 (26.7)
Total	3,076 (100.0)

Factors associated with health risk behaviors

Based on the results of logistic regression analysis, advancing age and male gender were significant risk factors for having a smoking habit ((AOR = 1.03, 95% CI: 1.02–1.05), (AOR = 8.29, 95% CI: 5.54–12.40)). Additionally, the Mon ethnic group had a lower chance of having a smoking habit compared with the Burmese ethnic group (AOR = 0.52, 95% CI: 0.32–0.85). Interestingly, the odds of a having smoking habit was four times greater in participants who drank alcohol when all other variables were kept constant (AOR = 4.08, 95% CI: 2.58–6.47) (Table 5). In addition, odds of drinking alcohol was increased by advancing age, male gender, having a smoking habit and being a fisherman, with an adjusted odds ratio of 1.03 (95% CI: 1.00–1.05), 9.30 (95% CI: 4.39–19.73), 4.23 (95% CI: 2.67–6.70), 3.08 (95% CI: 1.51–6.29) (Table 6). Increasing age, male gender, unemployment and belonging to the Dawei ethnic group were shown to have a significant association with having a betel quid chewing habit (Table 7). The female gender, belonging to the Burmese ethnic group, and being a fisherman, were considered to be predisposing factors for lack of exercise whilst participants who studied at secondary school level or higher were more likely to perform regular exercise compared with uneducated participants (Table 8).

Table 5
Factors influencing smoking habit

Variables	Smoking		Crude odds ratio (95% CI)	P value	AOR (95% CI)	P value
	Yes	No				
Age ^a (year)	-	-	1.03 (1.02–1.05)	< 0.001*	1.03 (1.02–1.05)	< 0.001*
Gender Female Male	43 230	587351	1 (reference) 8.95 (6.29–12.71)	< 0.001*	1 (reference) 8.29 (5.54–12.40)	< 0.001*
Ethnicity Burmese Mon Karen Dawei Other	120 31 10 102 10	400 183 47 276 32	1 (reference) 0.57 (0.37–0.87) 0.71 (0.35–1.45) 1.23 (0.91–1.67) 1.04 (0.50–2.18)	0.009* 0.345 0.181 0.914	1 (reference) 0.52 (0.32–0.85) 0.66 (0.29–1.47) 1.31 (0.90–1.91) 1.56 (0.64–3.83)	0.009* 0.307 0.158 0.328
Religion Buddhism Other religions	267 6	918 13	1 (reference) 1.59 (0.60–4.21)	0.354	1 (reference) 1.89 (0.57–6.29)	0.301
Marital status Single Married	90 182	370 566	1 (reference) 1.32 (0.99–1.76)	0.055	1 (reference) 1.35 (0.95–1.92)	0.090
Occupation Labour Fisherman Merchant No job Other	209 25 5 26 7	715 34 13 150 26	1 (reference) 2.52 (1.47–4.31) 1.32 (0.46–3.73) 0.59 (0.38–0.92) 0.92 (0.39–2.15)	 0.001* 0.606 0.021* 0.849	1 (reference) 1.04 (0.53–2.04) 1.21 (0.34–4.25) 1.07 (0.62–1.84) 0.69 (0.25–1.88)	 0.916 0.772 0.802 0.466
Education status Uneducated Primary school Secondary school Other	32 172 58 9	164 576 168 23	1 (reference) 1.53 (1.01–2.32) 1.77 (1.09–2.87) 2.01 (0.85–4.73)	 0.045* 0.020* 0.112	1 (reference) 1.51 (0.93–2.45) 1.63 (0.92–2.89) 1.66 (0.59–4.71)	 0.097 0.094 0.338
Alcohol drinking No Yes	190 81	888 42	1 (reference) 9.01 (6.02–13.50)	< 0.001*	1 (reference) 4.08 (2.58–6.47)	< 0.001*
Betel quid chewing No Yes	203 67	770 160	1 (reference) 1.59 (1.15–2.19)	0.005*	1 (reference) 0.95 (0.65–1.40)	0.802
Notes: ^a Age was analyzed as a continuous covariate; AOR: Adjusted Odds Ratio;						
CI: confidence interval. *p < 0.05.						

