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Comparison of Clients or Patients Attending Monk Healers and Primary Care Clinics in Thailand: A Cross-sectional Study

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ABSTRACT

Objective: This study aimed to compare characteristics of clients or patients presenting to monk healers and primary care health facilities in Thailand. **Methods:** Consecutively attending clients or patients of three monk healers or three health centres were assessed with self-reported measures of health status, symptoms and perceptions. **Results:** The total sample included 1251 participants, 607 from the monk healers and 644 from the health centres. Most participants in the temple and health facility sites were female (76.6% and 72.8%, respectively). Compared to patients attending the health centres, clients of monk healers were younger in age, better educated, and had a higher economic status. The prevalence of heart attack or stroke, emphysema or asthma, sore joints, osteoporosis, cancer, migraine headaches, mental disorder, depression, sleeping problem, and tobacco use problem was significantly higher among clients of monk healers than health care centre patients. While, the prevalence of hypertension and diabetes, was significantly higher among health centre patients than monk healer clients. Main symptoms or problems referring to psychological, social, spiritual, and female genital were significantly more frequent in clients attending monk healers than health centre patients, while main symptoms or problems referring to musculoskeletal, neurological, cardiovascular, digestive, and general and unspecified were significantly more frequent in health centre patients than clients attending monk healers. The causes or aetiology of psycho-social, supernatural and economic were significantly higher among monk healer than health centres clients, while the causes or aetiology behavioural, natural and physical were significantly higher among health centre than monk healer clients. **Conclusion:** The study found a high proportion of psychological, social, spiritual, and female genital problems among clients attending monk healers, calling for an integrated approach of primary health care.

Keywords: *Patient characteristics, Monk healer, Primary care, Thailand*

Introduction

"In Thailand there are 61,416 full-time monks and about 32,000 monasteries. The Sangha (brotherhood of monks) in Thailand consists of about 200,000 monks (full-time and part-time monks) and 85,000 novices at most times of the year." [1] "Many monks who become ordained for their entire lives serve as scholars or teachers, with some specializing in healing, folk magic, fortune telling, and astrology." [1] "Traditional healers, including spiritual, herbal, and monk healers, are distributed all over Thailand" [2]. Buddhist monks who are Thai traditional healers are called maw pra (monk healer) and they provide treatment, including Thai traditional medicine and indigenous practices, to the public at the Buddhist temple where they reside [3,4]. Monk healers treat a variety of ailments, including common mental and substance use disorders in Thailand [5,6]. In a case study of a rural Mahayana Buddhist temple, "it seems that the temple is a primary care center to support physical, mental, and spiritual illnesses. The main therapeutic actions include the following: a) Using a standard Chinese herb regimen for treatment, b) Meditation, and c) Eating vegetarian food." [4] In another case study of a monk healer in central Thailand,

patients are treated with digestive, respiratory, skin, neurological, pain, and muscle symptoms, including temporary paralysis, diabetes, and cancer [3]. In a survey of clients use of traditional and complementary medicine practitioners in Thailand, the most frequently mentioned providers included massage therapist, herbalist, acupuncturist and monk healer [7].

However, little is known about the characteristics of patients that chose traditional health practitioners, such as monk healers, in comparison to patients consulting medical primary care services in Thailand. In a comparative study among patients treated by physicians and folk healers in Taiwan, no differences were found in terms of the socioeconomic status of the attendees between both health systems [8]. However, in terms of sickness type, the prevalence of mild acute, chronic stable, and somatization was significantly higher in patients attending folk healers, and the prevalence of severe acute and chronic acute cases was significantly higher among patients attending physicians [8]. In a study comparing patients attending traditional healers and those attending primary health clinics in urban Tanzania found that the prevalence of having a common mental disorder was significantly higher among traditional healer patients (48%) compared to primary care patients (24%) [9], and in an investigation comparing patients consulting complementary medicine and general practitioners in Germany showed that patients consulting complementary medicine practitioners were more likely to be female, had higher education, had more psychological symptoms and had symptoms for a longer time duration than patients attending general practitioners [10]. This study aimed to compare characteristics of clients or patients presenting to monk healers and primary care health facilities in Thailand.

Methods

Sample and procedure

This is a cross-sectional study of adult patient seeking either care from a monk healer or a health care centre. It was carried out in four districts in the central and eastern region of Thailand. The three temples and three health centres selected were based on purposeful sampling, being the inclusion criteria to have at least five clients or patients a day. Consecutively attending clients or patients of any of the six study sites were recruited into the study over a period of four months in 2018/2019. In each study site, a trained external interviewer (professional nurse) was placed to interview clients or patients on health symptoms and perceptions and collect demographic information after written informed consent was obtained. The descriptions were written down verbatim. The study protocol was approved by the "Office of The Committee for Research Ethics (Social Sciences), Mahidol University (No.: 2017/055.1403)", and study permission was obtained from the study sites. The questionnaire was translated and back-translated by two independent bilingual researchers into the study language Thai. The study questionnaire was pretested for validity on a sample of 30 patients, which do not form part of the final sample.

Measures

Sociodemographic information included, sex, age, marital status, education, religion, and employment status. Economic status was assessed with the question, "Are you in debt?" (Response options: "No, little, high").

Chronic conditions. Clients were asked about 16 health care provider diagnosed chronic conditions, such as asthma, diabetes, emphysema, and hypertension (see Table 2).

Symptoms and explanatory models. A short form of the Short Explanatory Model Interview was used to explore emic perspectives of illness [11], as follows: "1) What have you come to see the doctor/healer/monk/ health care provider about? (List up to three reasons), 2) What do you call these problems? 3) How long ago did you first notice these problems? 4) What is the cause of you getting these problems?"

Data analysis

The sample is described using frequencies, means, and standard deviations. Parametric tests are used for continuous and Pearson chi-square tests for categorical variables. Verbatim descriptions of symptoms or problems and causes or explanatory models were content analysed in Thai and translated to English and back-translated to Thai by two independent bi-lingual experts. The main symptoms or problems were subsequently classified using the International Classification of Primary Care (ICPC2) [12]. The Barts Explanatory Model Inventory was used to classify the perceived causes of main symptoms and problems [13], including Thai culture-specific concepts [14-17] (see Table 3). The coding of individual responses documented in the verbatim scripts were compared for agreement by two independent researchers, and disagreements were discussed and reconciled. The quantitative data were analysed using IBM-SPSS for Windows, version 25 (Chicago, IL, USA).

Results

Sociodemographic sample characteristics of patients or clients

The total sample included 1251 participants (response rate 97%), 607 from the monk healers and 644 from the health centres. Most participants in the temple and health facility sites were female (76.6% and 72.8%, respectively) and all were Buddhists by religion. Compared to patients attending the health centres, clients of monk healers were younger in age, better educated, and had a higher economic status (less debts) (see Table 1).

Table 1 Sociodemographic of participants attending monk healers and primary care health centres (N=1,251)

Variable	Monk healer	Health centre	p-value
	Sample	Sample	
	M (SD)	M (SD)	
Age in years	47.3 (13.8)	53.3 (14.1)	<0.001
	N (%)	N (%)	
All	607	644	
Sex			
Female	465 (76.6)	469 (72.8)	0.254
Male	142 (23.4)	175 (27.2)	
Formal education			
Primary or less	225 (38.5)	404 (64.6)	<0.001
Secondary	185 (31.7)	166 (26.6)	
Post-secondary	174 (29.8)	55 (8.8)	
Marital status			
Single/divorced/separated/widowed	250 (41.7)	145 (22.9)	<0.001
Married	350 (58.3)	489 (77.1)	
Employment status			
No	192 (32.0)	169 (26.4)	0.127
Yes	408 (68.0)	467 (73.6)	
In debt			
No/Little	436 (71.8)	474 (73.6)	0.481
High	171 (28.2)	170 (26.4)	

M=Mean, SD=Standard deviation

Table 2 Chronic conditions in participants attending monk healers and primary care health centres

Variable	Monk healer	Health centre	p-value
	N (%)	N (%)	
High blood cholesterol	115 (19.1)	105 (16.3)	0.182
Migraine headaches	103 (17.1)	79 (12.2)	0.014
Hypertension	102 (17.0)	180 (27.9)	<0.001
Sleeping problem	96 (16.0)	68 (10.5)	0.004
Fatigue disorder	90 (15.0)	102 (15.8)	0.691
Sore joints, e.g., arthritis, gout	71 (11.8)	40 (6.2)	<0.001
Ulcer (a stomach, duodenal or peptic ulcer)	69 (11.5)	69 (10.7)	0.659
Depression	59 (9.8)	39 (6.0)	0.013
Diabetes	52 (8.7)	88 (13.6)	0.005
Heart attack or stroke	48 (8.0)	15 (2.3)	<0.001
Osteoporosis	40 (6.7)	12 (1.9)	<0.001
Cancer or a malignancy of any kind	36 (6.0)	10 (1.5)	<0.001
Emphysema/asthma	34 (5.7)	13 (2.0)	<0.001
Tobacco use problem	32 (5.3)	15 (2.3)	0.005
Mental disorder	24 (4.0)	11 (1.7)	0.014
Pain	23 (3.8)	24 (3.7)	0.917
Alcohol use problem	22 (3.7)	19 (2.9)	0.477
Epilepsy	8 (1.3)	6 (0.9)	0.500

Comorbidities of patients or clients

Among clients attending a monk healer, the highest prevalence of comorbidities was high blood cholesterol (19.1%), followed by migraine headaches (17.1%), hypertension (17.0%) and sleep problems (16.0%), the highest prevalence of comorbidities among health centre patients was hypertension (27.9%), high blood cholesterol (16.3%), fatigue disorder (15.8%) and diabetes (13.6%). The prevalence of heart attack or stroke, emphysema or asthma, sore joints, osteoporosis, cancer, migraine headaches, mental disorder, depression, sleeping problem, and tobacco use problem was significantly higher among clients of monk healers than health care centre patients. While, the prevalence of hypertension and diabetes was significantly higher among health centre patients than monk healer clients (see Table 2).

Main symptoms or problems

For clients of the monk healer, the major main symptom or problem referred to the musculoskeletal system (30.9%), followed by psychological (26.4%), spiritual (25.0%), neurological (13.3%), digestive (8.8%), and social (5.9%).