Table 6
Factors influencing alcohol drinking habit

Variables	Alcohol drinking		Crude odds ratio (95% CI)	P value	AOR (95% CI)	P value
	Yes	No				
Age ^a (year)	-	-	1.03 (1.01–1.05)	0.001*	1.03 (1.00–1.05)	0.032*
Gender Female Male	9 114	618460	1 (reference) 17.02 (8.54–33.90)	< 0.001*	1 (reference) 9.30 (4.39–19.73)	< 0.001*
Ethnicity Burmese Mon Karen Dawei Other	45 21 4 48 5	472 190 53 328 35	1 (reference) 1.16 (0.67–2.00) 0.79 (0.27–2.29) 1.54 (0.99–2.36) 1.49 (0.56–4.02)	 0.595 0.666 0.051 0.421	1 (reference) 1.58 (0.85–2.96) 0.79 (0.25–2.48) 1.44 (0.86–2.40) 1.77 (0.50–5.62)	 0.150 0.684 0.169 0.330
Religion Buddhism Other religions	121 2	1054 17	1 (reference) 1.03 (0.23–4.49)	0.974	1 (reference) 0.49 (0.09–2.77)	0.419
Marital status Single Married	41 82	416 659	1 (reference) 1.26 (0.85–1.87)	0.247	1 (reference) 1.11 (0.69–1.79)	0.659
Occupation Labour Fisherman Merchant No job Other	89 19 2 7 6	828 39 16 167 27	1 (reference) 4.53 (2.51–8.19) 1.16 (0.26–5.14) 0.39 (0.18–0.86) 2.07 (0.83–5.14)	 < 0.001* 0.842 0.019* 0.118	1 (reference) 3.08 (1.51–6.29) 0.75 (0.14–3.99) 0.77 (0.32–1.87) 2.96 (0.99–8.84)	 0.002* 0.733 0.560 0.052
Smoking No Yes	42 81	888 190	1 (reference) 9.01 (6.02–13.50)	< 0.001*	1 (reference) 4.23 (2.67–6.70)	< 0.001*
Betel quid chewing No Yes	82 38	883 187	1 (reference) 2.19 (1.44–3.32)	< 0.001*	1 (reference) 1.66 (1.02–2.68)	0.041*
Education status Uneducated Primary school Secondary school Other	16 72 32 3	178 672 192 27	1 (reference) 1.19 (0.68–2.10) 1.85 (0.98–3.49) 1.24 (0.34–4.53)	 0.543 0.056 0.749	1 (reference) 0.95 (0.49–1.85) 1.77 (0.84–3.74) 0.88 (0.19–3.97)	 0.878 0.134 0.873
Notes: ^a Age was analyzed as a continuous covariate; AOR: Adjusted Odds Ratio;						
CI: confidence interval. *p < 0.05.						

Table 7
Factors influencing betel quid chewing habit

Variables	Betel quid chewing		Crude odds ratio (95% CI)	P value	AOR (95% CI)	P value
	Yes	No				
Age ^a (year)	-	-	1.05 (1.03–1.06)	< 0.001*	1.04 (1.02–1.06)	< 0.001*
Gender	92	536438	1 (reference)	< 0.001*	1 (reference)	< 0.001*
Female	135		1.80 (1.34–2.41)		2.11 (1.47–3.03)	
Male						
Ethnicity	83	430	1 (reference)		1 (reference)	
Burmese						
Mon	28	185	0.78 (0.49–1.24)	0.302	0.73 (0.45–1.19)	0.209
Karen	13	44	1.53 (0.79–2.97)	0.207	1.65 (0.83–3.28)	0.155
Dawei	92	284	1.68 (1.20–2.34)	0.002*	1.68 (1.17–2.41)	0.005*
Other	11	31	1.84 (0.89–3.80)	0.101	1.93 (0.87–4.27)	0.107
Religion	223	952	1 (reference)	0.725	1 (reference)	0.788
Buddhism	3	16	0.80 (0.23–2.77)		0.84 (0.23–3.07)	
Other religions						
Marital status	68	388	1 (reference)	0.006*	1 (reference)	0.085
Single	158	584	1.54 (1.13–2.11)		1.35 (0.96–1.91)	
Married						
Occupation	164	750	1 (reference)		1 (reference)	
Labour						
Fisherman	15	44	1.56 (0.85–2.87)	0.154	0.87 (0.45–1.70)	0.685
Merchant	2	16	0.57 (0.13–2.51)	0.459	0.43 (0.09–2.00)	0.283
No job	43	133	1.48 (1.01–2.17)	0.045	1.65 (1.07–2.54)	0.025
Other	3	30	0.46 (0.14–1.52)	0.201	0.40 (0.12–1.36)	0.140
Smoking	160	770	1 (reference)	0.005*	1 (reference)	0.587
No	67	203	1.59 (1.15–2.20)		1.12 (0.75–1.65)	
Yes						
Education status	42	150	1 (reference)		1 (reference)	
Uneducated						
Primary school	142	604	0.84 (0.57–1.24)	0.377	0.78 (0.51–1.19)	0.249
Secondary school	38	184	0.74 (0.45–1.20)	0.222	0.71 (0.42–1.21)	0.210
Other	5	27	0.66 (0.24–1.82)	0.424	0.53 (0.18–1.55)	0.243
Alcohol drinking	187	883	1 (reference)	< 0.001*	1 (reference)	0.066
No	38	82	2.19 (1.44–3.32)		1.58 (0.97–2.56)	
Yes						
Notes: ^a Age was analyzed as a continuous covariate; AOR: Adjusted Odds Ratio;						
CI: confidence interval. *p < 0.05.						

Table 8
Factors influencing exercise

Variables	Exercise		Crude odds ratio (95% CI)	P value	AOR (95% CI)	P value
	Yes	No				
Age ^a (year)	-	-	0.98 (0.97–0.99)	0.018*	0.98 (0.96–0.99)	0.022*
Gender Female Male	50 173	578 405	1(reference) 4.94 (3.52–6.93)	< 0.001*	1 (reference) 4.19 (2.85–6.18)	< 0.001*
Ethnicity Burmese	79	436	1 (reference)		1 (reference)	
Mon	47	168	1.54 (1.03–2.31)	0.034*	1.89 (1.21–2.95)	0.005*
Karen	14	43	1.80 (0.94–3.44)	0.077	2.34 (1.16–4.75)	0.018*
Dawei	75	302	1.37 (0.97–1.94)	0.076	1.66 (1.13–2.45)	0.010*
Other	8	34	1.30 (0.58–2.91)	0.526	1.48 (0.58–3.78)	0.414
Religion Buddhism Other religions	220 3	961 15	1 (reference) 0.87(0.25–3.04)	0.832	1 (reference) 0.66(0.17–2.63)	0.560
Marital status Single Married	100 123	360 620	1 (reference) 0.71 (0.53–0.96)	0.025*	1 (reference) 0.87 (0.62–1.24)	0.445
Occupation Labour	183	738	1 (reference)		1 (reference)	
Fisherman	7	52	0.54 (0.24–1.22)	0.137	0.31 (0.13–0.76)	0.011*
Merchant	3	15	0.81 (0.23–2.82)	0.736	0.69 (0.18–2.61)	0.586
No job	24	151	0.64 (0.41–1.02)	0.058	1.09 (0.64–1.83)	0.759
Other	6	26	0.93 (0.38–2.29)	0.876	1.04 (0.40–2.75)	0.931
Education status Uneducated	24	172	1 (reference)		1 (reference)	
Primary school	132	613	1.54 (0.97–2.46)	0.068	1.61 (0.97–2.68)	0.067*
Secondary school	56	168	2.39 (1.42–4.03)	0.001*	2.03 (1.14–3.62)	0.016*
Other	10	22	3.26 (1.38–7.71)	0.007*	3.31 (1.25–8.82)	0.016*
Smoking No Yes	135 88	799 183	1 (reference) 2.85 (2.08–3.89)	< 0.001*	1 (reference) 1.89 (1.20–2.77)	0.001*
Alcohol drinking No Yes	180 37	894 84	1 (reference) 2.19 (1.44–3.33)	< 0.001*	1 (reference) 1.06 (0.66–1.72)	0.809
Notes: ^a Age was analyzed as a continuous covariate; AOR: Adjusted Odds Ratio;						
CI: confidence interval. *p < 0.05.						

Discussion

The major findings of this study were that a smoking habit was the most prevalent oral habit compared with other oral health risk behaviors, such as alcohol drinking and betel quid chewing. Smoking increases the risk of a variety of non-communicable diseases, such as coronary heart diseases, stroke and cancer [12]. Therefore, it is important to conduct health promotion and health education in relation to smoking cessation with Myanmar migrant workers.

In the present study, the percentage of all health risk behaviors were lower compared with past findings [11]. Htin et al previously reported that betel quid chewing was the most common health risk behavior (53.3%) amongst Myanmar migrant workers residing at Mae Sot

District, Tak Province followed by smoking (39.3%) and alcohol drinking (36.7%) [11].