For example:

"I feel so tired, leg pain, can not get up and unable to walk." (female, 92 years)

"I feel stressed, fatigue, powerless and cannot sleep." (female, 81 years)

"Want to stop smoking methamphetamine, family problems." (male, 26 years)

"To stop smoking and to stop drinking." (male 38 years)

"I am stressed with the illness of my family members, and also have so much debt and problems in my workplace" (female, 44 years)

"I come for creating prestige by making merit and meditation, because I wanted to buy a house." (female, 46 years)

"I wanted to do longevity ceremony, exorcise for making better life, income, health and many other things to become better." (female, 52 years)

"I am come for charitable dedication, make merit, remove karma and be compassionate with people with previous deeds for each other" (female, 61 years)

"I am asking for when I can have a baby, I am so worried that I will not have a baby."(female, 30 years)

"I am coming to have magic water shower because I have been visited by the ghost, so often I feel fatigue, tired and cannot sleep." (female, 67 years)

While for health centre patients, the major main symptom or problem referred to the musculoskeletal system (50.2%), followed by neurological (24.5%), general and unspecified (10.7%), digestive (11.0%), cardiovascular (4.3%), and endocrine/metabolic and nutritional (4.0%).

For example:

"I have fever and too much headache." (female, 59 years)

"I have pain in my shoulders and arm." (female, 47 years)

"I come to receive medication for my hypertension, I feel so bored about everything, sad, uncomfortable, and have numbness in all fingers." (male, 73 years)

"I have pain in my legs, I wanted to have a traditional massage and when I go back home I also wanted to have some medication." (male, 63 years)

"I have flatulence, hypertension. I want to have some herbal medicine and consult about my health." (male, 62 years)

"I come for medication for depression, I can not sleep in the past 4 days, I hear the noise in my ears all the time." (female, 32 years)

"Fever and cough." (female, 48 years)

"Abdominal pain." (female, 54 years)

Main symptoms or problems referring to psychological, social, spiritual, and female genitals were significantly more frequent in clients attending monk healers than health centre patients, while main symptoms or problems referring to musculoskeletal, neurological, cardiovascular, digestive, and general and unspecified were significantly more frequent in health centre patients than clients attending monk healers (see Table 3).

Duration of symptoms/problems

More than half of the monk healer (51.2%) and health centre (52.8%) attendees experienced their main symptom or problem for one year or more. About a third (35.0% of monk healer and 32.3% of health centre attendees) experienced their main symptom or problem for one month or less, and 12.2% of monk healer and 16.5% of health centre attendees experienced their main symptom or problem for 2-11 months.

Cause/aetiology of main symptoms/problems

Among attendees of monk healers, the most prevalent cause or aetiology of the main symptom or problem was psycho-social (38.3%), followed by behavioural (30.1%) and supernatural (21.9%).

For example:

"I was thinking too much about my work, it makes me stressed." (female, 41 years)

"Divorced with my wife, I was so disappointed, my wife has a new husband." (male, 47 years)

"I was working too much and forgot to look after my health." (male, 31 years)

"May be I have the ghost coming to sit and press on my arms." (female, 31 years)

"Ghost and committed sin, and persons with previous deeds on each other from previous life." (female, 60 years)

"I had an artificial abortion, so I come to cut off the karma." (female, 45 years)

"May be because of karma, as eventually my bone became bulging." (male, 55 years)

"The fortune teller told me that I have been disturbed by the ghost and evil spirits." (female, 67 years)

While among health centre patients, the most prevalent cause or aetiology of the main symptom or problem was behavioural (42.4%), followed by physical (27.3%) and psycho-social (23.0%).

For example:

"The cause is I am addicted to alcohol, I wanted to quit, but when I feel craving for drinking alcohol, I am so stressed." (male, 64 years)

"Standing, sitting for a long time." (male, 58 years)

"Eating a lot fast and not chew." (female, 55 years)

"I was thinking too much, no one helps me, I have to look after grandchildren" (female, 68)

"I was working very hard, restless, and never have regular meals." (female, 55 years)

Table 3 Main symptoms/problems

Variable	Monk healer	Health centre	p-value
	%	%	
Musculoskeletal	30.9	50.2	<0.001
Psychological	26.4	1.5	<0.001
Spiritual	25.0	0.0	<0.001
Neurological	13.3	24.5	<0.001
Digestive	8.8	11.0	<0.001
Social	5.9	0.0	<0.001
General and unspecified	5.4	10.7	<0.001
Endocrine/metabolic and nutritional	4.4	4.0	0.089
Female genital	2.9	0.0	<0.001
Cardiovascular	2.5	4.3	0.004
Respiratory	1.0	1.2	0.365
Eye	0.5	0.9	0.876
Blood, blood forming organs and immune mechanism	0.5	0.0	0.342
Skin	0.1	0.3	0.876
Ear	0.0	0.6	0.354
Urological	0.0	0.0	-
Male genital	0.0	0.0	-

Table 4 Cause/aetiology of main symptoms/problems

Variable	Monk healer	Health centre	p-value
	%	%	
Psycho-social (stress, work/family/marital problem, loss/bereavement, trauma/shock)	38.3	23.0	<0.001
Supernatural (destiny/fate, bad luck, *karma (=past actions*))	21.9	1.2	<0.001
Behavioural (diet, substance abuse, imbalance hot/cold, work related strain, accident)	30.1	42.4	<0.001
Natural (wind/weather, climate, astrology)	0.0	6.1	<0.001
Physical (illness, disability, heredity, virus/germ)	7.1	27.3	<0.001
Economic (financial)	2.7	0.0	<0.001

"I built my new house, and a lot in debt, my corps get lower price, make me feel so stressed with my much lower income." (female, 56 years)

"Hereditary." (male, 45 years)

"Stress, family problems." (female, 44 years).

The causes or aetiology of psycho-social, supernatural, and economic were significantly higher among monk healer than health centres clients, while the causes or aetiology, of behavioural, natural and physical were significantly higher among health centre than monk healer clients (see Table 4).

Discussion

Based on our knowledge, this investigation seems to be the first assessing patient/client characteristics (demographics, chronic conditions, main symptom/problem, and perceptions of causes of main symptom/problem) among attendees of monk healers in comparison with health centre attendees in Thailand. We discovered similarities but also a number of major differences between monk health and health centre attendees. Compared to patients attending the health centres, clients of monk healers were significantly younger in age, better educated, and had a higher economic status (less debts), but there were no sex differences. Significantly more clients with psychological, social, spiritual, and female genital problems consulted monk healers compared to health centres. Moreover, clients consulting monk healers seem to have more frequently migraine headaches, cancer, osteoporosis, sore joints, emphysema or asthma, heart attack or stroke, mental disorder, depression, sleeping and tobacco use problems. In terms of long-term complaints, we did not find significant differences between the two client groups. Causative concepts of main symptom or problem differed significantly between the two client groups, with a preponderance of

psycho-social and supernatural causation among monk healer attendees and behavioural and physical causation among health centre attendees.

Previous studies have also shown a higher prevalence of psychological problems among clients of traditional health practitioners compared to primary care attendees. Similar results were found in a study in Tanzania, comparing the prevalence of common mental disorders among attendees of traditional healers and primary care clinics [9], and in Germany, comparing attendees of complementary medicine and general practitioners [10]. It may be that monk healers are better placed to deal with psychological, spiritual and social problems than primary health care providers may. More research is needed on the treatment approach to these cases of monk healers in relation to their diagnosis, management, and treatment outcomes, such as naturalistic prospective investigations [9].

The largest proportion of attendees of both systems (monk and health centre) had symptoms referred to the musculoskeletal system. Similar findings were found among attendees in general practices in the central region of Denmark [18] and attendees of complementary medicine and general practitioners in Germany [10]. In both systems (monk healer and health centre), one of the most popular management of symptoms referred to the musculoskeletal system is Thai traditional massage. For example, massage therapy, including aromatherapy, herbal compression balls, and herbal sauna, was one of the most popular treatments in a monk healer setting in central Thailand [3], and "it is estimated that among Thai people seeking care in public health facilities 10% receive Thai traditional medicine, which may include Thai traditional massage, herbal steam bath, traditional herbal medicines and acupuncture." [19]

Among monk healer attendees psycho-social, behavioural, and supernatural causation were the most prevalent. Supernatural causation may include spirits, black magic, and karma (past actions), e.g., "if the diagnosis is that a patient in some way has offended and angered a spirit, who in retaliation has caused the offender to fall sick, then the curing process may consist of ritual offerings only" [14] In a study among somatoform disorder and first episode depression psychiatric out-patients in North India also a high proportion reported "karma-deed-heredity" as the causal models for their symptoms demonstrating the cultural influence on causal models held [20,21]. A better understanding of the explanatory illness models will help in the provision of culturally acceptable health care [22].

Unlike in previous studies in Taiwan [8] and Germany [10], this study did not find significant differences in the prevalence of long-term complaints between the two health systems. This may be explained by the observation that in both systems different long-term conditions were managed, e.g., psychological, spiritual, and female genitals in monk healer attendees, and, e.g., musculoskeletal, neurological, and cardiovascular in health centre attendees. In addition, clients with long-term conditions, e.g., heart attack or stroke, sore joints, emphysema or asthma, cancer, migraine headaches, tobacco use problem and osteoporosis were more prevalent among monk healer than health centre attendees, and patients with long-term conditions, e.g., hypertension, and diabetes were more prevalent among health centre than monk healer attendees. In addition, as long-term conditions increase with age, attendees of health centres were significantly older in age than attendees of monk healers.

Some previous investigations [7,10,23-25] have shown that female sex, older age, and lower socioeconomic status were associated with more frequent utilization of traditional health practitioners than medical health services, while in this study, younger age, better education, and higher economic status (less debt) were associated with the utilization of monk healers, and there were no significant sex differences in the utilization pattern of traditional and/or complementary medicine providers. Former research in Indonesia [24], Malaysia [23], and Thailand [7] also did not find significant sex differences in the utilization of traditional and/or complementary medicine. It is possible that monk healers, rather than traditional Thai health practitioners, similar to the use of complementary medicine [7,10], are more attractive to young, educated and middle class Thais. Overall, there was a preponderance of female patients in both health service sites. This may be explained by the nature of health centres, being "the first point of contact for the population for preventive, promotive, and basic curative services." [26]

Study limitations

The study was limited by the self-report of the data. Future studies should elicit information on the health seeking pattern and the subjective evaluation of the treatment received.