The difference between our findings may be explained by the decreasing trend of risk behaviors amongst Myanmar migrant workers, due to the increment in taxes for tobacco and alcoholic beverages, or by possibly becoming more aware of what constitutes a healthy lifestyle. Recently, Zaw et al reported that in a peri-urban township in Myanmar, 52% of the respondents had a betel quid chewing habit [13]. The authors concluded that this was likely the main reason for the increase in oral malignant lesions [13] and oral and pharyngeal cancer [14] in the chewer versus nonchewer. In a study conducted at the Thai-Myanmar border [15], betel quid chewing has also been shown to lead to adverse pregnancy outcomes in pregnant women.

The betel quid chewing habit has been considered a traditional practice in Myanmar [16] and is regarded as socially acceptable behavior. A possible reason for the lower rate of betel quid chewing by Myanmar people in Thailand may be due to the comparatively fewer betel quid shops, with the price of betel quid being more expensive in Thailand.

A total of 81.5% of the participants did not take part in regular exercise and therefore is regarded as the most common health risk behavior amongst Myanmar migrant workers. Our results are in agreement with Howteerakul and colleagues work [17], whom showed that physical inactivity was the most prevalent health risk behavior among Myanmar youth migrant workers who were working at Samut Sakhon Province. Importantly, avoidance of regular exercise may enhance the risk of future non-communicable diseases amongst the migrants.

Alcohol drinking was found to be a significant risk factor for smoking, with smoking also regarded as a significant risk for drinking alcohol. This indicates the increasing tendency of concurrent health risk behaviors among the migrant workers. Therefore, screening for oral premalignant lesions and oral cancer in Myanmar migrant workers who have concurrent risk behaviors of smoking and alcohol intake should be undertaken on a regular basis since many previous studies have shown that the combined habit of smoking, betel quid chewing or alcohol intake can have synergistic effects on the incidence of oral cancers [18].

Regarding ethnicity, there was a significant lower chance of having a smoking habit if belonging to the Mon ethnic group compared with the Burmese ethnic group. This may be partly explained by the twice higher number of uneducated participants in the Burmese ethnic group and the higher number of male participants amongst the Burmese ethnic group (data not shown). Furthermore, the Burmese ethnic group tended to be physically inactive compared with the Mon, Dawei, and Karen ethnic groups since most were labor workers or fisherman, which may discourage regular exercise due to less available time. Another interesting finding was that the likelihood of having all health risk behaviors was significantly raised in males compared with the females. This finding is in line with a previous study undertaken in Yangon, Myanmar, which revealed a significantly higher percentage of smoking and alcohol intake in male medical students and community youths [19]. The significant higher prevalence of health risk behaviors in males may be partly due to the lower alcohol drinking habits in females. Alcohol intake amongst females has been considered a culturally unacceptable practice in the Myanmar community [17]. In addition, the greater prevalence of smoking and betel quid chewing habits amongst males may be explained by the higher adolescent social influence amongst males compared with females [20].

Regarding food preference, over one-fifth of the respondents liked to eat salty tasting food and preferred to add salt as a main food additive, which may increase the incidence of future non-communicable diseases. More importantly, monosodium glutamate was the most popular food ingredient in the many different food ingredients amongst the Myanmar migrant workers. According to previous research, monosodium glutamate, which has been widely used as a flavoring agent, is significantly linked with the prevalence of obesity and hypertension in the Chinese population, which may lead to an increase in the risk of cardiovascular diseases [21]. Monosodium glutamate intake has also been associated with a significant increase in systolic blood pressure and diastolic blood pressure based on the Jiangsu Nutrition Study of Chinese men and women [22]. Indeed, the prevalence of high blood pressure in American children has been associated with monosodium glutamate intake [23]. These studies may explain why high prevalence of hypertension was found in a Myanmar study using 4,616 people aged 20 years and above in Yangon. The Yangon study showed that hypertension was associated with age, low physical activity, high intake of alcohol, obesity, high level of total cholesterol, and diabetes mellitus [24]. The study of eating behaviors in the voluntary group may support a recent report which was also showed a high prevalence of hypertension in association with metabolic-, behavioral- and socio-demographic factors [25].

Despite the present study focusing on the unhealthy lifestyles of Myanmar migrant workers, our study had a number of limitations. Firstly, the questionnaire did not assess customs and traditional influences, which might be potential risk factors of unhealthy behaviors amongst Myanmar migrant workers. Secondly, whilst this study included a large sample size, the data were only collected in the Samut Sakhon Province and is therefore difficult to extrapolate these findings to all Myanmar migrant workers across Thailand. Finally, as this

was a cross-sectional study, association of risk health factors were only interpreted. Therefore, further studies are required to determine the causal relationship between risk factors and unhealthy behaviors of Myanmar migrant workers.