Conclusions

The study found a high proportion of psychological, social, spiritual, and female genital problems among clients attending monk healers, calling for an integrated approach of primary health care in Thailand.

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Association of Knowledge, Attitude and Practice of COVID-19 Prevention with Anxiety Among Residents of Henan Province, China

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ABSTRACT

Background: Coronavirus disease 2019 (COVID-19) has spread rapidly in cities of central China, including Henan Province, since December 2019. Our study aimed to evaluate the knowledge, attitude, and practice of COVID-19 prevention with anxiety among residents of Henan Province, China. **Methods:** We conducted an electronic survey of 385 residents of Henan Province aged ≥18 years during the period of 3–15 February, 2020. Participants completed a structured questionnaire on the COVID-19 prevention and Zung Self-Rating Anxiety Scale (SAS). Univariate and multivariate logistic regressions was applied to analyze the associations between the explanatory variables and anxiety. **Results:** 360 participants were enrolled into the study, 45 (12.5%) had anxiety during the COVID-19 epidemic. Primary school or lower education (AOR=4.23; 95% CI = 1.01–15.94), unemployed or retired (AOR=3.11; 95% CI=1.02–9.47), rural (AOR = 3.23; 95% CI=1.54–6.29), low-level attitude toward COVID-19 prevention (AOR= 3.22; 95% CI=1.12–7.30), and medium-level practice of COVID-19 prevention (AOR = 3.17; 95% CI=1.08–9.34) were foud to be associated with anxiety. **Conclusions:** Local government and public health agencies need to act as a proactive in the provision of health education about COVID-19 prevention to the residents, particularly who are retired, have low-level education, and living in rural area.

Keywords: *anxiety; China; coronavirus disease 2019; residents.*

Introduction

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a previously unknown coronavirus that emerged in human populations in China in December 2019. Infection by SARS-CoV-2 causes coronavirus disease 2019 (COVID-19), which manifests as a severe acute respiratory infection [1]. World Health Organization (WHO) defined COVID-19 as a new disease related to the acute respiratory epidemic caused by the SARS-CoV-2 virus [2]. As of March 27, 2020, 509,164 COVID-19 cases have been reported globally [3].

The rapidly growing cases come from close contact with the infected person and spread through respiratory droplets generated when coughing, sneezing, or talking. There is also some evidence that contact transmission and aerosol transmission can cause infections in residents [3]. According to the U.S CDC report, the most common symptoms of COVID-19 are fever, dry cough, and tiredness. In severe cases, symptoms such as shortness of breath or difficulty breathing, the new loss of taste or smell, and persistent pain or pressure in the chest will appear. Some people will also have diarrhea, fatigue, nausea or vomiting after 2-14 days of exposure [4].

China is one of the most severely affected countries, with 82,078 people having been diagnosed with the COVID-19 [3]. In response, the World Health Organization (WHO) and the Chinese Center for Disease Control and Prevention (CCDC) have issued guidelines for preventing the rapid spread of COVID-19 [5,6], which include measures suitable for use by the general public.

China's surveillance system for infectious diseases is mainly derived from the national online epidemic reporting system and administrative reports on public health emergencies. When a suspected new type of infection occurs in the infectious disease department of

a local hospital, doctors can report it to the National Center for Disease Control within 4 hours through the national online epidemic reporting system, so that the national health department analyzes the epidemic situation and initiates an emergency plan. At the same time, local hospitals will also report cases to the local health administrative department, so that the local health administrative department can initiate emergency management plans for public health emergencies before the National Health Commission issues corresponding measures. During the outbreak of COVID-19, the private Internet industry, community, district level government, and COVID-19 designated treatment hospital cooperation response mechanism was activated for the first time, in order to enable the public to obtain the updated information on epidemic statistics, suspected cases and suspected infection in the community.

Although China has gradually established a direct network report system for infectious diseases after SARS in 2003, the sudden outbreak still exerts great pressure on the Chinese disease control system. The Hubei, Guangdong, Zhejiang, and Henan are most severely affected provinces in China [7]. These provinces have adopted first-level emergency response policies, including closing inter-city highways, suspending public transportation, closing schools, and colleges, and self-isolation at home, to prevent virus transmission.

A recent study found that the cancellation of public gatherings, suspension of classes, remote working, and self-isolation at home all have a positive effect on people's behaviors in preventing transmission of the coronavirus [8]. However, these measures also impact the emotional and psychological states of people [9].

Knowledge, attitude, and practice are regarded to have a significant impact on understanding the adoption of preventive measures and bridging the gap in providing health information. Given the substantial increase in COVID-19 in Henan Province, it was deemed necessary, and even urgent, to gather data on the current status of residents' knowledge, attitudes and behaviors toward COVID-19 prevention, as well as their anxiety status.

Methods

Study design

The study was a community-based cross-sectional survey.

Study setting

The study settings were 660 communities in Henan Province, central China, which is the most populous province in the country, with a population of 109.06 million, consisting of 69 million adults aged ≥18 years [10].

Inclusion and exclusion criteria

Participants were required to be residents in the community and aged ≥18 years. Individuals who were unable to answer the questions due to mental illness or severe organic disease were excluded.

Study population and sampling technique

Due to the central government's isolation policy during the epidemic, it was not feasible for researchers to collect data through field investigations. For this reason, the researchers used a convenient sampling technique to select 17 communities from five cities in Henan Province as the study sites. Residents aged ≥18 years residing in these communities were chosen as the study population, which amounted to a total of 28,850 persons. Out of which, a sample size of 385 were calculated by population proportion sample size formula and selected by their ID numbers using a simple random sampling technique [10,11].

Data collection procedures

Researchers used an electronic questionnaire to collect data from the participants during the period 3–15 February, 2020. The questionnaire used to collect the data on the study variables was designed by the researchers based on a review of the relevant literature and the guidelines for COVID-19 prevention issued by WHO and the CCDC [5,6]. The sections relating to knowledge about COVID-19 prevention included the following questions.

Knowledge about COVID-19 prevention consisted of ten multiple-choice questions. The total score for such knowledge was 10 for all items (100%), with a score of 1 for each correct answer and 0 for an incorrect answer. Knowledge of residents was classified into three levels according to bloom taxonomy: high-level knowledge for scores in the range 9–10 (80–100%), medium-level knowledge for scores in the range 6–7 (60–79.99%) and low-level knowledge for scores of <6 (<60%).

Attitude toward COVID-19 prevention included ten questions and the answer to each question had three different scores following the Likert scale: "Disagree" = 0; "Neutral" = 1; "Agree" = 2. A high level of attitude had a proportion of more than 80% (>16 score), a medium level of attitude had a proportion of 60–80% (12–16 score), and a low level of attitude had a proportion of less than 60% (<12 score).

The practice of preventing COVID-19 consisted of ten questions, and the answer to each question was assigned to "Always" = 2, "Sometimes" = 1, or "Seldom or none" = 0. Practice was classified into three levels: a high level of practice had a proportion of more than 80% (>16 score), a medium level of practice had a proportion of 60–80% (12–16 score), and a low level of practice had a proportion of less than 60% (<12 score).

A questionnaire was evaluated by three experts based on the Item Objective Congruence (IOC) method and found each item of the questionnaire as congruent (>0.5 IOC score). A pilot study was done among 30 samples and identified the Cronbach Alpha score of the research tool at 0.78.

Researchers used the Zung Self-Rating Anxiety Scale (SAS) to assess the anxiety among residents [12]. This scale is a standard anxiety assessment tool, which has been tested many times in the Chinese population and has a high degree of reliability and validity [13,14]. A score in the 20-44 range means normal, the score in the 45-59 range means mild to moderate anxiety level, the score in the 60-74 range means severe anxiety level, the score in the 75-80 range means extreme anxiety level. In this study, all anxiety levels were combined and considered as anxiety, whereas nomal level considered as no anxiety.

Statistical analysis

Data management and analysis were performed using IBM SPSS Statistics 24.0 (IBM Corp, Armonk, NY, USA). Participants' general characteristics, knowledge, attitude, and practice of COVID-19 prevention were presented using descriptive statistics. We applied univariate and multivariate logistic regression to analyze the association between the explanatory variables and anxiety.

Ethical approval

This study was approved by the Ethics Review Committee of (Confidentiality due to peer review). The formal permission was sought from the respective community administrations to conduct the study. Then, informed written consent was obtained from the participants.

Results

General characteristics

Of the total of 385 respondents to the electronic questionnaire, a total of 360 respondents were enrolled in this study, and 15 individuals were eliminated for the reasons stated above under Inclusion and exclusion criteria, giving a 93.5% response rate. The majority of the participants were female (76.9%), about half were aged 18–24 years, 57.2% were urban-dwelling, 64.7% had a high-school education, 41.9% were students, and 39.7% of participants were working staff (Table 1).

Table 1 Participant demographic information **(**n = 360**)**

Characteristics	n	%
1. Sex		
Male	83	23.1
Female	277	76.9
2. Age group (years)		
18–24	178	49.4
25–44	112	31.1
45–59	16	4.4
≥60	54	15.0
3. Place of residence		
Urban	206	57.2
Rural	154	42.8
4. Education		
Primary school and below	31	8.6
Middle school	49	13.6
High school	233	64.7
Bachelor's degree	47	13.1
5. Occupation		
Student	151	41.9
Working staff	143	39.7
No occupation or retired	66	18.3

Knowledge of prevention of COVID-19 among respondents

From the results, 76.7% of residents had a high-level knowledge of COVID-19 prevention, and 19.7% had a medium-level knowledge. A total of 99.2% of residents knew that masks need to be replaced as soon as they become contaminated. The vast majority of residents (>90%) had a good knowledge of the transmission routes of COVID-19, the cleaning of masks, and the need to keep a safe distance from people in public places. However, regarding methods for inactivating the virus, 37.5% of residents lacked the relevant knowledge (Table 2).

Table 2 Distribution of the knowledge of COVID-19 prevention among respondents **(**n = 360**)**

Characteristics	n	%
1. COVID-19 is sensitive to UV and heat	341	94.7
2. Boiling at 56°C or more for more than 30 minutes, diethyl ether, 75% ethanol, chlorine-containing disinfectant and peroxyacetic acid can all inactivate the SARS-CoV-2 virus	225	62.5
3. COVID-19 is infecting people and spreading easily from person to person	314	87.2
4. Hospitals need to use negative pressure ambulance to transfer patients	259	71.9
5. Antibiotics cannot treat COVID-19	249	69.2
6. Disposable medical masks cannot be used after washing with water	347	96.4
7. Masks need to be replaced as soon as they become contaminated	357	99.2
8. SARS-CoV-2 virus can spread through the respiratory tract and as an aerosol	352	97.8
9. Keep as far away from others as possible in public places	340	94.4
10. Try not to use public transportation. When you have to, try to avoid touching items on the way with your hands	264	73.3

Attitude toward COVID-19 prevention among respondents

In terms of attitude toward the prevention of the spread of COVID-19, 60.3% of residents had a high-level attitude toward prevention, whereas 17.2% had a low-level attitude. More than 90% of people agreed with the wearing of personal protective equipment (PPE) in private cars, 81.9% of residents agreed that daily indoor disinfection could help to prevent the spread of COVID-19, and 49.1% of residents agreed with reducing physical contact, such as hugs, handshakes, etc. (Table 3).

Practice of COVID-19 prevention among respondents

This study confirmed that more than half of the residents (53.3%) had a high-level practice of COVID-19 prevention, and 39.7% had a medium level. More than three-quarters of residents regularly monitored their temperature and use a contactless takeaway or courier service. In contrast, more than 20% of residents never, or seldom, covered their mouth and nose with their elbow, clothes, or a tissue when they coughed or sneezed (Table 4).

Table 3 Distribution of attitudes towards COVID-19 prevention among respondents **(**n = 360**)**

Characteristics	Disagree		Neutral		Agree	
	n	%	n	%	n	%
1. I think regular indoor disinfection every day helps prevent COVID-19 infection	21	5.8	44	12.3	295	81.9
2. I think if nasal congestion, fever and other symptoms are found during the isolation period, you need to go to a fever department in the hospital immediately	32	8.9	43	11.9	285	79.2
3. I think it's best not to go in and out of crowded places during the epidemic	46	12.8	80	22.2	234	65.0
4. I thought that when I have close contacts with infected patients, I need to use a separate toilet	40	11.1	118	32.8	202	56.1
5. I think it's best not to visit your relatives or take part in a party at will during the epidemic	36	10.0	37	10.3	287	79.7
6. I think I should avoid touching elevator buttons directly with my hands	36	10.0	104	28.9	220	61.1
7. I think anyone returning from a high-risk area should stay at home or be quarantined at a designated place for 14 days	14	3.9	68	18.9	278	77.2
8. I think I should reduce physical contact, such as hugs, handshakes, etc.	78	21.7	105	29.2	177	49.1
9. I think private cars should be equipped with personal protective equipment, such as masks and sanitary wipes	14	3.9	18	5	328	91.1
10. I think tableware should be boiled and sterilized for 15 minutes after cleaning food residues	35	9.7	87	24.2	238	66.1

Table 4 Distribution of practices of COVID-19 prevention among respondents

Characteristics	None or seldom		Sometimes		Always	
	n	%	n	%	n	%
1. Keep up to date with the latest situation and news of COVID-19	36	10.0	104	28.9	220	61.1
2. Cover your mouth and nose with your elbow, clothes or a tissue when you cough or sneeze	78	21.7	105	29.2	177	49.2
3. Keep more than one meter away from others in public places	29	8.1	68	18.9	263	73.1
4. Always monitor your temperature	14	3.9	68	18.9	278	77.2
5. In public places, if there is no facility to clean your hands, do not touch your mouth, nose or eyes directly with your hands	35	9.7	87	24.2	238	66.1
6. Pay attention to washing hands frequently and maintaining hand hygiene	7	1.9	112	31.1	241	66.9
7. Wash hands with running water or disinfect with a disposable hand sanitizer as soon as possible after coughing or sneezing	15	4.2	165	45.8	180	50.0
8. Clean or disinfect your phone frequently	65	18.1	116	32.2	179	49.7
9. Wrap it in paper and throw it in the trash when you spit	13	3.6	161	44.7	186	51.7
10. Using a contactless takeaway or courier service	4	1.1	84	23.3	272	75.6

Prevalence and factors associated with anxiety among respondents

The prevalence of anxiety among participants was 12.5%. Five factors were found to be associated with anxiety after controlling all possible confounding variables: educational background, occupation, place of residence, the attitude of prevention COVID-19, the practice of prevention COVID-19. Residents with primary school or a low level of education had greater odds of anxiety than residents who had a bachelor's degree or higher level of education, with ORadj=4.23 (95%CI=1.01-15.94). Unemployed or retired residents had greater odds of anxiety than students, with ORadj=3.11 (95%CI=1.02-9.47). Residents who lived in rural areas had greater odds of anxiety than urban-dwelling residents, with ORadj=3.23 (95%CI=1.54-6.29). Residents who had a low-level attitude toward COVID-19 prevention had greater odds of anxiety than residents who had a high-level attitude toward COVID-19 prevention, with ORadj=3.22 (95%CI=1.12-7.30). Residents who had a medium-level practice of COVID-19 prevention had greater odds of anxiety than residents who had a high-level practice of COVID-19 prevention, with ORadj=3.17 (95%CI=1.08-9.34) (Table 5).

Discussion

This is the first study to have been carried out into the levels of anxiety experienced by Chinese residents in relation to the recent outbreak of COVID-19, and highlights the fact that participants generally experienced an anxiety and had a high level of knowledge about the disease.

Table 5 Logistic regression analysis of anxiety levels among residents

Characteristics	Anxiety		COR[1] (95% CI)	AOR[2] (95% CI)
	Yes; *n* (%)	No; *n* (%)		
Gender				
Male	7 (8.4)	76 (91.6)	1.73 (0.74–4.03)	1.48 (0.67–3.50)
Female	38 (13.7)	239 (86.3)	Reference	Reference
Age				
18–24	15 (8.4)	165 (91.6)	Reference	Reference
25–44	12 (10.7)	100 (89.3)	1.30 (0.59–2.90)	0.58 (0.20–1.68)
45–59	3 (18.8)	13 (81.2)	2.51 (0.64–9.79)	2.16 (0.39–8.22)
>60	15 (27.8)	39 (72.2)	4.18 (1.89–9.27)	2.83 (0.99–8.09)
Educational background				
Bachelor degree or above	6 (12.8)	41 (87.2)	Reference	Reference
High school	14 (6.0)	219 (94.0)	0.44 (0.16–1.20)	0.32 (0.09–1.12)
Middle school	11 (22.4)	38 (77.6)	1.98 (0.67–5.87)	1.33 (0.34–5.19)
Primary school or lower	14 (45.2)	17 (54.8)	5.63 (1.85–17.09)	4.23 (1.01–15.94)*
Occupation				
Student	12 (7.9)	139 (92.1)	Reference	Reference
Working staff	19 (13.3)	124 (86.7)	1.78 (0.83–3.80)	1.61 (0.56–4.67)
No occupation or retired	14 (21.2)	52 (78.8)	3.12 (1.35–7.18)	3.11 (1.02–9.47)*
Place of residence				
Urban	14 (6.8)	192 (93.2)	Reference	Reference
Rural	31 (20.1)	123 (79.9)	3.46 (1.77–6.76)	3.23 (1.54–6.29)*
Knowledge level of COVID-19 prevention				
High	29 (10.5)	247 (89.5)	Reference	Reference
Medium	12 (16.9)	59 (83.1)	1.73 (0.84–3.60)	1.38 (0.54–3.53)
Low	4 (30.8)	9 (69.2)	3.79 (1.10–13.07)	1.77 (0.29–10.66)
Attitude toward COVID-19 prevention				
High	12 (5.5)	205 (94.5)	Reference	Reference
Medium	17 (21.0)	64 (79.0)	4.54 (2.06–10.00)	2.61 (0.87–4.63)
Low	16 (25.8)	46 (74.2)	5.94 (2.63–13.41)	3.22 (1.12–7.30)*
Practice of COVID-19 prevention				
High	12 (6.4)	175 (93.6)	Reference	Reference
Medium	26 (18.4)	115 (81.6)	3.65 (1.79–7.47)	3.17 (1.08–9.34)*
Low	25 (78.1)	7 (21.9)	3.75 (1.20–11.74)	3.25 (0.95–10.81)

[1]COR: Crude odds ratio, [2]AOR: Adjust odds ratio

By reviewing studies carried out during the H1N1 and Middle East Respiratory Syndrome (MERS) outbreaks, we found that the anxiety levels of residents in this study were significantly lower than those in Hong Kong and the Netherlands [15,16]. Compared with similar studies conducted in China during the Asian lineage avian influenza A virus (Asian H7N9) epidemic, our study population also experienced a lower level of anxiety [17]. Media propaganda and government advocacy played obvious major roles in reporting and controlling, respectively, this outbreak. According to the study by Wang et al., 93.5% of Chinese residents obtained information on COVID-19 prevention through the Internet [18], including information on the transmission routes of the disease, the effectiveness of medicines, the correct use of masks, and the distribution of confirmed and suspected cases. In addition, the relevant findings of our study also show that Chinese residents have an adequate level of knowledge about COVID-19 prevention. Increased knowledge has enabled residents to have greater confidence, which relieves anxiety, and to cooperate more fully with government policies to control the spread of COVID-19 [19].

Although most residents have a high-level knowledge on prevention of COVID-19, their attitude and practice toward COVID-19 prevention have apparent deficiencies, which are also significant factors affecting residents' anxiety levels. Our study findings indicate that some residents have a negative attitude and practice toward reducing physical contact, such as hugs, handshakes, cleaning or disinfecting their phones frequently, and covering their mouth and nose with their elbow, clothes, or a tissue when coughing or sneezing. Such an indifferent attitude, deprived knowledge, and negative practice regarding COVID-19

prevention can induce anxiety and have other adverse effects on people's psychology [20]. In the publicity material put out by local media and community workers, too much attention was paid to popularizing the knowledge of COVID-19 prevention and to the numbers of infected people and suspected cases, while advocating the need for residents to be well informed about SARS-CoV-2 and the good behaviors needed to prevent the spread of COVID-19 was ignored. Therefore, while dispersing preventive knowledge, community workers and the media should also strive to correct negative attitudes and educate people in the correct behaviors needed to control the outbreak.