Conclusion

The majority of migrant workers (93%) had some kind of unhealthy behavior, such as smoking, alcohol drinking, betel quid chewing and/or lack of exercise. Additionally, there was a preference for high consumption of monosodium glutamate and salt intake. These findings suggest that the prevalence of future non-communicable diseases among Myanmar migrant workers may be facilitated. Therefore, health education and promotion activities may be important for reducing these health risk behaviors to prevent non-communicable diseases amongst this population and reduce unnecessary budget burden upon the government. Moreover, longitudinal studies are required to identify the causal relationship between unhealthy behaviors and related factors in the Myanmar migrant population. Since tobacco usage and betel quid chewing is related with Myanmar tradition and culture, anthropological studies are recommended for delivering effective health education to Myanmar migrants.

The findings of this study will provide useful information for government authorities and policy makers by providing a greater understanding of personal health-risk behaviors in migrant workers. Moreover, these findings can be used to develop appropriate policies such as special health promotion programs and mass communication to prevent treated diseases in migrant workers. In addition, it can also give valuable baseline information for further studies.

Abbreviations

AOR: Adjusted Odds Ratio, 95% CI: 95% Confidence interval.

Declarations

Ethics approval and consent to participate

The study was approved by the Ethics Committee Institutional Review Board, Faculty of Tropical Medicine, Mahidol University (MUTM 2017-040-02).

Consent for publication

Not applicable.

Availability of data and materials

The raw datasets generated and analysed during the current study are not publicly available but is available on request for researchers from corresponding.

Competing interests

The authors declare that they have no competing interests.

Funding

This study was financially supported by the Thai Health Promotion Foundation, Thailand that does not have its role in the design of the study and collection, analysis, and interpretation of data and in writing the manuscript

Authors' contributions

CP participated in the design of the study, interpreted the data, wrote and edited the manuscript. NS performed in the design of the study, statistical analysis, interpreted the data and reviewed the manuscript. PM and KT participated in the design of the study, interpreted the data, wrote and edited the manuscript. APZ and SWYMT participated in the statistical analysis, interpretation of the data and reviewed of the manuscript. DA performed in the design of the study, interpreted the data, and reviewed the manuscript. All read and approved the final manuscript.

Acknowledgements

The authors would like to thank the research assistants of Samut Sakhon Hospital for their help during data collection. We would also like to thank Dr. Christopher Mawhinney, an instructor and English native speaker at the College of Sports Science and Technology, Mahidol University for thorough correction of the manuscript.

Authors' details

1College of Sports Science and Technology, Mahidol University, Nakhon Pathom Province, Thailand

2Department of Tropical Hygiene, Faculty of Tropical Medicine, Mahidol University, Bangkok, Thailand

3Samut Sakhon Hospital, Samut Sakhon Province, Thailand

4Department of Tropical Nutrition and Food Science, Faculty of Tropical Medicine,
Mahidol University, Bangkok, Thailand