Our research also suggests that educational background is significantly associated with anxiety. Residents with only elementary or no education have less access to information sources and lack the ability to discern the credibility of the limited sources available to them [21]. Compared with people with higher levels of education, they are more likely to be anxious. The majority of people with low-level of education live mainly in rural areas, resulting in differences in anxiety status between residents of urban and rural areas. In the latter, access to Internet information and online health resources is often limited. In the rural areas of Henan Province, the propaganda channels available to rural managers are more about controlling personal exchanges and cutting off Internet traffic. They have focused less on advocating for residents to adopt better personal protective behaviors and methods. This has led to concerns among residents about personal protection, which echoes the findings of Wu et al. on H7N9 [22].

Unemployed and retired residents are more at risk of anxiety. Studies in the UK and the Netherlands have shown that risk perception is a significant factor in determining residents' anxiety levels during outbreaks, and occupational differences have a substantial impact on risk perception [23,24]. In our study, unemployed and retired residents were concentrated among the elderly, who are less able to perceive the risks associated with COVID-19.

Due to various family and professional reasons, students and vocational workers are more sensitive to COVID-19 information compared to unemployed and retired residents; thus, they are more likely to behave more rationally when identifying and absorbing relevant COVID-19 information, which results in lower levels of anxiety.

This study was limited to some extent. Firstly, this study used an electronic questionnaire for data collection. Secondly, some participants who were not computer literate might not have been able to provide accurate information. Qualitative research would also be useful for providing further evidence and greater insight into the knowledge, attitude and practice (KAP) of COVID-19 prevention and its association with anxiety.

Conclusions

This study has provided Henan residents with valuable insights into the KAP of COVID-19 and its association with anxiety. Local government and public health agencies need to be proactive in the provision of health education about COVID-19 prevention to the residents, particularly who are retired, have low-level education, and living in rural area. So, people will be well informed, take necessary preventive measures, and avoid anxiety. The Chinese government, health department, and policy-makers need to refine management measures in response to public health incidents and have timely exchanged epidemic information with countries related to the epidemic to promote risk control. Advanced technologies such as big data information analysis and artificial intelligence can be used for information management in Chinese government health institutions.

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Knowledge and Perception Among Rural Adults toward Passive Smoking Exposure on Children - A Case Study from Bangladesh

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ABSTRACT

Background: Exposure of passive smoking is a key public health issue around the world. The goal of the study was to find out the knowledge and perception among adults towards passive smoking exposure on children in the rural communities of Bangladesh. **Methods:** A descriptive survey was conducted through a self-administrative questionnaire among six villages of Munshiganj District of Bangladesh. A multistage sampling method was used and a total of 410 both smokers and non-smoker's adult males and females participated in the study. Basic socio-demographic characteristics descriptive, statistics were described. Knowledge and perception were analyzed and presented by frequencies, percentages and using a chi-square test. The overall score for each item was presented by means and standard deviations. All analyses were completed at $\alpha = 0.05$ to test the differences between variables. **Results:** Among knowledge items, four variables included; exposer of healthy child on tobacco smoke does not have any effect (p-value=0.019), tobacco smoke exposure causes cancer (p-value=0.048), little exposure has no harm to a child (p-value=0.045), and public smoking is ban in Bangladesh (p-value=0.006) showed a significant difference with exposure and non-exposure of passive smoking. Whereas, for a perception, only a variable indicated law on smoking banning inside home (p-value=0.041) was found significant difference with exposure of passive smoking. **Conclusion:** An appropriate health promotion intervention needs to be implemented further which will help to reduce the exposure rate of passive smoking among children.

Keywords: *Bangladesh, Children, Knowledge, Perception, Passive smoking*

Introduction

Passive smoking exposure is an important public health problem and the exposure is a cause of huge numbers of death each year [1]. Though passive smoking affects humans of every age, children are especially vulnerable for this exposure [2] and the prevalence is significantly high in both developed and underdeveloped countries [3, 4].

There is a significant health effect on children due to exposure to passive smoking. The exposure causes respiratory problems such as asthma, coughing, wheezing as well as lower respiratory infection. The exposure also triggeres ear infection, allergic rhinitis, and dermatitis. Different types of cancer also cause by this exposure [5, 6].

The prevalence of passive smoking among children is potential public health concerns as it was estimated that 41% of children were exposed to secondhand smoking in the United Kingdom, whereas in Australia, it was 43%, 33% in Canada and 12%-34% in the USA. The highest prevalence was 89%in Turkish children [3]. For age above 15 years children, the prevalence was also calculated in Indonesia, which was 80%, while 75% in Vietnam, and 67% in China [4].

Knowledge and perception are two important factors that influence to adopt a healthy behavior [7]. Knowledge is the skill and expertise acquired by an individual through experience or education [8]. Perception is the method by which humans interpret and organize sensations to produce an expressive experience of the world. Perceptions of health also may define as subjective ratings by the affected individual of individual's health status [8, 9].

In Bangladesh, due to the low price and easy availability, the prevalence of tobacco smoking is high [1]. The prevalence of passive smoking among children is also high in both rural and urban areas [10, 11]. Additionally, household smoking is more common in rural area rather than urban area [12]. Despite of having a huge prevalence of passive smoking in South Asia and

South East Asia region, there are very few studies regarding exposure to passive smoking focusing on the child. The prevalence is 38.7% in India and in Myanmar 39.1% and both of these countries shared border with Bangladesh [13, 14]. Having knowledge and perception on passive smoking exposure is essential for behavior change. To our knowledge, in Bangladesh, no study before measured the knowledge and perception of passive smoking exposure on children. The study aimed to find out the knowledge and perception of passive smoking exposure on children in the rural adult communities of Bangladesh thus help to explore the outcome in neighboring countries as well.

Methods

Study Design and Sampling

A descriptive survey had been carried out in six villages of Munshiganj district, Bangladesh from July to October 2018. The multistage sampling method was used to select the villages and the samples. At first, Munshiganj district had been selected through lottery method of simple random sampling from 61 districts of Bangladesh excluding the hilly districts as the ethnic background of the population is different in the hilly area [15]. Then, three sub-districts of Munshoganj district, two unions from each sub-district and one village from each union had been selected through simple random sampling (lottery method). Later, participants from every third household from the selected villages had been nominated through systematic random sampling (Figure 1).

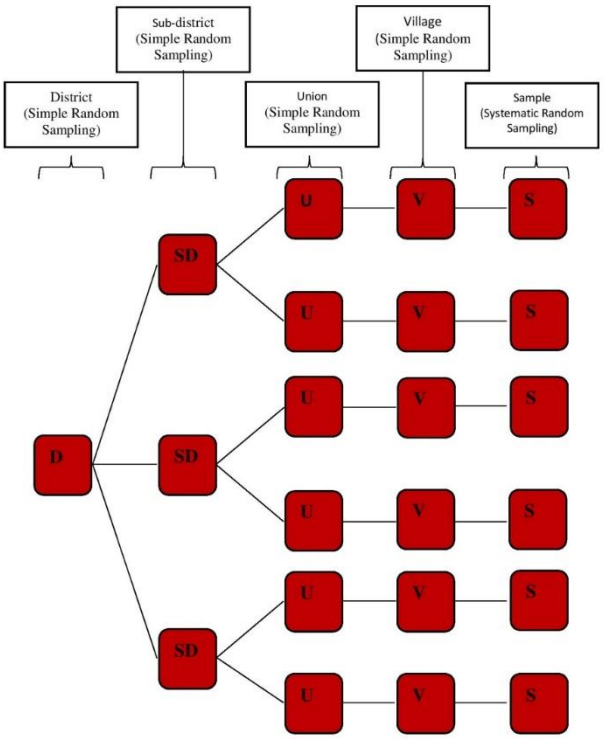

Figure 1 Sampling technique

The targeted populations were both smoker and non-smoker adult male and female of the Munshigonj District of Bangladesh. The total population of the research area was 1,502,449. By using Cochran's formula, 384 respondents had been selected initially. [16]. However, we have taken 10% extra samples and after data cleaning, a 410 samples were finally selected considering the inclusion criteria which was male and female smoker or non-smoker having at least one child in the household. All subjects provided informed consent before participation.

Data Collection

A close-ended self-administrative questionnaire containing four sections including demographics, exposure of passive smoking, knowledge, and perception of passive smoking exposure used to collect the data. Demographic variables consisted of gender, age, education, marital status, religion, occupation, and family income. Exposure of passive smoking indicated as exposure to another person's tobacco smoke in the household more than one day every week for at least 15 minutes daily in the past 30 days [17]. For each answer, a score of 1 (exposed) or 0 (non-exposed) was given. Knowledge was assessed with 9 items true or false questions containing harm, health and, the law of smoking. For each answer, a score of 1 (true) or 0 (false) was given. The perception was measured with 5 items by 3 Likert scale points (3 points for agreeing, 2 points for neutral and, 1 point for disagreeing) [18].

The quality of the research tool was measured by item objective congruence (IOC) and Cronbach's alpha coefficient. For IOC, three experts from the tobacco filed were selected. Both IOC and the overall Cronbach's alpha were calculated as 0.87 and 0.76, respectively which qualified the acceptable criteria [19, 20]. The questionnaire was distributed and collected by the principal researcher. Bengali (National language of Bangladesh) was used as the language of the questionnaire. The study was approved by the Institutional Review Board of Naresuan University, Thailand (COA No. 675/2018, IRB No.0502/61).

Statistical Analysis

The data were analyzed using SPSS version 20 for Windows (IBM Corp., Armonk, NY). To describe basic socio-demographic characteristics, descriptive statistics were used. Knowledge was analyzed and presented by frequencies and percentages. Chi-square test used to compare the proportion of correct knowledge and exposure or non-exposure of passive smoking. Assessment of perception was also carried out by percentages, frequencies and, using a Chi-square test. The overall score for each item was presented by means and standard deviations. All analyses were completed at a 5% level of statistical significance.

respondents. Furthermore, exposer of healthy child on

Table 1 Socio-demographic and socio-economic characteristics of the sample according to passive smoking exposure (n=410)

Characteristics	n	% of n	Expose (%)	Non-expose (%)	P-value
Gender					<0.001[b]
Male	290	70.7	116 (40.0)	174 (600)	
Female	120	29.3	34 (28.33)	86 (71.66)	
Age in year					.051[a]
18-24	38	9.3	17 (44.73)	31 (55.26)	
25-44	205	50.0	66 (32.19)	139 (67.08)	
45-64	157	38.3	60 (38.21)	97 (61.78)	
65+	10	2.4	7 (70.0)	3 (30.0)	
Marital status					0.652[a]
Single	55	13.4	22 (5.36)	33 (8.04)	
Married	355	86.6	128 (31.21)	227 (55.36)	
Education					<0.001[a]
No formal schooling	21	5.1	16 (3.9)	5 (1.2)	
Primary schooling	82	20.0	49 (11.95)	33(8.0)	
Secondary schooling	153	37.31	59 (14.39)	94 (22.92)	
College	53	12.92	16 (3.9)	37 (9.0)	
University	101	24.63	10 (2.4)	91 (22.19)	
Employment					<0.001[a]
Service holder	141	34.4	35 (8.53)	106 (25.36)	
Business	73	17.8	26 (6.34)	47 (11.46)	
Agriculture	84	20.5	52 (12.68)	32 (7.8)	
Unemployed	112	27.3	37 (9.02)	75 (18.26)	
Religion					<0.001[b]
Islam	362	88.3	140 (38.67)	222 (61.32)	
Other	48	11.7	10 (20.83)	38 (79.16)	
Family income in USD					<0.001[a]
Less than 100	124	30.0	52 (41.93)	72 (58.06)	
100-250	186	45.4	78 (41.93)	108 (58.06)	
More than 250	100	24.4	20 (20.0)	80 (80.0)	

[a]p-values from Chi-square tests
[b]p-values from Fisher's exact test

Results

Out of a total of 410 respondents, the majority were male (70.7%) and age more than 30 years (78%). The mean age was 40.39 ± 11.44 years. However, most of the respondents finished below secondary schooling (62.4%) and were Muslim (88.3%). Additionally, 34.4% of the respondents were service holder and 58.7% respondent's family income was less than 200 US dollar (USD). The mean income was 218.06±177.41 USD. Gender (p=0.016), Education (p≤0.001), religion (p=0.010), occupation (p≤0.001) and family income (p≤0.001) showed a significant difference with exposure and non-exposure of passive smoking. Among the respondents, 63.41% were found non-exposed to passive smoking whereas 36.58% responded marked them to expose on passive smoking (Table 1).

Out of the 9 questions of knowledge on passive smoking exposure variable, tobacco smoke causes harm to a child and tobacco smoke exposure causes cancer were most agreed by 99.3% of the respondents. The second most agreed question was tobacco smoke exposure causes asthma by 98.8% respondents. The least agreed question was exposer of a healthy child on tobacco smoke does not have any effect by 47.1% of the tobacco smoke does not have any effect (p=0.019), tobacco smoke exposure causes cancer (p=0.048), little exposure has no harm to a child (p=0.045) and public smoking is ban in Bangladesh (p=0.006) showed a significant difference with exposure and non-exposure of passive smoking (Table 2). The total mean score of knowledge on passive smoking exposure found 6.45±1.07.

Regarding the perception on exposure of passive smoking among children, majority of the respondent form both gender agreed on smoking is harmful for children and parents responsibility to keep away children from tobacco smoking. However, law on smoking banning inside home (p=0.041) was found significant difference with exposure and non-exposure of passive smoking (Table 3) and the total mean score of perception on passive smoking exposure found 14.07±1.25.

Discussion

In Bangladesh, there are very limited studies on passive smoking and the real picture of passive smoking exposure on children of the household related to knowledge and perception is not explored yet. The current study inspected participants' knowledge and

Table 2 Correct knowledge on the exposure of passive smoking among children across gender

Knowledge items	Total, n=410		Male, n=290		Female, n= 120		*P* value
	n (%)	$\bar{X}$ (SD)	n (%)	$\bar{X}$ (SD)	n (%)	$\bar{X}$ (SD)	
Q1	407 (99.3)	.99 (.085)	288 (99.3)	.99 (.083)	119 (99.2)	.99 (.091)	.254
Q2	193 (47.1)	.47 (.500)	137 (47.2)	.47 (.500)	56 (46.7)	.47 (.501)	.019*
Q3	204 (49.8)	.50 (.501)	138 (47.2)	.48 (.500)	66(55.0)	.55 (.500)	.278
Q4	407 (99.3)	.99 (.085)	288 (99.3)	.99 (.083)	119 (99.2)	.99 (.091)	.048*
Q5	405 (98.8)	.99 (.110)	287 (99.0)	.99 (.101)	118 (98.3)	.98 (.129)	.259
Q6	340 (82.9)	.83 (.377)	242 (83.4)	.83 (.372)	98 (81.7)	.82 (.389)	.092
Q7	218 (53.2)	.53 (.500)	161 (55.5)	.56 (.498)	57 (47.5)	.48 (.501)	.045*
Q8	245 (59.8)	.60 (.491)	173 (59.7)	.60 (.491)	72 (60.0)	.60 (.492)	.006*
Q9	229 (55.9)	.56 (.497)	152 (52.4)	.52 (.500)	77 (64.2)	.64 (.482)	.138

* Significant level at ≤ 0.05

Q1: Tobacco smoke cause harm to a child
Q2: Exposer of healthy child on tobacco smoke does not have any effect
Q3: Tobacco smoke exposure causes the respiratory problem of children
Q4: Tobacco smoke exposure causes cancer
Q5: Tobacco smoke exposure causes asthma
Q6: Tobacco smoke has only effect on sick children
Q7: Little exposure has no harm to a child
Q8: Public smoking is ban in Bangladesh
Q9: Selling smoking product under 18 years old is illegal

Table 3 Perception regarding exposure of the passive smoking among children

Perception Items	Male, n=290				Female, n= 120				*P* value
	n(%) Agree	n(%) Neutral	n(%) Disagree	$\bar{X}$(SD)	n(%) Agree	n(%) Neutral	n(%) Disagree	$\bar{X}$(SD)	
Q1	280(96.6)	5(1.7)	5(1.7)	2.95(.290)	117(97.5)	0(0.0)	3(2.5)	2.95(.314)	.548
Q2	249(85.9)	22(7.6)	19(6.6)	2.79(.544)	106(88.3)	8(6.5)	6(5.0)	2.83(.491)	.619
Q3	176(60.7)	68(23.4)	46(15.9)	2.45(.753)	78(65.0)	27(22.5)	15(12.5)	2.53(.710)	.625
Q4	269(92.8)	14(4.8)	7(2.4)	2.90(.369)	115(95.8)	3(2.5)	2(1.7)	2.94(.298)	.041*
Q5	280(96.6)	3(1.0)	7(2.4)	2.94(.322)	113(94.2)	3(2.5)	4(3.2)	2.91(.389)	.816

* Significant level at ≤ 0.05

Q1: Smoking is harmful to children
Q2: Parents can protect their child from tobacco smoke exposure
Q3: Parents have the right to decide whether smoking is allowed in front of a child
Q4: Should have a law of smoking ban inside the home like public place banning
Q5: Parents responsibility to keep away children from tobacco smoking

perception of the exposure of the passive smoking effect on children. Almost all of the respondents (99.3%) recognized exposure to passive smoking is harmful to children. Global adult tobacco survey (GATS) report of 2017 found that the knowledge of the harmful effect of passive smoking among Bangladeshi is 93.1% [21]. The difference may be due to GATS data represented the whole country whereas, this study represented only a specific district. The finding is also in line with another study conducted among Vietnamese showed 83.8% had knowledge on the harmful effect of passive smoking [22].

This study also found that the knowledge regarding the passive smoking consequence of cancer and asthma is high among respondents. The previous study conducted in Bangladeshi adult's also found the same result [23]. This result is also reflected in the same line with the GATS data. Though, in this case, GATS data reflected the overall knowledge of tobacco smoking [21]. Another study in Pakistani women also found the association of high knowledge and lung diseases [24]. Surprisingly, this study found the knowledge regarding healthy child's exposure to passive smoking is low. It may due to this study conducted in the rural area and people of the rural area may not differentiate the tremendous health effect between the healthy and sick child. One of the studies from Brazil also reflected the 52% of the respondents did not believe that their children would suffer [25]. Additionally, the knowledge regarding smoking law was also found low. In Bangladesh, the practice of smoking law is not properly implemented and monitored which may be a cause of low knowledge on smoking laws [26].

The study finding also showed that the majority of the respondents agreed in the statements that smoking is harmful to children and parents' responsibility to keep away children from tobacco smoking. Additionally, introducing a government law to ban smoking inside the household found statistically significant. These results reflected that Bangladeshi people are aware of the effect of passive smoking and also agreed the importance of government law to reduce the rate of exposure rate. The

study also showed significant differences with different socio-demographic variables regarding exposure and non-exposure to passive smoking. Previous research found that male attitude is a significant barrier to reduce passive smoking exposure [10]. Besides that, another study conducted in Bangladesh found higher education is related to reduce exposure of passive smoking [23]. As Bangladesh is a Muslim country, previous study conducted in Bangladesh also emitted that Islamic rules can help to reduce exposure [27]. Additionally, former research confirmed that lower-income has a significant effect on increasing smoking exposure [28].

The study results have certain limitations. The study is cross-sectional in nature and all the variables were measured in a single point of time. Additionally, a self-administrative questionnaire were used which may lead to recall and reporting bias. Despite all the limitations, the research has its strength as it is the reflection of both smoker and nonsmoker populations which helped to get the actual picture of the research objective.

The study concludes that proper measurements need to be taken to improve the knowledge and perception among the rural community to reduce the exposure of passive smoking. An appropriate health promotion intervention needs to be implemented which will help to reduce the exposure rate of passive smoking among children.

Conflict of interest

There is no Conflict of interest by the authors.