References

1. Hall A. Migration and Thailand: policy, perspectives, and challenges: In: Jerrold WH and Chamratrithirong A, ed. Thailand Migration Report 2011 Migration for development in Thailand: Overview and tools for policymakers. Bangkok: FSPNetwork; 2011: 17-37.
2. McGann N. The opening of Burmese borders: impacts on migration. Migration Policy Institute [Internet]. 2013 Feb 20[cited 2019 Jan 13]. Available from: <https://www.migrationpolicy.org/article/opening-burmese-borders-impacts-migration>.
3. International Organization for Migration (IOM), the UN migration Agency. Migration Information Note. The Labour Migration Programme, IOM Thailand Office [Internet] 2016 Dec[cited 2019 Jan 13]. Available from: https://thailand.iom.int/sites/default/files/document/publications/MIN%20No.30_ENG_FINAL.pdf.
4. Ussawarakha S. Burmese religion in Thailand. Transcience 2015; 6: 53-61.
5. International Labour Organization (ILO). TRIANGLE II Quarterly Briefing Note [Internet] 2016 Apr 11[cited 2019 Jan 13]. Available from: https://www.ilo.org/asia/publications/WCMS_469496/lang-en/index.htm
6. Kristiansen M, Mygind A, Krasnik A. Health effects of migration. Dan Med Bull 2007; 54: 46-7.
7. World Health Organization (WHO). Global status report on noncommunicable diseases 2010. [Internet] 2011[cited 2019 Jan 13]. Available from: http://apps.who.int/iris/bitstream/handle/10665/44579/9789240686458_eng.pdf;jsessionid=8862F646D4BC9A7AE50921B4A87F4660?sequence=1
8. Kimman M, Norman R, Jan S, Kingston D, Woodward M. The burden of cancer in member countries of the Association of Southeast Asian Nations (ASEAN). Asian Pac J Cancer Prev 2012; 13: 411-20.
9. Merchant AT, Pitiphat W. Total, direct and indirect effects of paan on oral cancer. Cancer Causes Control 2015; 26: 487-91.
10. Booth FW, Roberts CK, Laye MJ. Lack of exercise is a major cause of chronic diseases. Compr Physiol 2012;2:1143-211.
11. Htin K, Howteerakull N, Suwannapong N, Tipayamongkhogull M. Smoking, alcohol consumption and betel-quid chewing among young adult Myanmar laborers in Thailand. Southeast Asian J Trop Med Public Health 2014; 45: 926-39.
12. National Center for Chronic Disease Prevention and Health Promotion (US) Office on Smoking and Health. The health consequences of smoking—50 years of progress: a report of the surgeon general. Atlanta: Centers for Disease Control and Prevention (US); 2014.
13. Zaw KK, Ohnmar M, Hlaing MM, Oo YT, Win SS, Htike MM, et al. Betel quid and oral potentially malignant disorders in a periurban township in Myanmar. PLOS ONE 2016; 11: e0162081.
14. Chen PH, Mahmood Q, Mariottini GL, Chiang TA, Lee KW. Adverse health effects of betel quid and the risk of oral and pharyngeal cancers. Biomed Res Int 2017; 2017: 1-26.

15. Chue AL, Carrara VI, Paw MK, Pimanpanarak M, Wiladphaingern J, van Vugt M, et al. Is areca innocent? The effect of areca (betel) nut chewing in a population of pregnant women on the Thai-Myanmar border. *Int Health* 2012; 4: 204-9.
16. Bowman KF, Rose JH, Radziewicz RM, O'Toole EE, Berila RA. Family caregiver engagement in a coping and communication support intervention tailored to advanced cancer patients and families. *Cancer Nurs* 2009; 32: 73-81.
17. Howteerakul N, Suwannapong N, Than M. Cigarette, alcohol use and physical activity among Myanmar youth workers, Samut Sakhon Province, Thailand. *Southeast Asian J Trop Med Public Health* 2005;36:790-6.
18. Lin WJ, Jiang RS, Wu SH, Chen FJ, Liu SA. Smoking, alcohol, and betel quid and oral cancer: a prospective cohort study. *J Oncol* 2011; 2011: 525976.
19. Htay SS, Oo M, Yoshida Y, Harun-Or-Rashid M, Sakamoto J. Risk behaviours and associated factors among medical students and community youths in Myanmar. *Nagoya J Med Sci* 2010; 72: 71-81.
20. Kyaing NN. Report on global youth tobacco survey (GYTS) and global school personnel survey (GSPS) 2007 in Myanmar. New Delhi: World Health Organization Regional Office for South-East Asia; 2005.
21. He K, Du S, Xun P, Sharma S, Wang H, Zhai F, et al. Consumption of monosodium glutamate in relation to incidence of overweight in Chinese adults: China Health and Nutrition Survey (CHNS). *Am J Clin Nutr* 2011; 93: 1328-36.
22. Shi Z, Luscombe-Marsh ND, Wittert GA, Yuan B, Dai Y, Pan X, Taylor AW. Monosodium glutamate is not associated with obesity or a greater prevalence of weight gain over 5 years: findings from the Jiangsu Nutrition Study of Chinese adults. *Br J Nutr* 2010; 104: 457-63.
23. Bobowski NK, Mennella JA. Disruption in the relationship between blood pressure and salty taste thresholds among overweight and obese children. *J Acad Nutr Diet* 2015;115:1272-82.
24. Ko-Ko-Zaw, Tint-Swe-Latt, Phyu-Phyu-Aung, Thein-Gi-Thwin, Tin-Khine-Myint. Prevalence of hypertension and its associated factors in the adult population in Yangon Division, Myanmar. *Asia Pac J Public Health* 2011;23: 496-506.
25. Bjertness MB, Htet AS, Meyer HE, Htike MM, Zaw KK, Oo WM, et al. Prevalence and determinants of hypertension in Myanmar - a nationwide cross-sectional study. *BMC Public Health* 2016; 16: 590.