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Prevalence and Factor Associated with Falling Among Older Adults in Ban Den San Sai Village, Thung Ko Sub-district, Wiang Chiang Rung District, Chiang Rai Province, Thailand

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ABSTRACT

Background: Falling is an important cause of morbidity and disability among the elderly. **Objective:** The study aimed to estimate prevalence of and determine factors associated with fall among older adults in Ban Den San Sai Village, Thung Ko Sub-District, Wiang Chiang Rung District, Chiang Rai Province, Thailand. **Methods:** An analytic cross-sectional study was conducted. The study setting was Ban Den San Sai Village, Chiang Rai Province. Data were collected between February and April 2020. The general and socio-demographic information were collected by using a validated questionnaire. Chi-square was used to detect the associations between variables at the significant level of α=0.05. **Results:** Seventy older adults aged 60 years or above participated the study; 52.8% were female, 68.6% had no partner. The prevalence of fall in the past six months was 14.2%. Only those who were no-working was found to be associated with fall (p-vlaue=0.001). **Conclusion:** Older adults who do not work need to be given the program of fall prevention.

Keywords: *Fall, Older adults, Factors, Thailand*

Introduction

Falls are the leading cause of injury-related visits to emergency departments in the United States and the primary etiology of accidental deaths in persons over the age of 65 years. The mortality rate for falls increases dramatically with age in both sexes and in all racial and ethnic groups, with falls accounting for 70.0% of accidental deaths in persons 75 years of age and older. Falls can be markers of poor health and declining function, and they are often associated with significant morbidity [1].

Approximately 28.0-35.0% of people aged of 65 and over fall each year increasing to 32.0-42.0% for those over 70 years of age [2]. The incidence of falls appears to vary among countries as well. For instance, a study in the South-East Asia Region found that in China was presented at 31.0% [3] while another, found that in Japan, 20.0% [4] of older adults fell each year. A study in the region of the Americas (Latin/Caribbean region) found the proportion of older adults who fell each year ranging from 21.6% in Barbados to 34% in Chile [5].

Thailand, it will be accounted for 27.0% of older adults falling in 2021 [6]. In a study on mortality rate of falling among older adults in Thailand, the results showed that Chiang Rai Province were ranked in the 5th and reported in the highest rate of fall mortality 22.2 per 100,000 population [7]. We aimed to determine the factors associated with fall among older adults in Ban Den San Sai village, Chiang Rai, Thailand. The results could be used for fall prevention and control measures development in later.

Methods

Study design

Analytic cross-sectional study was conducted. It was used to find the associations between variables. All older adult aged 60 or above who lived in Ban Den San Sai Village were invited to participate in the study. The duration of this study was 2 months; 1st February 2020 – 1st April in 2020.

Study setting

The study was conducted at Ban Den San Sai Village, Thung Ko Sub-district, Wiang Chiang Rung District, Chiang Rai Province, Thailand.

Study population

The study population were older adult aged 60 years or above who lived the study setting at least 12 months prior the study.

Study sample

An older adult aged 60 years or above lived the study setting between February and April 2020 were met the inclusion criteria.

Research instruments

Validated questionnaire was used tocollect information of the participants such as age, sex, marital status, working status, BMI, smoking behavior, personal illness. The questionnaire was tested for validity by three experts in the filed so called the item-objective congruence (IOC). The definition of "fall" was considered as a sudden loss of gait causing the hit of any part of the body to the floor that occurs within the past six months [8-10].

Data collection

Individulas aged 60 years or above lived in the study setting were invited to participate in the study. The verbal consent was obtained from all participants after completion the verbal explianation of the study purpose. Interview lasted for 15 minutes in each.

Data analysis

Data were double-entered into excel spreadsheet. All analyses were done by using the statistical package of the social science (SPSS) version 24. Descriptive statistics were used for explaining the general characteristics of participants. The associations between variables were analyzed by chi-square at significance level of α=0.05.

Ethical consideration

All study protocols and procedures were following the Declaration of Helsinki. Verbal consent was obtained from all participants before the study commenced, after informing them on all essential information of the study. The participation was based on voluntary basis. The participants could stop their participation any time without any adversed consequences. The participations were treated privacy and respectful. Data gained were kept confidentially.

Results

A total of 70 older adults participated in this study; 52.8% were female, 68.6% had no-partner, 68.6% aged >70 years, and 52.9% had normal BMI, 17.1% were smoking, 38.5% were no exercise, 67.1% were working, and 27.1% were mobility problem. 14.2% reported having fall in the past six months (Table.1).

Only working status was found to be significant associated with fall (p-value=0.001). While other factors including sex, age, marital status, BMI, smoking, and indivual illness were not found the significant association with fall.

Table 1 General characteristics, risk behavior, and fall of participants (N = 70)

Characteristic	n	%
Sex		
Male	33	47.1
Female	37	52.8
Marital status		
No partner	48	68.6
With partner	22	31.4
Age group (years)		
≤69	48	68.6
>70	22	31.4
BMI (Body mass index)		
Abnormal	37	52.9
Normal	33	47.1
Smoking		
Yes	12	17.1
No	58	82.9
Working status		
Yes	47	67.1
No	23	32.8
Mobility problem		
Yes	19	27.1
No	51	72.8
Fall (past 6 months)		
Yes	10	14.2
No	60	85.7

Discussion

In our study, it was found that the prevalence of fall among the older adults in Ban Den San Sai Village was 14.2% which is different from the study of Rongmueng et al. [11] which was reported at 26.2%. This maybe because the difference of environmental factors and a large proportion of the elderly in this study were active person. Moreover, in our study we defined fall as losing the balance such that hands, arms, knees, buttocks or body touch or hit the ground or floor that oparticipants would report only serious occurrences but ignoring or underreporting on any non-injurious fall, near falls, or missteps.

The study showed that working status is only a factor that associated with fall in older adults. There were some previous studies showed similar result, which were presented that fall was closely related to inactivite of daily living. Means that those the elderly people who had low daily activity tended to have a greater chance of fall while comparing with those who had high dialy activity such as regularly walk around their home, and exercise [12]. This may be attributed

Table 2 Factor associated with fall among participants.

Variable	Falling present (n = 10) n (%)	Falling absent (n = 60) n (%)	Total	χ^2	*P*-value
Gender					
Male	4 (12.1)	29 (87.9)	33	0.241[a]	0.739
Female	6 (16.2)	31 (83.8)	37		
Age					
≤69	8 (16.7)	38 (83.3)	48	0.758[a]	0.488
>70	2 (9.1)	22 (90.9)	22		
Marital status					
No partner	5 (22.7)	17 (77.3)	22	1.867	0.172
With partner	5 (10.4)	43 (89.6)	48		
BMI					
Abnormal	5 (13.5)	32 (86.5)	37	0.038	0.845
Normal	5 (15.2)	28 (84.8)	33		
Smoking					
Yes	1 (8.3)	11 (91.7)	12	0.469[a]	0.681
No	9 (15.5)	49 (84.5)	58		
Working status					
No	8 (34.8)	15 (65.2)	23	11.753[a]	0.001[b]
Yes	2 (4.3)	45 (95.7)	47		
Mobility problem					
Yes	4 (21.1)	15 (78.9)	19	0.914[a]	0.443
No	6 (11.8)	45 (88.2)	51		

[a]Fisher's exact test; [b]Significant at a=0.05

to the frequent or more movement of the lower limbs greatly aids the blood flow and pressure that maintains adequate perfusion of the brain by assisting in the venous return process and by maintaining the important reflexes that compensate for changes in posture [13]. Moreover, the natural ageing process combined with inactivity can gradually lead to decreased physical performance with the result that many older adults are at increased risk of fall [14].

Conclusions

The prevalence of fall among older adults in Ban Den San Sai Village is high while comparing to some other populations. Inactive working status is indicated as a risk factors of fall. Therefore, older adults with low activities and do not work need to be provided falling prevention program by health professionals.

Limitations

There are some limitations in this study. Participnats were invited from one specific community which might not be able to generaliz to other older adult populations. A cross-sectional study provides a snapshot of the risk profile of those with fall, then to find the associations between variables may not too much strong. Some variables such as biological factors, socioeconomic status, and environment factors were not considered in this analysis.

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Prevalence and Factors Associated with Tobacco Consumption Among People Lived in Pong Klang Village, Pa Daet Sub-district, Mae Suai District, Chiang Rai Province, Thailand

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ABSTRACT

Background: Nowadays, the prevalence of tobacco consumption in Thailand was reported in the decreased trend from 2017 to 2019. However, in the same measure to detect among people living in rural reas in Chiang Rai Province, it was found the increase. **Objective**: This study aimed to determine the prevalence of and determine factors associated with tobacco consumption among people in Pong Klang Village, Mae Suai District, Chiang Rai Province. **Methods**: A cross-sectional study was conducted to gather the information from people aged 15 years and over. Data were collected between March and April 2020. A vailadted questionnaire and ST-5 were used for data collection. Data were described in forms of percentage, mean, standard deviation. Logistic regression was used to detect the associations between variables at the significance level of α=0.05. **Results**: Eighty six people were participated the study; 64,0% were female, and mean of age was 57.6±14.3 years. The prevalence of tobacco consumption was found at 22.1%. In the multivariate model, sex was found to be associated with tobacco consumption; male had a greater chance of tobacco consumption than female with a 7.34 time (95%CI = 2.01-26.86). **Conclusion**: A specific public health intervention is needed to be developed and intervened for reducing tobacco use particularly among males aged 15 years and over.

Keywords: *Tobacco consumption, Prevalence, Factors, Thailand*

Introduction

In 2019, there were 1.12 billion people those aged 15 years and over using tobacco globally, and among those 942 millions were male [1]. In Thailand, more than 10.7 million of people aged 15 years and over were reported in use of tobacco which accounted for 19.1% in 2017 [2]. While in 2018 and 2019, there were reported at 17.5% and 17% respectively [3]. In Chiang Rai Province, the rate of tobacco consumption among people aged 15 to 70 years was 6.4% (44,248 persons) in 2017. While in 2018, it was 9.2% (62,588 persons), and 10.0% (67,702 persons) in 2019 [4].

Mae Suai District is one of 18 districts in Chiang Rai Province, which was reported the tobacco consumption rate among people aged 15 to 70 at 8.3% in 2017. The rates were presented at 8.5% and 11.4% in 2018 and 2019 respectively. There are 7 sub-districts in Mae Suai District, and Pa Daet Sub-district is the second largest in Mae Suai District. The tabacco consumption rates were reported at 8.9%, 6.2%, and 13.2% in 2017-2019, respectively [4].

Pong Klang Village is located in Pa Daet Subdistrict, and many key health indicators were reported under the standard rates of the Ministry of Public Health, Thailan. The study aimed to estimate the prevalence of and determine factors associated with tobacco consumption among people aged 15 years and over lived in Pong Klang Village, Pa Deat Sub-district, Mae Suai District, Chiang Rai Province, Thailand.

Methods

Study design

A cross-sectional study was conducted to collect information from people aged aged 15 years and over lived in Pong Klang Village. The study was conducted between March and April, 2020.

Study setting

Pong Klang, Pa Daet Subdistrict, Mae Suai District, Chiang Rai, Thailand was the study setting.

Study sample

People aged 15 years and over lived in the study setting were eligible to be selected into the study. The

Krejcie and Morgan fomular was used to calculate the sample size, and at least 86 participants required for the analysis.

Research instruments

Validated questionnaire was used to collect the data. It consisted of 9 questions to collect the general information such as sex, age, education, occupatio, etc. In addition, the standard stress test (ST-5) which developed by the Department of Mental Health, Ministry of Public Health was use to destect the level of stress among the participants [6].

Before use for data collection, the questionnaire was piloted in 20 subjects who had similar charactertics with the study participants. The purposes to do the pilot were to improve the reliability and validity of the questionnaire. The Cronbach's alpha coefficient was found at 0.70.

Data collection

The list of people aged 15 years and over was obtained fromvillage headman. All eligible people who met the inclusion critreria were invited to participate in the study. All perticipants were explained about the purposes, process and also other essential information of the study. Before starting the interview, participants were asked their agreement to participate by verbal method. Each interview lasted 15 minutes.

Data analysis

Descriptive data analysis was performed to present percentage, mean, and stadard deviation. Logistic regression was used to dectect the associations between varaibles at the significance level of alpha 0.05.

Ethical consideration

Verbal consent was used to get the agreement from participants after explaining the whole process of the study to the participants. They kept the rights to withdraw from the study in anytime. All obtained data were kept confidnetailly.

Results

A total of 86 participants were recruited into the study; 64.0% were females, and the mean of age was 57.6±14.3 years, 22.1% were underweight and 46.5% were overweight. 39.5% were illiterate, 12.8% were unemployed, and 37.2% were detected having an underlying disease. The tobacco consumption rate was 22.1%, while 54.7% used alcohol, 94.19% had low level of stress, and 5.81% had moderate level of stress (Table 1).

In the simple logistic regression, sex and BMI were found to be associated with tobacco consumption with the OR=8.24 (95%CI=2.58-26.27) and OR=4.12, (95%CI=1.22-13.95), respectively. While age, education, occupation, underlying disease, alcohol use, exercise, and stress level were not found to be associated with tobacco consumption (Table 2).

Table 1 General characteristics of people at Pong Klang village (n=86)

Characteristics	n	%
Sex		
Male	31	36.0
Female	55	64.0
Age (years)		
15-59	57	66.3
≥60	29	33.7
Education		
Yes	52	60.5
No	34	39.5
Occupation		
Employed	75	87.2
Unemployed	11	12.8
BMI		
Underweight	19	22.1
Normal weight	27	31.4
Overweight	40	46.5
Underlying diseases		
Yes	32	37.2
No	54	62.8
Tobacco consumption		
Yes	19	22.1
No	67	77.9
Alcohol use		
Yes	47	54.7
No	39	45.3
Exercise		
Yes	68	79.1
No	18	20.9
Stress level (ST-5)		
Low l	81	94.2
Moderate	5	5.8

In the multiple logistic regression analysis, only sex was found to be associated with tobacco consumption. Males had a greater odds of tobacco consumption than females with a-7.34 time (95%CI=2.01-26.86) (Table 3).

Discussion

In Thailand, the prevalence of tobacco consumption rate in people aged 15 years and over was 17.0% [3]. The prevalence of tobacco consumption was 9.2 % in Chiang Rai Province [4]. We have found that the the tobacco consumption rate among the Thai people living in rural area such as Pong Klang Village is over the provincial and national rates. The rate was found a higher in oder age and those poor education. Moreover, the people in rural Thailand are facing the problem of stress and having high underlining diseases rate which could attributed many health outcomes in later.

Table 2 Univariate analysis of tobacco consumption among person in Pong Klang village (n=86)

Factor	Tobacco consumption		Total	Crude OR (95%CI)	*P*-value
	Yes (n=19)	No (n=67)			
	n (%)	n (%)			
Sex					
Female	5(36.36)	50(63.64)	55	1	
Male	14(45.16)	17(54.84)	31	8.24(2.58-26.27)	<0.001*
Age (years)					
≥ 60	5(17.24)	24(82.76)	29	1	
15-59	14(24.56)	43(75.44)	57	1.56(0.50-4.87)	0.440
Education					
Yes	11(21.15)	41(78.85)	52	1	
No	8(23.53)	26(76.47)	34	1.15(0.41-3.23)	0.790
Occupation					
Employed	17(22.67)	58(77.33)	75	1	
Unemployed	2(18.18)	9(81.82)	11	0.76(0.15-3.85)	0.740
BMI					
Overweight	5(12.50)	35(87.5)	40	1	
Normal weight	10(37.04)	17(62.96)	27	4.12(1.22-13.95)	0.023*
Underweight	4(21.05)	15(78.95)	19	1.87(0.44-7.94)	0.390
Underlying diseases					
Yes	4(12.50)	28(87.50)	32	1	
No	15(27.78)	39(72.22)	54	2.69(0.81-8.98)	0.110
Alcohol consumption					
No	5(12.82)	34(87.18)	39	1	
Yes	14(29.79)	33(70.21)	47	2.89(0.93-8.91)	0.070
Exercise					
Yes	13(19.12)	55(80.88)	68	1	
No	6(33.33)	12(66.67)	18	0.47(0.15-1.50)	0.200
Stress level					
Low	18(22.22)	63(77.78)	81	1	
Moderate	1(20.00)	4(80.00)	5	0.88(0.09-8.33)	0.910

* Significant level at α=0.05

In our study, males had a greater chance to be a tobacco user than females. This coincides with a study conducted in India, it was reported that the prevalence of tobacco use was significantly higher (39.6%) among males when compared to females (5.0%) [7]. It was also supported by a study in Malaysia, males (43%, 95%CI=41.1-44.6) had a greater prevalence to use tobacco than females (1.4%, 95%CI=1.1-1.7) [8]. Many other studies had supported the findings of us as well [9-11].

Other factors were not found the associations with tobacco use among the rural people of Thailand from our study. However, a study in South Africa was clearly presented that age was associated with tobacco use [12]. Those who were older age had a greater chance to use tobacco than younger age group. Many studies were reported on the associations between education and tobacco use particularly those who were poor education were at a higher risk of tobacco use than those having a higher education [13-15]. While some other studies were presented that type of work or occupation were associated with tobacco use [16-18].

In oure study BMI was not detected as the factor associated with tobacco use among the people in rural Thailand which was supported by a study conducted by Zhang [19]. However, a study conducted among the Korean who lived in California, it was found that those who had a low BMI was associated with tobacco consumption and had a greater chance to use tobacco than those who had overweight at 22 times [20].

One very interesting factor that did not see the association in our study was the relationship between tobacco use and having underlying diseases. Since the underlying disease in our study, we focused on asthma, hypertension and diabetes mellitus which are very common among the tobacco users. However, a study conducted in Japan, it was found that underlying diseases was closely associated with tobacco use among the Japanese [21]. Anoether study, it was reported that having asthma was associated with tobacco use significantly [22].

Alcohol consumption was not found to be associated with tobacco consumption in our study. While some other studies were presented that alcohol used was strongly associated with tobacco consumption [23]. In our study, exercise and stress were also detected that there were not associated with tobacco use. However, many other studies were reported the associations between exercise and tobacco use [24, 25]. Jiménez-Treviño, et al. reported that stress

Table 3 Multivariate analysis of factor associated with tobacco use.

Factor	Tobacco consumption		Total	AOR (95%CI)	*P*-value
	Yes (n=19)	No (n=67)			
	n (%)	n (%)			
Sex					
Female	5(36.36)	50(63.64)	55	1.00	
Male	14(45.16)	17(54.84)	31	7.34(2.01-26.86)	0.003*
Age (years)					
≥ 60	5(17.24)	24(82.76)	29	1.00	
15-59	14(24.56)	43(75.44)	57	2.21(0.38-12.72)	0.380
Education					
Yes	11(21.15)	41(78.85)	52	1.00	
No	8(23.53)	26(76.47)	34	1.06(0.21-5.47)	0.940
Occupation					
Employed	17(22.67)	58(77.33)	75	1.00	
Unemployed	2(18.18)	9(81.82)	11	1.65(0.19-14.53)	0.650
BMI					
Overweight	5(12.50)	35(87.50)	40	1.00	
Normal weight	10(37.04)	17(62.96)	27	4.21(0.89-19.97)	0.070
Underweight	4(21.05)	15(78.95)	19	3.99(0.43-36.91)	0.220
Underlying diseases					
Yes	4(12.50)	28(87.50)	32	1.00	
No	15(27.78)	39(72.22)	54	3.8(0.86-16.74)	0.080
Alcohol consumption					
No	5(12.82)	34(87.18)	39	1.00	
Yes	14(29.79)	33(70.21)	47	2.95(0.73-11.96)	0.130
Exercise					
Yes	13(19.12)	55(80.88)	68	1.00	
No	6(33.33)	12(66.67)	18	0.55(0.13-2.24)	0.400
Stress level (ST-5)					
Low	18(22.22)	63(77.78)	81	1.00	
Moderate	1(20.00)	4(80.00)	5	0.53(0.01-26.69)	0.750

* Significant level at α=0.05

was a key factor to contribute tobacco use [26] and it was also supported by a study of Ami Cohen, et al.[27] which was presented in the same direction that stress was associated with tobacco use.

Conclusions

The people live in rural areas of Thailand are using a high rate of tobacco. A large proportion of them are living in poor education and economic status. The stress that driving from daily life and also other factors such as economic constarints are acting as the major contributors to use tobacco. Public health intervention should be developed and implemented to reduce the tobacco consumption rate among the people in rural area particularly those youg adults.

Limitations

Some limitations has been found in this study. First, partcipants were collected from a community then the findings might not be able to generalize to other populations. Second, some variables such as income, maritual status, riligion and ethnic are not included in the analysis, there might impact the results.

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